



Provision of adequate tree seed portfolios



Norway's International
Climate and Forest Initiative
(NICFI)

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PLANNING

Prepared by
World Agroforestry Centre (ICRAF)
in collaboration with the
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Provision of Adequate Tree Seed Portfolios (PATSPO)
to enhance
Productivity and Resilience of Forest Landscape Restoration in
Ethiopia

2017-2020

*Strengthening the Development of
the Green Economy in Ethiopia*

Final proposal

March 2017

Prepared by

World Agroforestry Centre (ICRAF)

in collaboration with the

Ministry of Environment, Forestry and Climate Change of Ethiopia (MEFCC)

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List of abbreviations and acronyms

AOCC	African Orphan Crops Consortium
AWP	Annual Work Plan
BSO	Breeding Seed Orchard
CRGE	Climate Resilient Green Economy
CRPs	Consortium Research Programmes (CGIAR)
CTCN	Climate Technology Centre and Network
EEFRI	Ethiopia Environment and Forest Research Institute
EIAB	Ethiopian Institute of Agricultural Research
ESMF	Environmental and Social Management Framework
FAO	Food and Agriculture Organisation of the United Nations
FERI	Forest Ecosystem Restoration Initiative
FIP	Forest Investment Programme (World Bank)
FRL	Forest Reference Level
GOE	Government of Ethiopia
GPFLR	Global Partnership on Forest Landscape Restoration
GTP	Growth and Transformation Plan
IBC	Institute of Biodiversity Conservation
ICRAF	World Agroforestry Centre
INDC	Intended Nationally Determined Contribution
JICS	Japan International Cooperation System
LFA	Logical Framework Approach
MEFCC	Ministry of Environment, Forest and Climate Change, Ethiopia
NDC	Nationally Determined Contribution
NFP	National Forest Programme
NFG	Norwegian Forestry Group
NGO	Non-Governmental Organisation
NICFI	Norwegian International Climate and Forest Initiative
Norad	Norwegian Agency for Development Cooperation
PATSPPO	Provision of Adequate Tree Seed Portfolios
PCC	Project Coordination Committee
PIP	Project Implementation Plan
PF	Process Framework
PMF	Performance Measurement Framework
PMT	Project Management Team
PR	Progress Report
PSC	Provincial Seed Centres
REDD	Reduced emission from destruction and degradation of forest
RPF	Resettlement Policy Framework
SESA	Strategic Environmental and Social Assessment
TOR	Terms of Reference
TSTC	Tree Seed Technology Coordination of EEFRI
UCPH	University of Copenhagen
UNFCCC	United Nations Framework Convention on Climate Change

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Executive Summary

Restoration of forest and vegetation cover and establishment of new forests and other types of tree cover have probably never been of higher global political concern than at present. The New York Declaration on Forests and Action Agenda announced at the Climate Summit, September 2014, has already been endorsed by 35 national governments and 137 other relevant partners. The Declaration summarizes current goals and challenges related to conservation, restoration and management of forest lands for the benefit of mankind including the huge climate mitigation effect, which relevant action can provide. Among the goals are to restore 150 million ha of degraded landscapes and forest land by 2020 (The Bonn Challenge) and at least an additional 200 million ha by 2030.

The continued destruction of in particular tropical and boreal forest has serious implications for climate change and loss of biological diversity, which are generally acknowledged as global social, economic and environmental problems. The political process has so far resulted in commitments to provide additional funds for forest rehabilitation and mechanisms to prioritize allocation and for monitoring such funds in appropriate ways. The full potential of forests and trees in contributing to green growth is beginning to unfold. The possibility of integrating increasing productivity and improving the environment is unique.

Ethiopia has embarked on one of the globally most ambitious programmes of forest landscape restoration with the recent announcement of a commitment to restore more than 20 million ha of degraded forest landscapes within the next 20 years. Even before this commitment was made, Ethiopia's programme for afforestation and reforestation was one of the world's largest and embedded in Ethiopia's Climate-Resilient Green Economy Strategy (CRGE).

Deforestation and land degradation in Ethiopia are limiting the capacity of forests and the land to contribute to food- and water security and to provide other benefits such as timber, fuel wood, fodder, and environmental services. Ethiopians are facing rapid deforestation and degradation of land resources. Population increases have resulted in extensive forest clearing for agricultural use, overgrazing, and exploitation of existing forests for fuel wood, fodder, and construction materials. Ethiopia's high forest areas have been reduced from 40 percent a century ago to an estimated less than 11 percent today (FAO 2010).

A major challenge of tree based restoration work is that it generally requires the use of many tree species at the same time. Where restoration is based on natural regeneration, it would thus require the presence of healthy and diverse seed sources and/or soil seed banks. When planting is necessary, whether for replenishment or enrichment, the supply of a broad spectrum of genetically diverse, healthy and productive tree species is generally not easily available. Traditional supply programmes focus on relatively few species, most of them of unknown genetic quality and often with insufficient knowledge on adaptation to site conditions and adaptability to climate change.

The present project, Provision of Adequate Tree Seed Portfolios in Ethiopia (PATSPPO), addresses this major challenge by providing a multiple tree species programme able to provide:

- organizational setup of the tree seed sector, including stakeholder identification and roles and responsibilities, based on a sector analysis;
- species specific knowledge for most priority tree species;
- a built up of the tree genetic resources for the future, comprising exploration, mobilisation, conservation, establishment, management and improvement; and

- capacity to monitor and deliver quality seed and seedlings of multiple species required for large scale restoration.

Priority elements highlighted by the Ministry of Environment, Forest and Climate Change in Ethiopia (MEFCC) are the establishment of a functional tree seed system linked to the seed users, the application of quality standards and monitoring of seed collection, seed source mapping and development, guidelines for use, strengthening of the seed research system including staff training and education, and the development and maintenance of appropriate facilities. The project will therefore support the Government of Ethiopia (GOE) in promoting and strengthening the existing tree seed organisations and support to establishment of additional government and private organisations through the provision of relevant information related to all aspects of seed procurement to the major tree seed producers/users and to enhance collaboration (establish a network) between institutions engaged in research and development within the fields of tree seed technology, tree improvement and gene resource conservation.

The project will ensure forest restoration projects and tree planting actors having high quality seed of the most important tree species used for forest landscape restoration and all other tree planting activities in Ethiopia.

The project is designed to support the large forest and landscape restoration programme, which is part of the ‘green growth strategy’ of the GOE. The project will therefore develop along with the development of the national restoration programme. The investment in the four year project phase of the programme is approximately 8 million USD:

The Norwegian International Climate and Forest Initiative (NICFI) under the Norwegian Ministry of Climate and Environment is, as part of its environmental programme in Ethiopia, *i.a.* financing another project addressing tree nursery establishment and tree planting activities in support of the national forest and land rehabilitation programme. This project is being implemented by the Norwegian Forest Group (NFG).

The two projects complement each other in the value chain from quality tree seed, through nursery operation, to tree planting and maintenance. The projects are being implemented in parallel and synergy effects will be capitalised through close collaboration on technical as well as capacity building issues.

Several other restoration projects will be implemented in the years to come as part of a much larger investment portfolio. PATSPO project will ensure access to high quality seeds of the most important tree species used for forest landscape restoration and all other tree planting activities in Ethiopia. PATSPO is therefore one among necessary pre-requisites to achieve the ambitious restoration targets of CRGE. PATSPO will furthermore create capacities enabling that an even higher abatement potential and thus add further to the value of the investment.

The PATSPO project is a four years project financed by NICFI through the Royal Norwegian Embassy in Ethiopia (RNE) to ICRAF Head Quarters in Nairobi. ICRAF is thus responsible for the actual implementation of the project, in full coordination with MEFCC, and answers to NICFI/RNE and GOE (MEFCC).

1. NAME OF APPLICANT

The World Agroforestry Centre – brand name for the International Centre for Research in Agroforestry (ICRAF).

2. LEGAL STATUS

ICRAF is an International Research Organisation, member of the Consortium of CGIAR (Consultative Group on International Agricultural Research) centres.

3. PROJECT TITLE

Provision of Adequate Tree Seed Portfolios (PATSPPO) to enhance Productivity and Resilience of Forest Landscape Restoration in Ethiopia, 2017-2020

4. GRANT SUM APPLIED FOR IN US\$ PER YEAR

	Grand total	2017	2018	2019	2020
Amount in US\$	8,000,000	2,118,690	2,369,654	2,095,685	1,414,082

The budget is further shown in section 10 and *annex 2*.

5. PROJECT BACKGROUND AND JUSTIFICATION

a. Global Context

The continued destruction of in particular tropical and boreal forest has serious implications for climate change and loss of biological diversity, which are generally acknowledged as global social, economic and environmental problems. The political process has so far resulted in commitments to provide additional funds for forest rehabilitation and mechanisms to prioritize allocation and for monitoring such funds in appropriate ways. The full potential of forests and trees in contributing to green growth is beginning to unfold. The possibility of integrating increasing productivity and improving the environment is unique.

Restoration of forest and vegetation cover and establishment of new forests and other types of tree cover have probably never been of higher global political concern than at present. The New York Declaration on Forests and Action Agenda announced at the Climate Summit, September 2014, has already been endorsed by 35 national governments and 137 other relevant partners. The Declaration summarizes current goals and challenges related to conservation, restoration and management of forest lands for the benefit of mankind including the huge climate mitigation effect, which relevant action can provide. Among the goals are to restore 150 million ha of degraded landscapes and forest land by 2020 (The Bonn Challenge) and at least an additional 200 million ha by 2030.

Investments into physical implementation of actual rehabilitation activities is still lacking behind. A possible explanation for this discrepancy between the good intentions and practical implementation may be found in an overlooked factor: At the global level, the theoretical technical knowledge and know-how required may be available, but it is very rarely available for implementation by the practitioners at local level - the basic *technical skills* and the institutions to provide *input supply* for effective rehabilitation are generally lacking.

At the global level it is estimated that 2.2 billion ha of forest landscapes corresponding to almost 20% of global land surface need restoration. In very general terms the task of restoring forest and vegetation cover will occur in different types of landscapes: (i) rehabilitation of natural vegetation; (ii) establishment of other types of forest; and (iii) supporting farmers' tree planting

on agricultural lands. The rehabilitation of landscapes requires coordination of a wide range of activities by a diverse set of actors. The global network of institutions with technical know-how to enhance tree planting in the tropics that was established under the *aegis* of FAO from the 1970's with support from a wide range of donors (e.g. Canada, France, United Kingdom, the Netherlands, Belgium, USA, Norway and Denmark) is today very far from intact – not to say deteriorated; and corresponding national networks in Africa have been severely weakened. There is therefore a need to strengthen an institutional framework with a sufficient capacity to guide and support practical implementation of the huge landscape restoration imperative ahead of us.

The difference in impact between well planned and well implemented restoration and more erratic restoration efforts can easily be in the magnitude of 100%. To be successful restoration will have to provide economic as well as social return, but also provide climate adaption and mitigation. Doubling the mitigation effect of a global restoration programme from 1.5 GtC/year or between 15-20% of current emissions to 3 GtC/year or 30-40 % of current emissions is not an unlikely benefit to achieve by optimizing restoration activities.

There are initiatives that may provide policy as well as implementation guidance, like the Global Partnership on Forest Landscape Restoration (GPFLR) and the Bonn Challenge, the Forest Ecosystem Restoration Initiative (FERI), the Consortium Research Programmes (CRPs) of the CGIAR, the UN REDD programmes, the FAO coordinated National Forest Programmes (NFP), the Norwegian Forest and Climate Initiative (NICFI), the World Bank Forest Investment Programme (FIP) and the Climate Technology Centre and Network (CTCN). Likewise some of the national institutions of the aforementioned global network from the previous century still exist and holds some of the capacity required.

Overall, operational field hubs of input supply to provide for sustainable and economically profitable forest rehabilitation and tree planting in particular in the tropics are, however, missing. This gap needs to be closed if the overall goal of restoring and improving the resilience and productivity of tropical landscapes and ecosystems are to be achieved.

Several countries have made pledges to the Bonn Challenge, currently 39 commitments covering a total of more than 135 million ha have been made (cf. Bonn Challenge website 2017 <http://www.bonnchallenge.org/content/challenge>).

The level of commitment is thus very high, including a number of large scale programmes in Africa of which the largest initiative currently is in Ethiopia.

b. Ethiopian Context

Deforestation and land degradation in Ethiopia are limiting the capacity of forests and the land to contribute to food- and water security and to provide other benefits such as timber, fuel wood, fodder and environmental services. Ethiopians are facing rapid deforestation and degradation of land resources. Population increases have resulted in extensive forest clearing for agricultural use, overgrazing, and exploitation of existing forests for fuel wood, fodder, and construction materials. Ethiopia's high forest areas have been reduced from 40 percent a century ago to an estimated less than 4 percent today. The current rate of deforestation is estimated at 160,000 to 200,000 hectares (ha) per year, and fertile topsoil is lost at an estimated rate of up to 100 tons/ha/year in the highlands, resulting in massive environmental degradation and constituting a serious threat to sustainable agriculture, forestry and green growth development.

To counteract this situation Ethiopia has embarked on one of the globally most ambitious programmes of forest landscape restoration with the recent announcement of a commitment to

restore 20 million ha of degraded forest landscapes within the next 20 years. Even before this commitment was made, Ethiopia's programme for afforestation and reforestation was one of the world's largest and embedded in Ethiopia's Climate-Resilient Green Economy Strategy (CRGE). The current forest area is 12.3 million ha or 11% of the total land area of the country (FAO 2010). Planted forest constitute close to 1 million ha or only 8% of the forest lands.

The green economy strategy of Ethiopia will be based on four pillars:

- “Improving crop and livestock production practices to increase food yields, hence food security and farmer income, while reducing emissions
- Protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks
- Expanding electric power generation from renewable sources of energy fivefold over the next five years for markets at home and in neighbouring countries
- Leapfrogging to modern and energy-efficient technologies in transport, industry, and buildings.”

(Quote from Federal Democratic Republic of Ethiopia,
“The path to sustainable development”, 2011,
cf. Documents consulted, *annex 4*)

Trees and forests have an important role to play in all these four pillars; as an integral part of crop and livestock production systems (agroforestry); for environmental rehabilitation, protection and increase of productivity; in biomass for energy; and in provision of low energy consuming materials.

The diversity of tree species and the quality of their seed and seedlings constitutes the foundation for their adaptation, adaptability and productivity in current and future landscapes.

Based on the CRGE, Ethiopia has submitted its Intended Nationally Determined Contribution (INDC) to the UNFCCC in June 2015, representing a 64 % emissions reduction compared to business as usual by 2030, of which forestry is planned to be responsible for more than half of the reduction. The Forest Reference Emission Level has been estimated at approximately 20Mt CO₂ per year and the Forest Reference Removal Level at approximately 10Mt CO₂ per year (Anonymous 2016). The importance of improving forestry production can thus hardly be over emphasised.

c. Project Justification

Despite the significant planted forest area, most tree plantings in Ethiopia are, however, not as successful as they could be due to technical as well as institutional constraints.

Although the general trend in Ethiopia has been an increase of degraded lands, cases of successful natural regeneration are now emerging. Management of natural regeneration may thus be an important tool for landscape restoration together with tree planting. A major challenge for both cases is to assure availability/supply of seedlings of sufficient quality. In the case of tree planting the nature of this challenge may vary, depending on whether it is large-scale plantation establishment or small holder woodlots and agroforestry.

A huge amount of tree seed is procured and distributed in Ethiopia with the majority of seed used in nurseries (supported by government offices and NGOs) to produce seedlings for planting in small woodlots and other farmland-niches. Additionally a large amount of seedlings is distributed and planted to restore natural vegetation and for watershed protection. Only a very small amount

of seedlings are provided to large scale commercial plantations (mainly replacement plantings after harvests of timber).

Most of the tree seed is supplied through an informal seed system where there is no legal certification. This includes retained seed by farmers, farmer-to-farm seed exchange and cooperative or NGO-based seed multiplication and distribution. The formal seed system, on the other hand, is a system that involves the production and distribution of basic seed, mainly by the research system or certified multipliers, like the Tree Seed Technology Coordination of EEFR (TSTC), the provincial tree seed enterprises and private seed companies.

In general, matching of planting material to planting site is inadequate, leading to huge loss of higher productivity opportunities. Most seed procured by traders is collected from trees in farmlands, urban areas and other compounds, implying that the genetic quality and origin of the seed is not known and performance is suboptimal compared to seed deliberately chosen to match a planting site. Immediate availability of seed rather than site matching (for potential tree productivity) is the overriding factor in the distribution chains. Information about quality is not provided with seed/seedlings distribution and tree planters are not aware of the (lack of) quality of the planting material that they receive.

Last but not least, seed sources for improvement of productivity and product quality is practically non-existent in the sector.

The cost of the planting material to restore 20 million ha of land in Ethiopia over the next 20 years will at current prices of supply be in the order of 70 billion Birr or around 3.5 billion US\$. To ascertain that this investment results in survival and adequate productivity will - based on experience from elsewhere - raise the cost of the planting material in the order of 5%, but also assure survival and physical productivity increases in a magnitude of 60%.

A catalytic investment in this project of less than 0.2% of this total cost during the first four years (2017-2020) of the restoration period will enable these returns to materialize.

In response to the challenges outlined above, the present project document was prepared in a dialogue between MEFCC, ICRAF, and RNE for consideration by NICFI (ICRAF Debriefing Note of 18 February 2015, cf. Documents consulted *annex 4*).

d. Alignment with objectives of Norwegian international cooperation

The Government of Norway's International Climate and Forest Initiative (NICFI) was launched in December 2007, pledging substantial development cooperation funding towards efforts to reduce emissions from deforestation and forest degradation in developing countries (REDD+). The primary objective of the Norwegian Government's climate policy is to play a part in establishing a global, binding, long-term post-2012 regime that will ensure deep enough cuts in global greenhouse gas emissions for the average rise in global temperature to be limited to no more than 2°C above the pre-industrial level.

Sustainable development and poverty alleviation are overarching goals of Norwegian foreign and development policy (Norad ODA). Thus, in addition to the climate-related goals, these are essential goals for NICFI.

The funding shall be used in accordance with the objectives of NICFI and Norad:

- To take early action to achieve cost-effective and verifiable reductions in greenhouse gas emissions from forest and other land uses;
- To promote the conservation of natural forests and maintain their carbon storage capacity by safeguarding natural forests at national level; and

- To contribute to poverty alleviation and sustainable development goals.

The contributions of the project to these three objectives are further explained below.

Reduced emissions

As mentioned above, PATSPO is designed to support the large forest and landscape restoration programme, which is part of the ‘green growth strategy’ (CRGE 2011; GTP II; FRL 2016) of the GOE aiming at a 64 % emissions reduction (INDC, 2015) compared to business as usual (BAU) by 2030, of which the forestry sector is planned to be responsible for more than half of the emission reduction.

Afforestation/reforestation and forest management are the largest potential abatement measures in the forestry sector to this improvement (CRGE 2011), an assessment supported by the scientific literature (*e.g.* for Ethiopia, Watson *et al.* 2013). By 2030 a net emission can be reduced to an annual net sequestration of 42 Mt CO_{2e} based on intervention at 7 million ha. 7 million ha is used as the target for the abatement and economic calculations of CRGE. The actual target is now higher, and figures will therefore likely be higher.

The achievement of the abatement potential will, however, depend on the quality of the planting material, the planting itself, post-planting management and subsequent stand management.

The project will ensure access to high quality seeds of the most important tree species used for forest landscape restoration and all other tree planting activities in Ethiopia. PATSPO is therefore one among necessary pre-requisites to achieve the ambitious restoration targets of CRGE. PATSPO will furthermore create capacities enabling that an even higher abatement potential and thus add further to the value of the investment (ICRAF 2016, *annex 8*).

Safeguarding natural forest

Most remaining natural forests in Ethiopia continue to be under pressure and in a state of degradation. Protection and regrowth of such degraded, often secondary forests, are considered to be one of the most efficient ways of sequestering carbon.

The contribution of the project to this objective is primarily indirect, through the possible land sparing effect of afforestation and reforestation on natural forest lands. Drivers of deforestation are addressed indirectly through the contribution to higher productivity and diversification of tree plantings. This indirect effect depends on integrated policy approaches applied simultaneously to both natural and planted forests (Pirard *et al.* 2016). Rooted in CRGE, the aim of PATSPO is to provide for a national service to support all kinds of forest landscape restoration throughout the country. In line with this, sustainability and safeguard elements have been identified and will be monitored according to national guidelines. In the tree seed sector assessment, a stakeholder engagement approach will be adopted complying with the REDD+ grievance and redress mechanism. Seed sourcing for many tree species will depend on the remaining natural forests. *In situ* conservation, of indigenous priority tree species (genetic resources) identified by the project, will therefore be an important component in the national forest conservation efforts.

Poverty alleviation

To be successful restoration will have to provide climate adaption and mitigation, but also provide economic as well as social return. The positive effect on the carbon balance is as described above relatively easy to quantify, whereas the economic returns often may be more

difficult to estimate. For instance, CRGE (2011) consider that afforestation/ reforestation and forest management initiatives will not yield a positive economic return in the timespan considered due to high investment and operating costs; and concludes that these initiatives need to be supported by grant or pay-for-performance schemes. This is no doubt true in the investment phase. However, in relatively few years, this may be converted to positive incomes for tree planters.

A recent World Bank study shows for instance that trees deliver sizeable economic benefits to rural households (Miller et al 2016). A study published by IUCN (Weldesemaet, 2015) further shows that the annual per hectare net-value (i.e. after restoration costs have been paid back) of restoration in Kanat, Amhara, Ethiopia amounts to a product value income of 6,000 USD per ha per year arising from the tangible production of fodder, fuelwood and timber. Given the uncertain price of carbon credits, the tangible livelihood benefits will constitute the major community incentive for engaging in restoration.

This generation of value happens in the producer link of the value chain, where it will contribute to alleviation of poverty. The contribution of the project is in the input supply link of the value chain, where for instance the careful choice of an adapted variety developed from superior natural provenances versus using any 'landrace' can provide up to four times higher volume growth in the producer link. Producers, whether communities, small scale farmers or more commercial enterprises will benefit many-fold from supply of a diverse set of species for a variety of purposes, carefully selected for the planting site.

6. PROJECT IMPACT, OUTCOME, THEORY OF CHANGE, INCEPTION PHASE, OUTPUTS AND MAJOR ACTIVITIES¹

A major challenge of tree based restoration work is that it generally requires the use of many tree species at the same time. Where restoration is based on natural regeneration, it would thus require the presence of healthy and diverse seed sources and/or soil seed banks. When planting is necessary, whether for replenishment or enrichment, the supply of a broad spectrum of genetically diverse, healthy and productive tree species is generally not easily available. Traditional supply programmes focus on relatively few species, most of them of unknown genetic quality and often with insufficient knowledge on adaptation to site conditions and adaptability to climate change.

The present project addresses this major challenge by providing a multiple tree species programme able to provide:

- organizational setup of the tree seed sector, including stakeholder identification and roles and responsibilities, - based on a sector analysis
- species specific knowledge for most priority tree species, including:
 - the plant ecological base line for restoration
 - the potential natural distribution of multiple species and how they may be affected by climate change
 - DNA-based genetic variation patterns for priority tree species
 - an interactive knowledge and information portal for users
- a built up and establishment of the tree genetic resources for the future, comprising exploration, mobilisation, conservation, establishment, management and improvement
- capacity to monitor and deliver quality seed and seedlings of multiple species required for large scale restoration.

The strategy of the project linking impact, outcome, and outputs is further elaborated in section 10.

a. Impact and Indicators

The Project Impact (development goal) is:

Ethiopia's national forest restoration targets for the next 20 years and beyond are reached.

This is obviously an impact objective which is highly dependent on government and other actors and activities outside of the project's control. However, it is the ultimate impact on society that the project is aiming to contribute to (cf. Executive Summary, "the project is designed to support the large scale forest and landscape restoration programme, which is part of the green growth strategy of GOE"). The project is a long-term investment by which current and future landscape restoration activities in Ethiopia involving the use of trees will be enhanced.

The major Impact Performance Indicators are associated with the substantial landscapes to be restored through planting of trees:

- Area (ha) restored using quality tree seedlings raised from quality tree seed.

¹ The project elements are designed in accordance with "Results Management in Norwegian Development Cooperation", cf. documents consulted, *annex 4*

- Increased survival rate of forest planted using high quality seeds (%) compared to BAU
- Increased productivity of forest planted using high quality seeds (%) compared to BAU.

Obviously, the positive effects of restoration will also manifest in improvements like:

- Water availability increased, soil erosion reduced and agriculture production potential increased in restored landscapes
- Livelihood increased for people living in and around the restored landscapes

The extent to which such effects can be measured will be looked into during the project.

b. Outcome and Indicators

The Project Outcome (project purpose) is:

Tree seed sector in Ethiopia enabled to provide high quality tree seeds of priority species for large-scale restoration plantings.

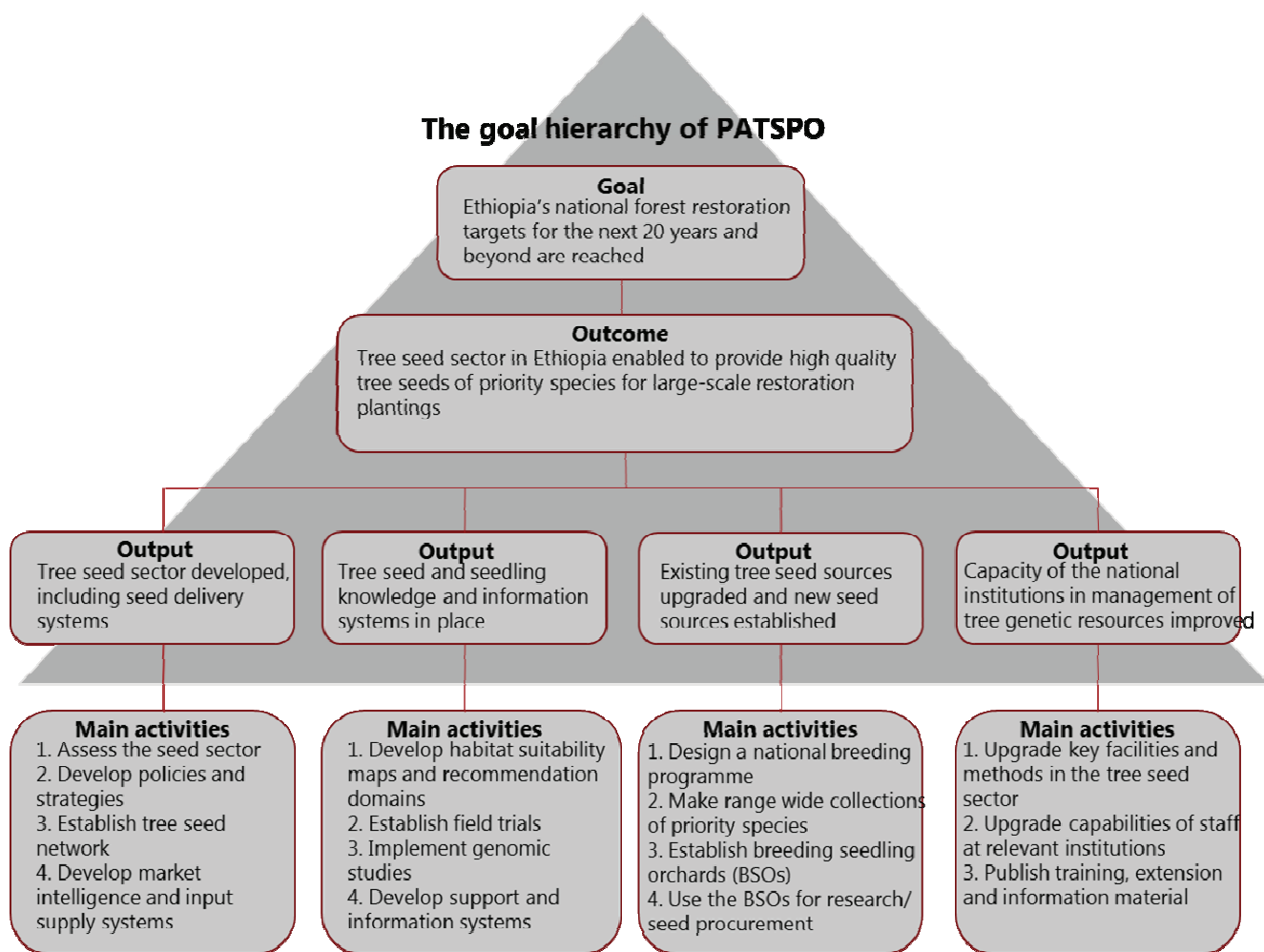
The implication is that improved reproductive material of indigenous and exotic tree species for use in landscape restoration purposes in Ethiopia is explored, characterised, conserved, mass produced and delivered by the tree seed sector.

The major outcome performance indicators are associated with the actual delivery of quality tree seed as a basis for better forest landscape restoration:

- Amount of high quality tree seed of priority species produced
- Amount of high quality tree seed of priority species distributed
- Ratio of supply vs demand of high quality tree seed of priority species

More details on indicators and means of verification for impact, outcome and outputs are given in the Performance Measurement Framework (PMF) in section 10c and *annex 1*. The PMF is a planning framework, similar to the Logical Framework Approach (LFA).

The elements of the results framework, the goal hierarchy, are shown in the following figure, which also encompass the project *theory of change*.



c. Theory of Change, Inception Phase, Outputs and Major Activities

Theory of Change

The fulfilment of the project outcome will ensure forest restoration projects and tree planting actors in general having better information on the best tree species and seed sources to plant/restore (*knowledge of better and larger variety of seeds*). The role of small-scale tree nursery operators within efficient tree seed and seedling systems will be understood and demonstrated and will provide an impetus for actors to negotiate innovations in the agroforestry input supply sector (*better delivery of seed to end-users*). Suggestions will have been provided to policy makers on how to deal with current hurdles within tree seed policies, and collaboration is fostered within the sector, including public-private partnerships (*better regulation of seed production and delivery to end-users*). Breeding seed orchards *cum* conservation stands for important tree species will be established and in production. The value of breeding seed orchards will have been demonstrated and brought to scale (*higher production of quality seed*). Tools will be available to account for the potential effects of climate change when planning for regional tree seed production and distribution – and when planning for tree planting on farms, in restoration and other planting projects (*better match of what to plant where and for what purpose*). A much better general understanding is obtained regarding the usefulness, effectiveness and possible integration of different botanic, genetic and genomic types of surveys for supporting a sustainable use and conservation of socio-economic and ecological important tree species in Ethiopia (*better knowledge base for and ability of making good investments in tree planting and management*).

Through co-development of decision-support tools and by capacity building, national institutions are better able to define priorities and select methods for tree genetic resource management, and more widely and effectively apply approaches to realize faster, more targeted and better-sustained genetic gains during tree domestication (*outcome - amount of high quality tree seed of priority species produced*).

The more efficient delivery pipeline options and delivery support tools for tree-planting materials – developed with the tree seed centers in engagement with policy makers, the private sector, government extension services, and business-development NGOs – enable input suppliers to provide growers with a range of more productive, site-matched tree planting material (*outcome - amount of high quality tree seed of priority species distributed*).

These improved inputs increase the range and yield of tree products (e.g. timber, fuel, fodder, fruits) available for tree growers, supporting their incomes and diets, as well as restoring degraded lands (*impact – more land with higher survival and productivity (economic and environmental)*). When farmers and traders integrate these improved products into value chains, peri-urban and urban consumers benefit through increased supply and reduced unit production costs; and hence lower consumer prices (*impact – better livelihoods*).

Central to the theory of change is the assumption that all stakeholders are able to recognize the value of better planting material, and therefore support pathways to impact. An important role of the project is therefore to characterize and demonstrate this value, which is often not immediately apparent, and how it can be captured and mobilized.

Inception Phase

The implementation of the project will be initiated with a six months inception phase where baseline data will be collected that will inform, and may lead to adjusted, outputs and/or indicators, as further detailed in the following sections. A work plan for the six months inception phase is presented in *Annex 7*.

The major deliverables of the inception phase are:

1. Project organisation and specific job descriptions in place as part of Project Implementation Plan 2017-2020 and Annual Work Programme 2017
2. Priority species and seed demand identified
3. Seed source development plan prepared and initiated
4. Seed delivery options identified/seed delivered
5. Assessment of knowledge and information needs/design of systems and tools
6. Training needs and plan in place
7. Baseline for performance indicators established and a risk assessment and management plan in place.

A formal meeting between RNE and ICRAF will take place at the end of the inception phase, approving the updated log-frame, work plan and if relevant revised budgets all informed by the information and analysis from the inception phase.

Outputs

To meet the project outcome, four Project Outputs and related Major Activities will be delivered by the project:

Output I. Tree seed sector developed, including delivery systems

This output will strengthen the tree seed sector in Ethiopia and gather information on the actual situation in the tree seed sector in Ethiopia. The data compiled will be presented in a ‘Baseline Report’ for the project and form the starting point for the preparation of strategies, definition of roles and responsibilities of the actors in the sector, seed supply-demand modalities, seed source establishment, etc.

The role of the tree seed sector is basically to provide reproductive material for the right tree at the right place for the right purpose. This involves the productive functions of providing good seed and the normative functions of providing standards, guidance and mechanisms to influence and monitor the use of seed.

Seed and seedlings are produced and distributed by people in many different ways. Accordingly, there are numerous actual and potential actors playing a variety of roles. A well-functioning seed system depends on good collaboration among the various actors. Seed production and distribution may become more successful by preparing an investment strategy that takes into account the constraints and opportunities of all the actors and their roles and the potential commercial as well as livelihood benefits from the range of possible tree products. Investments should be based on an overall analysis of the sector, its different functions (seed sources, procurement and distribution), supply channels, and institutions composed of different actors and mechanisms influencing their interaction, as well as estimates of the effects of investments on productivity and quality of tree products on incomes (for agroforestry) and sustainability of plantings (for restoration). In many places the supply of tree seed in forestry has been dominated by the public sector but often restricted to forest plantations. With tree planting increasingly taking place on farm and for environmental protection with involvement of local communities and small scale farmers, more informal and more erratic seed distribution has become dominant with consequential serious losses as described in section 5c above.

Typical immediate areas of action to improve the situation are:

- Immediate and future germplasm sources for particular agroforestry interventions should be determined at the planning stage or as early as possible within the program.
- Consultations among the possible public and private actors involved in germplasm delivery should be undertaken before field implementation of the activities begin
- The participation of small-scale entrepreneurs including commercial nurseries and seed suppliers should be considered.
- A monitoring and evaluation (M&E) protocol to measure the impacts of chosen approaches should be established.

The involvement of the private sector (commercial business as well as civil society organisations) and the public-private partnership is considered of significant importance for sustainability, not the least in the longer term (described further below in the context of the project strategy and project monitoring).

Marketing and sales of tree seed is an important component of the programme. Marketing is a way of promoting and stimulating sales, which creates revenue contributing to the economic

sustainability of the programme. Marketing is also a tool to create awareness of tree seed as a commodity and to make the programme visible as well-known and respected suppliers. In order to achieve sustainability the organizational set-up must allow some of the earning to remain within the programme.

In many areas there is a high awareness of the benefit of having access to trees. Especially in rural areas, trees provide the population with many of its basic needs. To be able to sell tree seed it is of the importance that it is recognized as profitable to plant trees. Those who want to plant trees will normally demand seedlings and not tree seed. Those who demand tree seed are the seedling producers. In marketing, it is essential to focus on the decision makers (the buyers) who are not necessarily the end users. In general, marketing of tree seed is meant to help raise awareness of the advantages of producing seedlings and of where to purchase seed, and in particular to make sure that the producers of seedlings are familiar with and have a positive attitude towards the engagement of the programme in providing appropriate and healthy seed. The link to appropriate knowledge developed under Output II is therefore important.

The qualities of tree seed - physiological and genetically - are hard to recognize immediately. Most likely people's interest in tree seed is not the seed itself, but the products that the trees can give them in the future. So the effect of buying quality seed is first seen after several years. The marketing approach of the programme will be based on the view that the tree planter is looking at trees as an investment. Consequently, the tree planter is expected to be willing to pay for the tree seed. In some areas this may not be the case, at least not immediately, obviously also influenced by the actual ability to pay. The importance of adequate policies including possible incentive schemes to support the use of good material is therefore emphasized. Marketing is then a question of making tree planters able to recognize the advantages in using better seeds for tree planting through extension. The incentive schemes should be seen within the context of the large investment portfolio of forest landscape restoration activities planned by the Government partly based on international funding sources and will therefore be designed and implemented in close collaboration with this investment portfolio under the auspices of MEFCC.

To identify appropriate models for seed supply a sub-sector assessment is a useful tool for developing appropriate business development services. The objective of a sub-sector assessment is to analyse all of the participants, their linkages, and influential factors in the agribusiness system in order to identify constraints and opportunities for growth. The sub-sector review should explore opportunities for leveraged intervention, determining where opportunities for intervention and points of leverage converge.

The Major Activities for Output I are:

1.1 Seed sector assessment: Assessment of the tree seed sector.

1.2 Policies and strategies: Development of appropriate policies, legal framework for and organisation of the tree seed sector as well as strategies for conservation and use of genetic resources of priority species.

1.3 Tree seed network: The establishment of a tree seed network of relevant stakeholders to cover the national seed demand with quality seed of priority species from appropriate seed sources.

1.4 Market intelligence and input supply systems: Demand-supply scenarios developed for all tree species priority groups, based on which location and size of seed sources to be established can be determined, and quality material promoted through the most appropriate channels of supply.

Output II. Tree seed and seedling knowledge and information systems in place

This output will provide the knowledge and information required to establish a national modality for conservation, improvement and utilization of tree genetic resources, leading to establishment of improved seed sources cum conservation areas, as well as delivery of germplasm of the priority tree species in Ethiopia.

The project will develop and test species and provenance specific recommendation domains, combining the expertise of national and international tree seed and research centres, high-resolution present and future climate data sets, species distribution records and new approaches for habitat distribution mapping, recently developed by the partners involved in the project.

A potential natural vegetation map of Ethiopia is available (www.vegetationmap4africa.org), entitled '*Atlas of the Potential Vegetation of Ethiopia*' prepared by some of the project partners (cf. Documents consulted, *annex 4*).

This 'higher resolution' map provides the possibility to model potential natural distribution of species in the landscapes and thus to identify the genealogical baseline of the species considered. They provide the possibility to assess the status of the intraspecific variation of a much larger number of species than would otherwise be considered realistic. The Atlas shows the distribution of about 1200 naturally occurring woody species in Ethiopia. The book on '*Useful Trees and Shrubs for Ethiopia*' (cf. Documents consulted, *annex 4*) describes 421 tree species of which 53 are exotics, but guidelines for their use and sourcing of propagation material is virtually non-existent.

The enhanced map will be relevant for several project activities:

- indicate the position of transitions between areas with significantly different environmental conditions, linked with the distributions of all useful and ecologically important tree species across environmental gradients
- provide a tool for ecosystem restoration, park management, and community conservation in areas surrounding protected areas,
- provide a tool for forecasting the effects of climate change on ecosystems (distribution, composition, and state shifts),
- provide a tool for recommendation domains of indigenous species for use in productive smallholder agroforestry

For the highest ranking priority tree species, the project will refine and test provenance maps using genomic tools and through early-screening trials across environmental gradients. The application of genomics to advance breeding programmes will be done in collaboration with the African Orphan Crops Consortium (AOCC) based at ICRAF in Nairobi, where genome sequencing of promising but underutilized African crops have been initiated in parallel with a programme to educate African plant breeders (African Plant Breeding Academy).

Results will guide the conversion of early-screening into breeding seed orchards providing effective mobilisation of selected, diverse gene pools for wise use in planting programmes across

the region (cf. Output III). The component will enhance the national capacity of governmental and private partners to develop tree seed input supply systems that enable the delivery of superior tree planting materials to smallholder farmers, and forest landscape restoration projects.

Breeding is usually considered to be expensive, possible for a few species only and generally leading to a narrowing of the genetic base in the material deployed for planting. However, none of this needs to be true.

A diversity breeding concept based on the low input breeding model has been developed using the BSO approach enabling the combination of covering many species, maintaining high levels of diversity and providing high productivity gains at relatively low cost. Proof of concept exists e.g. from Denmark and Nepal. The specific models for the priority tree species of Ethiopia will be developed under the inception phase of the project.

The Major Activities for Output II are:

2.1 Habitat Suitability Maps and Recommendation Domains: Development of high resolution habitat suitability maps that delineate species- and provenance-specific recommendation domains for up to 150 priority tree species in Ethiopia.

2.2 Genetic differentiation of selected species based on field trials: Document important patterns of genetic differentiation (in growth, phenology, productivity and health) of selected indigenous species in experimental tests.

2.3 Genetic differentiation of selected species based on genomic studies: Introduce and use genomic studies as a supplement to field testing to clarify genotype by environment patterns and to provide recommendations for practical application of genomic tools for forest genetic resources management in face of climate change.

2.4 Development of a decision support system and interactive information portal: Develop and introduce a user-friendly decision support system and interactive information portal (“choosing your tree for planting”), allowing stakeholders to make informed choices regarding the best-suited tree species and their seed sources location.

Output III. Existing seed sources upgraded and new seed sources established (tree genetic resources for the future mobilised and developed)

This output will identify existing- and establish new seed production *cum* conservation areas of the priority tree species in Ethiopia. The new seed production areas will be established as breeding trials and at the same time serving as seed production areas producing genetically high quality seed. The aim is to make the at any time best quality seed available for tree planting activities in Ethiopia, while at the same time continuously improve the quality of the seed.

The country report of Ethiopia (IBC 2012) prepared for the State of the Worlds Forest Genetic Resources (FAO 2014) mention 395 tree species including 60 exotics (cf. Documents consulted, *annex 4*). Only 9 species have been subject to some level of improvement; however only for 2 species seed production areas are recorded (cf. *annex 5*).

With respect to farmlands, evidence suggests that some tree species have passed through significant genetic diversity bottlenecks, while others have not, depending in part on the primary

function allocated to each species by farmers and the source of planting material. Only a few farmland tree species have been subject to a degree of formal breeding. Even for these species, however, many of the trees found planted in smallholders' fields are 'landraces' of unknown provenance, due to the highly informal nature of germplasm sourcing in the tropical agroforestry sector. Their genetic constitution and correlation to performance behaviour on farm are therefore little known.

The high gains that can be achieved from domestication of trees are well known from plantation forestry. Physical production gains of 30% in a generation turnover and economic internal rates of return in the order of 5-10 % are common. This potential is also available for agroforestry species. High quality reproductive material is, however, rarely available to smallholder farmers. In many cases small farmers rely on a supply from farmland seed sources, grafted fruit seedlings and plantation crops (e.g. for tea, coffee, etc.). Many farmland seed sources and a lot of the vegetative material sourced are of inferior quality and access of small producers to markets therefore severely constrained already by the amount and the quality of their produce. Seed orchards are hardly utilised in agroforestry, because no-one takes responsibility for investment. For vegetative material to be superior, it has to be selected and tested for the purpose and based on a sufficient number of clones to maintain diversity for resilience. Farmland seed sources are often poor, because collection is made from few un-selected individuals, which may even be related (leading to inbreeding depression).

Breeding for smallholders needs to be provided as "a global common good", because the market fails to provide the immediate connection of benefits, despite the obvious advantages to society. A strong public-private partnership where investment in and development of seed sources is done at central level in support of production and distribution at de-central level could be suitable for many trees. Key is that utilisation of quality seed sources needs forward planning, coordination, and investments. It cannot in general be handled efficiently by small individual projects, because planning for quality planting material must be done at a landscape level which requires consensus and extensive coordination considering also climate change. The need to breed for resilience (diversity) is essential.

The Major Activities for Output III are:

3.1 Design of a national breeding programme: Design a national breeding programme for more than 50 priority species, including identification of distribution and deployment zones - also considering climate change aspects.

3.2 Range wide collections of priority species: Make range wide collections of plus tree families (from natural stands as well as possible landraces) complementing existing collections.

3.3 Establishment of breeding seedling orchards (BSOs): Design and establishment of breeding seedling orchards (BSOs – combined provenance/progeny testing and seed production/multiplication/conservation) in relevant deployment zones.

3.4 Assess, manage and use the BSOs for research, breeding and seed procurement

Output IV. Capacity of the national institutions in management of tree genetic resources improved

This output will, through a substantial training and education programme, provide capacity building for all major actors in the tree seed sector in Ethiopia. In addition needed equipment will be made available for the major national and provincial organisations.

The primary focus is on 1) the Tree Seed Technology Coordination of EEFRI (TSTC) and the four Regional Seed Centres to be adequately upgraded, staffed and equipped; 2) that project relevant knowledge and capabilities of staff at all levels among relevant stakeholders are upgraded and maintained; and 3) that relevant technologies and capabilities in appropriate tree seed procurement are imparted to target beneficiaries through training, information, marketing and extension. The intention of this focus is to achieve large scale impact through the technical training.

The overall PATSPO approach will be to focus on training and extension as the main vehicles for raising awareness. The training will primarily (but not exclusively) be directed towards the core institutions which play a normative and supervisory role with regard to tree seed whereas the extension will be broader in scope and in principle be directed towards all important stakeholders in tree seed supply in Ethiopia.

Training and extension activities by the PATSPO will have two major aims, 1) to develop the human resources and increase awareness within the key government institutions involved in tree seed supply, and 2) through training of trainers (ToT) to enable the same institutions, on their own, to carry out training and extension work directed towards the other stakeholders in the tree seed sub-sector.

Technical assistance and advice to technical tree seed supply subjects will be cross-cutting in as much as it will be relevant for and delivered to all major tree seed stakeholders, both directly and through training and extension activities.

The strengthening of the capacity and capabilities of the staff from the primary (STC and regional centre staff) and the secondary (staff of seed producers and suppliers, seed users (nurseries), research, and government administration agencies) target groups will be a continuous activity throughout the project period. The development of these human resources will be achieved partly through provision of opportunities and funding for longer term education, partly through provision of in-service training at all levels through training courses, seminars, workshops, professional attachments, and study tours.

The overall aim of PATSPO training will be to ensure that training is properly matched with institutional and individual needs, individual experience and responsibilities, and prior training and education history of target groups. The point of departure for the PATSPO training programme will therefore be an identification of training needs, based on a formal training needs assessment (TNA). The TNA will be developed by PATSPO in collaboration with target group staff at the regional centres and STC.

The PATSPO extension strategy will focus on two major priorities: 1) the massive production and dissemination of extension materials and messages concerning tree seed supply aspects to tree seed users and producers, and to government staff involved in control, regulation, research, and development of tree seed, and 2) capacity building for selected target group staff in extension

principles, methods, systems, materials, and techniques (cf. Training of Trainers -ToT, mentioned above).

A basic feature of the NICFI support is that it should contribute to building and mobilising national capacity as well as long-term sustainability in the tree seed sector. Consequently some applied research elements and education are parts of the project. The applied research elements are primarily under output III, II and I. There will be no higher education component in the project itself but collaboration will be established with Ethiopian universities, *e.g.* Wondo Genet College under Hawassa University, as well as international universities, *e.g.* University of Copenhagen (UCPH) to provide for relevant twinning arrangements.

Emphasis will be on capacity building at the five operating seed centre units with respect to 1) design the mainstreaming of providing adequate quality of seed delivery in the governance of restoration investments, 2) provide the knowledge extension tools needed to reach the tree planters with adequate information and planting material, and 3) design and manage a multiple species genetic resource improvement and multiplication programme.

The establishment and management of National Tree Seed Programmes covering many species and large environmental variation is a specialized and knowledge-intensive and -dependent field of work. The project will therefore need specialised international technical assistance from the ICRAF Genebank in Nairobi and from the international tree seed unit at University of Copenhagen. The tree gene bank of ICRAF in Nairobi currently handles more than 5000 accessions of about 200 species; and thirty-six field gene bank hubs (similar to the tree seed orchards proposed for Ethiopia) with stands of 44 species are operated in 16 other countries. International Technical Assistance will further be delivered by the University of Copenhagen (UCPH), where the former Danida Forest Seed Centre (DFSC) is embedded. The experience of UCPH/DFSC draws on hands-on work with tree seed programmes in more than 20 tropical countries since the early 1960'ies, and in collaboration with ICRAF since 1991. PATSPO builds on the lessons learned from this large body of work. Local Technical Assistance (LTA) will be engaged and developed as part of the exit strategy.

TSTC has been the major institution for production and distribution of tree seed since 1975 (with initial support from Norway and Denmark). The four provincial tree seed centres were established recently (in Bahir Dar (Amhara), Sebeta (Oromia), Hawasa (Southern Nations, Nationalities, and Peoples' Region –SNNPR) and Mekele (Tigray) with infrastructure support from the Japan International Cooperation System (JICS). These centres need additional equipment to become fully operational. Furthermore, a number of licensed private tree seed suppliers are also operating and tree seed production and distribution is currently dominated by the private sector.

As strongly emphasized by MEFCC, there is an extensive need for capacity building at all levels from extension, over operational tree seed procurement to higher education, with the primary focus on technical capacity.

The Major Activities for Output IV are:

4.1 Rehabilitation, upgrading and maintenance of key facilities and methods in the tree seed sector: Support rehabilitation and maintenance of existing key facilities of the major stakeholders in the tree seed sector (EEFRI and Provincial Seed Enterprises), to cover part of the national seed demand and promote good practices among other seed suppliers in the

private sector. This includes improved methods for documentation and technologies for seed source establishment and management, for collection, handling and storage of tree seed.

4.2 Upgrade knowledge and capabilities of selected staff at relevant stakeholder institutions: Upgrade knowledge and capabilities of selected staff at relevant stakeholder institutions, including research, education and training in relevant methods and relevant technologies in tree seed procurement, as well as extension of knowledge target beneficiaries.

4.3 Prepare, publish and distribute training, extension and information material: Prepare, publish and distribute of training, extension and information material in all aspects of a national tree seed procurement programme, - in large quantities.

A further analysis and prioritization of needs for capacity development in the tree seed sector will be part of the inception phase of the project.

7. PROJECT TARGET AREAS, PRIORITY SPECIES, TARGET BENEFICIARIES AND COMMUNICATIONS

Project target areas

The project is designed to support the large forest and landscape restoration programme, which is part of the ‘green growth strategy’ of the GOE. The project will therefore develop along with the development of the national restoration programme.

The criteria for selection of target areas/institutions are twofold:

- a) Initial priority to areas where the restoration programme is active and consequently require quality tree seedlings and quality seed.
- b) Initial priority to tree seed institutions anchored in the government system or the provincial systems

This means, that the project initially will work with MEFCC, TSTC in Addis Ababa and the four Provincial Seed Enterprises (PSEs) in Amhara, Oromia, Hawasa and Mekele and major NGOs and private companies engaged in tree seed procurement in these locations.

Priority species

Selection of priority species is referred to in the previous section (section 6, under major activities for output I and III) with reference to a preliminary list in *annex 5* (based on the country report of Ethiopia prepared for the State of the Worlds Forest Genetic Resources), and in the performance measurement framework (section 10c).

In addition to the country report on the state of forest genetic resources in Ethiopia, the Tree Seed Technology Coordination of EEFR has compiled relevant information on current seed stands and species trials in Ethiopia which will be an important point of departure for further work on priority setting (TSTC, EEFR 2016).

The identification of important tree species and their genetic resources is a cost/benefit consideration. The main criteria for including species in genetic resource management programmes are their present and their possible future use. There are at least three different ways of assessing priority: (i) Survey of planting areas and value production in planting programmes, (ii) Market survey of forest products consumption, and (iii) User preference measurements. Whenever possible, the three approaches should be combined to give a realistic and valid impression of species priorities. It is especially important to examine carefully the potential of highly valuable species, which may contribute only little to the economy simply because they are rare. Also, the value of locally used species, which are not traded at high prices on international markets, should not be underestimated. Such species may be of major importance for the subsistence of local populations in rural areas. Efforts should also be taken to conserve endangered species, even if they are seen as having little or no utilisation value. However, conservation of such species will typically be integrated in more general nature conservation programmes. The impact of climate change also needs to be carefully considered when providing recommendations for suitability domains (cf. Output II in section 6).

The approach of the project to tackle the immediate demand for quality seed is described under the Project Strategy in section 10a below. For the purpose of assessing future demands (as a basis for design of delivery, breeding, seed source development and conservation programmes) a baseline survey of existing seed sources, existing nursery structure, and species preferences for

the different tree planting activities in the country will be carried out during the initial year of the project. This will require a dialogue with the various tree planting programmes in the country, preference measurements among seed users (participatory approach), and market surveys (cf. the major activities for Output I in section 6, specifically the demand-supply scenarios referred to there).

The huge needs of industrial timber in the country (as shown by the significant net-import of timber) will require specific attention. A particular focus will therefore be given to high-productive, high-quality, short rotation production of relevant timber species in plantations as well as on farm.

Project Beneficiaries/target groups

Beneficiaries appear indirectly from the sections on impact (6a), outcome (6b), partners, roles and functions (9), and sustainability and safeguards (12a).

The various institutions, organisations, projects, and individuals engaged in tree planting will be the immediate beneficiaries. Ultimately, the owners or users of the land will obtain a higher, or an improved yield of products and other benefits from the plantings. The ultimate target groups are thus:

- farmers and communities in rural areas using and planting trees for a multitude of purposes and
- more organised enterprises or agencies, or private investors often undertaking afforestation on a larger scale, for both industrial and environmental purposes.

These groups may raise seedlings in own nurseries, use direct sowing or obtain seedlings from other nurseries. Seed for these purposes may be supplied by the Tree Seed Centres or by other suppliers. The main direct target groups are thus:

- the government, community, non-governmental and private nurseries which should receive a reliable supply of well documented quality seed, and
- other operational seed suppliers which should benefit from the technology development of the project and be addressed to follow the guidelines for good practise provided.

In addition, collaborating institutions in the sector will benefit from direct collaboration with the project, partly in the form of complementary inputs to their respective programmes, partly through the practical application of their work.

Seed collection itself already constitute an important activity for the livelihood of the local population, apart from business (sale to planting projects), seeds of some multipurpose species are also collected for various traditional purposes. The project will contribute positively to the local economy by providing employment in an expanding field.

More indirectly the project will have a positive impact for both rural and urban dwellers depending on forest products, including fuelwood. Forest production and tree planting in general will be improved through the promotion of suitable reproductive material for planting for different purposes.

Finally, society as a whole will benefit from the contribution of the project to increasing production and resilience within the framework of the Green Economy Strategy of Ethiopia.

The project holds a key position in relation to protection and rehabilitation of the environment. Forest genetic resources will be conserved, and the benefits from growing trees - wood production, soil conservation etc. - will be improved through the promotion of reproductive material which is well adapted to the ecological conditions.

Communications

Given the broad societal importance of the project and its focus on knowledge dissemination and capacity building, communication is crucial and is therefore built into all components of the project. In addition to the specific technical communication outputs (*e.g.* in the form of training and extension material, the web portal, technical guidelines, articles, technical briefs and policy briefs), the production of information material for external communication to the international public and in particular the Norwegian public will be an important outreach activity of the project (cf. section 5).

8. PROJECT ORGANISATION, COORDINATION, MANAGEMENT, OFFICE AND STAFFING

Organisation and coordination

As mentioned, the project is designed to support the GOE (MEFCC) in its large forest land rehabilitation programme, in particular through strengthening of the tree seed sector in the country.

NICFI is, as part of its environmental programme in Ethiopia, financing another project addressing tree nursery establishment and tree planting activities in support of the national forest and land rehabilitation programme. This project is being implemented by the Norwegian Forest Group (NFG). The two projects complement each other in the value chain from quality tree seed, through nursery operation, to tree planting and maintenance. The projects are being implemented in parallel and synergy effects will be capitalised through close collaboration on technical issues as well as capacity building issues.

The PATSPO-project is financed by NICFI to ICRAF Head Quarters in Nairobi. ICRAF is responsible for the actual implementation of the project, in full coordination with MEFCC, and answers to NICFI and GOE (MEFCC).

The TSTC under EEFRI in MFECC is the main institution at federal level for the technical aspects of the implementation of the project, as are the four PSCs (Amhara, Oromia, SNNPR, and Tigray) at the regional level. The TSTC will have the normative, coordination and technically supervisory functions towards the PSCs in order to ensure coherence between techniques, methods and standards used in all aspects of the tree seed procurement chain in the country; this is required for the TSTC and PSC to work as one entity allowing for smooth sharing of information and in particular smooth exchange of seed aiming at meeting the seed demand throughout the country in the most optimal way.

A steering committee will be established to ensure the overall guiding management of the project and that the project works within and in support of the GOE policies and strategies, including CRGE, GTP II and INDC/NDC. The steering committee will be chaired by a person nominated by MEFCC and the members will include representatives from the RNE, EEFRI, ICRAF and other relevant organizations, like the CRGE Facility.

A local management team will be established in each of the provinces where the project will have its major activities; initially this means the four provinces (Amhara, Oromia, SNNPR, and Tigray) where the PSCs are established. The major functions of the local management teams will be to ensure close contact between the federal and the regional governments as well as other major stakeholders in the regions, and to ensure close collaboration within the regions between the project, the PSCs and the major stakeholders.

A technical coordinating committee will be established to ensure coordination, collaboration and information exchange among all major stakeholders involved in technical aspect covered by the project implementation. The Director of EEFRI is proposed to chair the technical coordination committee which will include relevant members from MEFCC, Tree Seed Technology Coordination (under EEFRI), Provincial Seed Centres, ICRAF, NFG, NGOs, private seed dealers and other relevant organizations.

The steering committee and the technical coordination committee will both be established (members appointed, TOR prepared, operational modality defined, etc.) and the first meeting will be held during the 6 months inception phase of the project, ref. preliminary WP for the inception phase in *Annex 7*.

As suggested by MEFCC and supported by RNE, an 'FLR information-sharing forum' to be hosted and managed by MEFCC will be established during the 6 months inception period. Such a forum will facilitate that lessons learned from pilot or model projects working with and supporting FLR programmes in Ethiopia, like the NFG project and PATSPO, will be communicated to local/regional and federal government agencies and other relevant stakeholders. The tentative organogram for the coordination of the project is given in *annex 3*.

Based on request from MEFCC and RNE, the PATSPO project will assist in the establishment of the forum. Actual communication will also take place as part of the training and extension activities of PATSPO (see further in section 6 under Output IV on capacity building).

Office and staffing

A Project Management Team (PMT) consisting of project staff from ICRAF/ETH and advisers from ICRAF/NRB and UCPH will be responsible for the management of the project.

The project will operate with an office at the ILRI/ICRAF compound in Addis Ababa as headquarters (HQ), where ICRAF has its country office in Ethiopia; and with units of activity at the EEFRI office and tree seed centre also in Addis (neighbour to ILRI), and at the four regional tree seed centres in Bahir Dar (Amhara), Sebeta (Oromia), Hawasa (Southern Nations, Nationalities, and Peoples' Region –SNNPR) and Mekele (Tigray).

The project is field-work oriented covering a large geographic area. Considerable costs of operation, in particular for the field work, such as seed collection and establishment of seed sources including a considerable amount of staff and temporary labour will be required.

A Senior Team Leader and Technical Advisor will be appointed to lead the programme with support of junior expert. Professional staff at the ICRAF offices in Addis Ababa and in Nairobi (ICRAF Tree Genetic Resource Advisors) will work on the project in accordance with specific job descriptions to be prepared during the inception phase. Specialist in tree genetic resource management (International Tree Genetic Resource Advisors – International Technical Assistance Services) primarily from the University of Copenhagen (operating under a current Memorandum of Understanding between ICRAF and the university) will similarly deliver specified services to the programme.

One professional staff of the ICRAF office will be associated and partly based in each of the four regional centres (ICRAF Tree Genetic Resource Managers) supported by a national counterpart at each centre recruited on a service basis (Local Technical Assistance Services), and by temporary technical staff to guide and implement the expanded activity level of the centres compared to current level of operation.

Other staff at the Seed Technology Division of EEFRI and the four regional centres is employed by their respective units based on their current budgets to implement activities at central level in Addis Ababa and the four regional tree seed centres. The research and development activities will be carried out by staff already in place in the Seed Technology Division of EEFRI. The training

activities will be coordinated by the Project and implemented in cooperation with existing EEFRI staff and staff from other relevant institutions in Ethiopia.

At the central level staff requirements include officers and technicians with competence in project management, seed procurement, seed source development, gene resource conservation, seed technology and outreach. At each of the regional centres staff requirements are similar with an added emphasis on the technical level and skilled labourers for the extended field work. Overall staff is in place but training is required for the programme to scale up. Work process analyses and training needs assessments will be carried out during the inception phase to design the training programme, and prepare for a quality management system and standard operational procedures (see further in section 6, Output 4 on Capacity building).

9. PARTNERS, ROLES AND FUNCTIONS

There are many partners involved in the implementation of the project and the most important ones are: MEFCC (GOE), NICFI, TSTC, PSEs, NGOs, private companies, farmer groups, ICRAF (HQ), ICRAF (ETH) and UCPH. Each partner will have a particular set of roles and functions during the implementation of the project. Some of roles and functions are more general and relate directly to the project, i.e. planning, financing, monitoring, and reviewing, whereas others are more technical and relates to the seed sector in Ethiopia, i.e. normative, controlling, implementing and reporting.

Partnerships and collaboration between the stakeholders involved in the implementation of the project has top priority in order to ensure optimal outputs and efficient use of the projects funds. The project will build on and support already ongoing activities within the tree seed sector in Ethiopia like seed source utilization and establishment, seed collection, seed processing, seed testing, seed storing and seed distribution. In particular the knowledge and experience available at the Tree Seed Technology Coordination at EEFRI will be an important starting point for the project. Seed procurement experiences available with many NGOs (e.g. Farm African) are also important to include in the project implementation.

Also partnerships at local levels will be important for the project, as substantial knowledge and information relevant for the project implementation are nested in local institutions. The project will therefore support the establishment of a network to ensure availability of relevant information related to all aspects of seed procurement to the major tree seed producers/users and to enhance collaboration between institutions engaged in research and development within the fields of tree seed technology, tree improvement and tree genetic resource conservation (cf. section 10a on Project Strategy).

The actual definition of roles and responsibilities will be decided during the inception phase of the project and described in the Project Inception Report and Project Implementation Plan (PIP), cf. section 10b below.

NFG is an indirect partner in the project, as coordination and common activities with the tree nursery/tree planting project will be emphasized. The areas of collaboration will include: i) awareness raising, extension and training; ii) seed availability information; iii) plant production for seed source establishment; iv) tree plantings to demonstrate effect of using quality seed and v) arboretum establishments.

In considering roles and functions, attention will be given to the involvement of women, and youth and advanced age groups and safeguards for this purpose (see section 12).

10. STRATEGY AND PLANNING, MONITORING AND REPORTING MODALITY

a. Project Strategy

The expected *impact* (or *development goal*) of the proposal will be enhanced current and future landscape restoration activities in Ethiopia involving the use of trees. The landscape restoration efforts in Ethiopia include different planting interventions:

- Participatory Forest Management, where the aspect of adding value to current practices is critical
- Assisted Natural Regeneration, including Farmer Managed Natural Regeneration (FMNR), which is one of the most promising strategies for forest landscape restoration, will similarly benefit many fold from enrichment with context specific tree portfolios for provision of more efficient mitigation and added economic value
- Small and large-scale plantation and woodlots led by small holders and the private sector, whether for production of timber, energy wood, food, forage or other non-wood value products
- Agroforestry to enhance agricultural production through soil improvement and agricultural diversification.

Current planting efforts in Ethiopia suffer to a large extent from low survival and low or non-optimal productivity. These problems can be addressed by ensuring:

- Availability of better adapted planting material implying that use of tree species and seed sources are matched to planting site and purpose of planting, mass production and delivery of improved propagation material by seed suppliers, and
- Accessibility of the material from nurseries to tree planters and appropriate post planting management to ensure survival and optimal growth.

The aspects of availability of planting material will be covered by the project (comprising exploration, characterisation, collection, conservation, breeding and mass production of reproductive material of a wide variety of indigenous and exotic tree species of current and future use in the landscape restoration programme of Ethiopia).

The aspects of accessibility of seedlings and post planting management will be covered *i.a.* by the proposed NFG ‘sister’ project as well as a number of other programmes, projects and activities implementing restoration activities in practise, like the Sustainable Land Management Project (SLMP) and the MEFCC/UNDP proposed Forest Sector Development Programme, cf. Documents consulted (*annex 4*). The ‘Provision of Adequate Tree Seed Portfolios’ will constitute a national service to support forest landscape restoration throughout the country.

The expected *outcome* (or *specific project purpose*) of the project will thus be based on the exploration, characterisation, conservation, mass production and delivery of improved reproductive material of indigenous and exotic tree species by the tree seed sector for landscape restoration purposes in Ethiopia now and in the future.

To meet this specific project purpose the four *major outputs* described above have been identified: 1) Seed sector analysis and development including delivery systems, 2) Tree seed and seedling knowledge and information systems, 3) Mobilising and building the tree genetic resources for the future, and 4) Capacity building of the national tree seed sector in Ethiopia.

Some initial work on tree seed and seedling systems in Ethiopia has been made by TSTC in collaboration with *i.a.* ICRAF and the University of Copenhagen, which would provide a starting point for Output I aiming at a transformation of current systems into operational delivery systems of quality material.

Extensive work on the natural vegetation of Ethiopia and the natural distribution of around 1200 tree species has also taken place, *i.a.* in collaboration between the University of Addis Ababa, the University of Copenhagen and ICRAF, and some 400 tree and shrub species have been characterised in terms of use but guidelines for their use, cultivation and sourcing of propagation material in current and future climates are needed. This work will constitute an important base and contribution to Output II.

A status of the tree genetic resources of Ethiopia was prepared by the Ethiopian Institute of Biodiversity Conservation (EIBC) in collaboration with TSTC as part of FAO's State of the World's Forest Genetic Resources published in 2014. Of almost 400 woody species covered by the country report of Ethiopia, more than a 100 is red listed; only 9 have been subject to some level of improvement; and seed production areas are recorded for just 2 of those. There is thus a great need for conservation as well as a huge potential for improvement (Output III).

TSTC has been the major institution for production and distribution of tree seed since 1975 (with initial support from Norway and Denmark). Recently four regional tree seed centres have been established (in Bahir Dar, Sebeta, Hawasa and Mekele) with infrastructure support from the Japan International Cooperation System (JICS). Furthermore, a number of licensed private tree seed suppliers are also operating and tree seed production and distribution is currently dominated by the private sector. As strongly emphasized by MEFCC, there is an extensive need for capacity building at all levels from extension, over operational tree seed procurement to higher education (Output IV).

It is assumed that no single institution in Ethiopia will ever be in a position to control and co-ordinate seed procurement, tree improvement or gene resource conservation at a national scale. The project will consequently emphasise support to the national (TSTC, private companies, NGOs) and provincial institutions (Provincial Seed Enterprises (PSEs), NGOs and private companies), engaged in tree seed procurement. The major support will be given to i) institutional setup; ii) knowledge development, compilation, and dissemination; iii) establishment of seed production cum gene conservation areas and iv) human resource development.

The role of the private sector and the interaction between private business, civil society organisations (NGOs) and the government regulations and institutions are considered of particular importance.

In order to make the best possible use of the resources available and obtain the optimal end product - quality tree seed in sufficient quantities - , it is essential that all major players involved, co-operate and exchange the information available.

Among the priority elements highlighted by MEFCC are the establishment of a functional tree seed system linked to the seed users, the application of quality standards and monitoring of seed collection, seed source mapping and development, guidelines for use, strengthening of the seed research system including staff training and higher education, and the development and maintenance of appropriate facilities.

The strategy for the project is therefore to support the GOE in promoting strengthening of existing tree seed organisations through the provision of relevant information related to all aspects of seed procurement to the major tree seed producers/users and to enhance collaboration (establish a network) between institutions engaged in research and development within the fields of tree seed technology, tree improvement and gene resource conservation.

An overarching principle of the strategy is to build on all existing elements of the existing national tree seed organisations, this is valid for structures as well as for procedures and is perceived in support of ensuring quick impact of the project as well as sustainability of the project activities.

The strategy of the project related to making quality seed available at large scale and at national level is to make the '*at any time best quality seed*' available. In practice this means to make seed available from existing seed sources in Ethiopia, while at the same time identify and establish improved seed stands at various technical levels from identified stands in existing plantations/natural forests to more advanced breeding seedling orchards (BSOs). This strategy leads to a continued availability of better and better quality seed at large scale for tree planting purposes in Ethiopia.

During the inception phase (6 months) the challenge is to make as much quality seed as possible available from existing seed sources for the immediate planting season. In order to meet this challenge the project will assess the volume and quality of seed of the most demanded tree species being available at the major seed producing organizations: EEFRI, Provincial Seed Centres, NGOs (e.g. Farm Africa) and major well reputed private seed dealers. Based on this assessment the project will facilitate exchange of seed between similar agro-ecological zones of Ethiopia in order to meet as large a part as possible of the seed demand in Ethiopia with the best quality seed available. A preliminary work plan for the inception phase is given in *Annex 7*.

Ethiopia has a national target of restoring approximately 1 million ha of forest landscapes per year over the next couple of decades. Calculations in CRGE (2011) are based on about half of that, of which approximately half again is supposed to be actual afforestation and reforestation. To provide meaningful estimates of the seed requirements, it is necessary to have fairly accurate information about the major planting purposes (e.g. timber, fuelwood, shelter), systems (e.g. plantations, woodlots, agroforestry systems), and techniques (seedlings or direct sowing), as well as the species being used, because of a huge variation among species in terms of seed size (from several hundred thousand to a few hundred or even less seed per kg), germination percentage, storability, survival in the nursery and in the field, and thus for replanting purposes. A survey to provide reliable estimates of current and future plant demand is therefore needed before reliable targets can be set, which is why this is planned as part of the inception phase. A conservative estimate to meet about half of the restoration targets with planting will require some 500 million seedlings annually, which using a variety of species with different seed characteristics will amount to some 250 tons of seed per year. Direct sowing of a relatively small area, e.g. 50,000 ha would alone require the same amount. Collection and handling of the right seeds for the right place and the right purpose in such amounts is a huge challenge. But if the initial target is going to be 250 tons per year of 20 species or 1000 tons of only 10 species can only be realistically determined after a survey has taken place.

Initially the project will not establish a formalised network between the institutions being engaged in the different aspect of tree seed, but rather promote collaboration through the implementation of seminars, workshops, training courses and study tours, and through the initiation and co-ordination of research activities of common interest to the stakeholders. The possible establishment of a formalised network and its working modalities will be designed during the course of the project for consideration by MEFCC.

As mentioned above, consideration of gender and age will be important aspects of the strategy for stakeholder participations, as will the involvement of people of different ethnicities and socioeconomic backgrounds (see further in section 12).

b. Project Planning

The Project Document is prepared to meet the requirements of GOE and according to Norad guidelines for project preparation, which are based on *result- and risk management* using *logical planning models* (i.e. the Logical Framework Approach (LFA) for planning and reporting purposes). The project will use these models for planning-, monitoring- and reporting purposes following current Norad Guidelines, referred to earlier (cf. also Documents consulted, *annex 4*).

Project Implementation Plan:

During the inception phase of the project a long term Project Implementation Plan (PIP) shall be prepared. The PIP will set out the strategic planning framework for the implementation of the project, and based on the Project Document. The major activities identified in the Project Document and the PIP is broadly defined and valid for the entire project period.

Key elements to be included in the PIP are:

- Project implementation strategies and priorities clearly described;
- A project planning matrix which identifies and describes the relation between the development objective, the immediate objectives, the outputs, and the activities of the project. The indicators and assumptions related to the individual objective and output, will further be identified and described as will the inputs and assumptions related to the individual activities;
- A description and scheduling of project outputs;
- A description and scheduling of major project activities;
- A quantification and scheduling of major inputs, including a manning schedule for national staff (incl. TORs);
- A programme for technical assistance (long and short term) to the project including a manning schedule and draft TORs for key international staff;
- A specific outline of target groups for the projects training and extension activities, possible technical fields, possible locations, likely number of activities each year and likely number of participants each year;
- A plan and programming of project monitoring and supervision with an indication of milestones.

A possible format (table of contents) for the PIP is included in *annex 6*.

Annual Work Plans (AWPs):

Work plans will be prepared by the PMT on an annual basis, based on the project documentation and the PIP. The work plan will be submitted to the PCC for review and, following this, to the MEFCC and NICFI. The aim of the annual work plan is be to break down the main project

activities into sub-activities, to define the inputs required for the successful implementation of these activities (including provision of technical assistance), to assign implementation responsibility to individual staff and stakeholder organisations, and to schedule activities and inputs in time (including a manning schedule for short term technical assistance).

A possible format (table of contents and matrix) for the AWP is included in *annex 6*.

c. Project Monitoring and Reporting

Monitoring

The monitoring modality described in this section is related to the implementation of the project, but as the project is anchored in and implemented in close collaboration with the TSTC and the PSCs, which are the GOEs key institutions in the tree sector, the monitoring modality will build on the monitoring system presently used by these institutions. The project will support the TSTC and the PSCs in further developing their monitoring system to meet the requirements of the MEFCC while at the same time feeding into the project's monitoring system, which will meet the requirements of NICFI as well as MEFCC.

Overall monitoring of inputs, outputs, progress, and assumptions will be undertaken by the PMT, while the project staff and individual advisers will be responsible for monitoring the implementation of specific activities.

Monitoring will be a continuous process which will be intensified at certain points in time (milestones). Such milestones will be established in more detail during the planning of annual activities. An important part of project monitoring is communication with all involved parties and stakeholders who should be kept informed about the project progress via project reports, meetings, and seminars. Potential problems of a technical or organisational nature can thus be dealt with immediately.

Input and progress monitoring of the supported institutions and organisations (TSTC, PSEs, NGOs etc.) will be undertaken in connection with visits by project staff and advisers.

The PCC will play an important role with regard to monitoring of project implementation. Before each meeting by the PCC the project will submit copies of any new reports and technical documents. Part of the PCC's standard agenda will be to review the project progress, including bottlenecks and constraints and ways to overcome these. Both NICFI, represented by the RNE and GOE, represented by MEFCC, will be members of the PCC.

Performance Management Framework

Monitoring of activities and progress will be based on the indicators specified in the overall Performance Measurement Framework and the implementation schedules contained in the annual work plans.

Performance Measurement Framework (PMF) impact and outcome level is shown in the table below. The full Performance Measurement Framework (PMF) is given in *annex 1*.

Planning Level	Performance Indicators	Means of Verification	Frequency	Responsibility
<u>Impact</u> Ethiopia's national forest restoration targets for the next 20 years and beyond are reached	Area restored using quality tree seedlings raised from quality seed	MEFCC and project statistics	Yearly	ICRAF/MEFCC
<u>Outcome</u> Tree seed sector in Ethiopia enabled to provide high quality tree seeds of priority species for large-scale restoration plantings.	Amount of quality tree seed of priority species made available for restoration plantings in Ethiopia	Statistics from stakeholders in the tree seed sector in Ethiopia.	Yearly	ICRAF/TSTC

The performance measurement framework (PMF) presented in *annex 1* is prepared according to the Guidelines for results management in Norwegian Development Cooperation. The indicators have, however, not been quantified at this stage. The overall national targets are huge (discussed in section 5 and section 10a of the project proposal and further elaborated in *annex 8*). The preparation of realistic indicators will require more detailed information and will therefore be quantified within this framework based on assessment in the inception phase (*annex 7*) as described in the following.

The performance measurement framework (PMF) presented in *annex 1* will be further detailed during the inception phase, in particular the performance indicators will be specified following the SMART- definition that indicators, to the extent possible, should be:

- specific (*precisely* formulated)
- measurable (verifiable and *appropriate*; that is, the effort of collecting data to examine the values measured is economically reasonable)
- achievable (the indicators are oriented towards the objective and the target value is realistic and reasonable in terms of the resources available to the project)
- relevant (the key dimensions of the objective are measured and formulated at results level)
- time-bound (the achievement of the indicators is determined at fixed intermediate and final deadlines)

In order to establish appropriate, correct and quantified performance indicators, for the different hierarchical levels of the PMF, information needs to be compiled and assessed, during the inception phase, as follows:

Impact:

- Compile ongoing and planned landscape restoration initiatives (projects/programme) in the different provinces of Ethiopia and their tree planting targets in ha.
- Estimate seed demand based on province wise planting targets.

Outcome:

- Assess present and future seed available (quantity and quality wise) at TSTC (EEFRI), provincial seed centres, major NGS and major private seed dealers.

- Assess how big a part of the seed demand that can be met with seed from the established seed sector.

Output I:

- Assess existing policies, legal framework for and organisation of the tree seed sector, - and needs for modifications and changes.
- Assess the present seed demand-supply scenario for the most demanded tree species in order to optimize the most appropriate channels of seed supply.

Output II:

- Assess which and when information- and knowledge systems and ‘tools’ should be developed and introduced at various institutional levels at the different stakeholder institutions, e.g. systems like potential vegetation maps, field trials, genomic studies and species selection portal.

Output III:

- Compile and assess the existing seed sources, their locations and actual status/ usefulness and possible need for maintenance and upgrading.
- Estimate the need for additional seed sources (incl. BSOs) for the priority species and locations for their establishment.

Output IV:

- Based on training needs assessment done during the inception phase determine: i) technical contents, numbers of training courses to be implemented; ii) technical attachments (no. and institutions); and iii) type of extension activities (topics and no.)
- Assess and describe the training and extension materials (subject areas and volumes) to be prepared and published.
- Assess the requirements and make plans for upgrading of the physical facilities at TSTC (EEFRI) and the provincial tree seed centres (4).

Based on the compilation and assessment of data as described above a baseline for the performance indicators will be established during the inception phase and throughout the project the performance indicators will be measured, evaluated and reported against the baseline data.

Reporting

The project reporting will be a major tool for the supervision, monitoring, and quality assurance of the project. Routine reporting by the project will include Annual Work Plans, Progress Reports, technical reports and financial reports. In addition, the project will prepare an inception report (including the PIP) and will, towards the end of the project implementation period, prepare a completion report. The number of copies to be printed for each report, and the circulation and distribution to project stakeholders will be decided by the PMT, in consultation with NICFI and MEFCC.

Consolidated Progress Reports will be prepared semi-annually and will meet the requirements of both NICFI and the GOE. The progress reports will be prepared by the PMT and will incorporate reporting by project staff members and by local and international advisers. The progress reports will provide summary statements of progress (based on an assessment of the project indicators),

issues and problems encountered, financial considerations, and suggestions and comments on how to overcome potential and actual problems.

A possible format (table of contents and matrix) for the progress report is included in *annex 6*.

A number of technical and scientific reports and articles on different subjects will be prepared during the project period. There will be no standard format for such technical reports and articles, as the most appropriate format will be decided by the PMT in each case. Format and content requirements for technical outputs by short term consultants will be stated in the TOR for each consultancy, and explained in detail by the PMT before consultant commences work.

Review

The project will be subject to periodic technical reviews in accordance with the procedures established by NICFI and GOE.

11. BUDGET FINANCIAL MANAGEMENT AND PROCUREMENT MODALITIES

The budget given by outputs, major activities, staff costs, operational costs and years is given in *annex 2*. A summary budget by outputs is shown in the table below.

Financial management and procurement will follow guidelines by NICFI and ICRAF for project implementation (cf. ICRAF 2016a,c).

12. ASSESSMENT AND MONITORING OF SUSTAINABILITY ELEMENTS AND RISK FACTORS

The assessment and monitoring of the project's sustainability elements and risk factors follow two guidelines from Norad: 'Result Management in Norwegian Development Cooperation' (2008) and 'Assessment of Sustainability Elements/Key Risk Factors' (2010), cf. Documents consulted, *annex 4*.

Assessment of sustainability and risk factors in relation to overall sustainability elements and cross-cutting issues is covered by *section a* below; and the specific risk factors in relation to the expected results of the project is dealt with in *section b*. Safeguarding measures to be introduced following national guidelines are referred to in *section c*, and sustainability following the end of the project in *section d*.

a. Sustainability and Safeguard Elements and risk factors

Important sustainability elements of the project are: i) Environmental and Social Sustainability and Climate Change Risk Management; ii) Institutional Capacity; iii) Gender Equality and Women's Empowerment; iv) Financial management and corruption; and v) Human Rights and Equity.

Re i): The project is designed to support the GOE in its large scale forest and landscape restoration programme, which will lead to a better environment in Ethiopia and provide for enhanced carbon sequestration contributing significantly to Ethiopia's INDC (cf. section 5b). Possible climate change scenarios are built into the project design and are an important feature of the project, *i.e.* the use of vegetation maps, describing likely distribution of trees under different climate development scenarios, to determine location seed production areas of selected priority tree species. Concerning climate change and environment, the positive impact of the project is further elaborated in *annex 8*.

Social sustainability is enhanced as better growth conditions for crops will develop as landscapes are being restored using better germplasm of priority tree species. Social sustainability is closely related to the improvement of stakeholder incomes. Higher productivity and better quality of produce will significantly contribute to improved income. Access to markets is a crucial factor to monitor in this context.

Re ii): The project target institutions capacity, to actively participate in the project and to take full advantage and develop as foreseen in the project, is an important sustainability element.

The key target institutions are the PSEs and TSTC. TSTC has existed for more than 30 years and has collaborated with international institutions and donors. The 4 provincial enterprises have recently been established with support from Japan, including buildings and some equipment and training. ME FCC has been reorganized recently and is now in a good position to spearhead the national coordination of the tree seed sector.

This situation is a good foundation for the project to support the expansion of ongoing activities in the tree seed sector into a well-coordinated and technically founded national tree seed programme to support forest and landscape restoration activities in Ethiopia.

The involvement of the private sector is, as earlier mentioned, considered crucial for future sustainability. For the society as a whole, the most significant production gains (and potential for generation of climate mitigation as well as economic revenue) happen at the producer. The overall objective of creating efficient input supply chains is therefore to improve conditions of production, including livelihoods and cash incomes for smallholders. In this process a large degree of privatisation will be conducive for creating a demand based supply. However, privatisation should be carried out with the overall objective in mind. Public support is therefore required in order to improve the economic environment for private sector participation and the strategies for support must be based on careful evaluation of the sector's development potential. In many cases the national institutions will hold an important part of the expertise to help evaluate the sector and to assist in implementation of strategies.

Re iii): Experience shows, that many women are involved in and working with tree seed organisations (seed lab., seed processing, seed packing, nurseries), and the situation is the same for the more field related activities often involving local communities. There are special concerns related to Gender Equality and Women's Empowerment. Commitment to gender will begin with a particular focus on recruiting, retaining and building the capacity of women and training team members in gender-responsive methods. The involvement of women, young adults and children in setting safeguarding priorities will be based on their particular knowledge, uses and future needs. Full attention will be given to the involvement of women, and youth and advanced age groups, in setting values, species priorities and traits for selection, particularly for tree foods that support families' nutrition and women's and youths' incomes. Research and development will also draw on the different sets of knowledge held by people of different ethnicities and socioeconomic backgrounds. Full engagement of women and youth in participatory domestication approaches and in business opportunities in value addition will be supported. Women's and young entrepreneurs' involvement in delivery systems will be enhanced, seeking specific comparative advantages through understanding their existing knowledge, skills and experiences.

Re iv): Financial management, fraud and anti-corruption are covered by ICRAF policies (cf. *annex 9*)

Re v): Concerning Human Rights and Equity, social safeguards, stakeholder involvement, various beneficiary groups, tenure and the use of indigenous and traditional knowledge are all considered (cf. *annex 9*)

It should be noted that climate change mitigation and environment rehabilitation are more than cross-cutting issues of the project; they are actually the *core issues* of the project together with institutional capacity generating economic, livelihood and environmental benefits.

All the mentioned sustainability and safeguard elements will be monitored and reported on during the project implementation.

Risk management associated with these elements are summarized in the following table

Cross-cutting theme	Relevant factors	Risk indicators/ effects	Risk probability (without project intervention)	Response/ Mitigation	Risk probability (during/ after project intervention)
Climate change and environment	Species selection, recommendation domains, resource mobilisation	In-appropriate matching to site and purpose, loss of productivity, invasiveness, loss of biodiversity.	High	Application of evidence based response models, and policies for appropriate use of genetic resources, and for of invasive alien species.	Low
Institutional capacity	Delivery of seed and seedlings (sub-sector functioning)	‘Un-conscious’ delivery of in-appropriate material	High	Developing an enabling regulatory framework and a collaborative seed supply network. Building capacity to sustain such application.	Low
Women’s rights and gender equality	As above	As above	Medium/high	As above	Low
Anti-corruption	Financial sustainability	Fiduciary risk (money used for un-intended purpose, not providing adequate return, not adequately accounted for)	Medium/high	Adequate financial management implemented. Fraud prevention, monitoring and response policy adhered to	Low
Human rights	Beneficiaries Stakeholders Partners	Lack of involvement, in-adequate benefit sharing, violation of tenure and traditional rights	Medium	Application of the SHARED approach and a set of relevant safeguard policies	Low

b. Risk Factors

The risk factors for the impact, outcome and the outputs are most relevant to identify and assess in the project inception phase, when judging the robustness of the project and the likelihood of successful project implementation.

The risk factors are identified, assessed and responded to in the table below, following the Norad Guide on ‘Assessment of Sustainability/Key Risk factors and with special emphasis on potential environmental, climate change and social risks’ (cf. Documents consulted, *annex 4*).

Overall the project is classified as a category C project² with respect to risk (Norad 2010, p 11), reason being that the project is designed to contribute to environment rehabilitation and climate mitigation, but operating as a service (and material) provider from well protected sites, rather than implementing agriculture related *e.g.* to water in climate sensitive areas *per se*. The latter would call for classification in Category B with a more extensive assessment of risks but is not considered relevant for this project. A detailed risk assessment and management plan will be prepared during the inception phase as part of establishing the specific monitoring and reporting modality.

The risk assessment table below is based on guidance in the Norad publications on results management in development co-operation (Norad 2008) and on assessment of sustainability elements/key risk factors (Norad, 2010), cf. *annex 4*, documents consulted. The risk factors in the table are associated with the corresponding planning level in the table, structured according to the suggestion in the results management guide: “Risks are closely related to results and should consequently be analysed against the results framework of programme” (Norad 2008, p 8). The response column in the table describes what the project will do to avoid possible risk issues at the respective planning/result levels. Probability levels of the risk with and without the project intervention is given in the table.

² Category C projects are *projects with minimal or no adverse social or environmental impacts or no climate change risk*. This category includes development projects that are not affected in any significant way by climate, and not affecting external vulnerabilities.

RISK ASSESSMENT FRAMEWORK					
Planning Level	Relevant factors	Risk indicators/ effects	Risk probability (without project intervention)	Response/ Mitigation	Risk probability (during/ after project intervention)
<u>Impact:</u> Ethiopia's national forest restoration targets for the next 20 years and beyond are reached.	Substantial areas of landscapes restored	Lack of political support to landscape restoration Lack of stakeholder interest and involvement in landscape restoration	Medium/ low	GOI strongly committed to landscape restoration (Bonn Challenge and INDC) which is embedded in the CRGE. The landscape restoration leads to higher production potential and thus directly benefits the stakeholders.	Low
<u>Outcome:</u> Tree seed sector in Ethiopia enabled to provide high quality tree seeds of priority species for large-scale restoration plantings.	Availability of quality tree seed in quantities to meet the demand.	Quality and quantity of tree seed not sufficient to meet demand Low transparency and lack of quality control in the tree seed sector.	Medium/ high	The TSTC, the four regional tree seed centres and a number of private tree seed dealers form a solid institutional foundation from where the project can support the expansion of the quantity and quality of tree seed being procured. The tree seed sector analysis and the additional project support to normative functions of the government institutions as well as the overall focus on quality will provide for transparency and quality control	Low
<u>Output 1:</u> Tree seed sector developed, including seed delivery systems.	Policies and strategies on tree seed. Tree seed network and forum for stakeholders in the tree seed sector.	Facilitating and supporting strategies on tree seed lacking and cannot be developed. A functional tree seed network and forum is lacking and cannot be formed.	Medium/ high	The support and dedication of the MEFC and TSTC towards improving the seed procurement system together with the experience brought into the tree seed sector by the project.	Low

RISK ASSESSMENT FRAMEWORK					
Planning Level	Relevant factors	Risk indicators/ effects	Risk probability (without project intervention)	Response/ Mitigation	Risk probability (during/ after project intervention)
<u>Output II:</u> Tree seed and seedling knowledge and information systems in place.	Maps and recommendation domains. Decision support system and interactive information portal	Adequate recommendations and guidelines are absent and the supportive tools and systems are not being developed and put into operation.	High	The key institution (TSTC) is staffed with highly qualified staff and substantial work related to mapping is already being done. Support from the project will further develop the tools and ensure they are put into operation (cf. also output IV).	Low
<u>Output III:</u> Existing seed sources upgraded and new seed sources established (Tree genetic resources for the future mobilized and developed).	National breeding programme. Range wide collections of priority species. Breeding seedling orchards (BSO)	Breeding programme, collections and establishment of BSOs/trials/production areas will not be established at sufficient scale.	High	The capacity of TSTC, the dedication of the regional tree seed centres and the vibrant private tree seed sector together with the technical- and funding input from the project will ensure mentioned outputs. The seed sources will be established on land under the control of and close to the institutions being part of the tree seed sector (TSTC, PSE, NGOs, etc.)	Medium/low
<u>Output IV:</u> Capacity of national institutions in management of tree genetic resources improved.	Qualified staff at national tree seed institutions and private seed dealers.	Qualified staff not available at scale. Trained staff will not remain within the tree seed sector.	High	The project will be based on a thorough 'training needs assessment', and develop and implement comprehensive capacity development at all levels in the public and private sectors. When the large national forest and landscape programme is taking off, the tree seed sector will continue to develop, become an attractive sector to work in and thus attract the needed qualified staff.	Low

c. Safeguards

Development of safeguarding measures related to the implementation of REDD+ is currently taking place by MEFCC. The on-going work will produce four inter-related documents: Strategic Environmental and Social Assessment (SESA), Environmental and Social Management Framework (ESMF), Resettlement Policy Framework (RPF) and Process Framework (PF). These four safeguard documents will provide directions for managing and mitigating the environmental and social risks and impacts of future investments (projects, activities, and/or policies and regulations) associated with implementing the country's REDD+ strategy and will thus also serve as a monitoring framework for PATSPO.

d. Exit Strategy

Institutional sustainability will ensure local takeover after the project finishes. The design and implementation of the project is based on existing institutional structures. The responsibility of the various tasks of the project is thus in principle allocated to partner institutions and will be taken fully over by them at the end of the project. The capacity building component of the project provides a coherent training and extension programme which combined with the governance elements will enable this to happen.

One of the tasks of the project is to develop the legal (regulatory) framework of the tree seed sector, including a monitoring and evaluation protocol to measure impact and guide progressive sector wide uptake of improved knowledge, technology and reproductive material. The coordination and information to take place through the 'FLR information sharing forum' (cf. section 8) and the 'tree seed network' (cf. section 6, output 1; and section 10a Project Strategy) will be important elements to ensure that monitoring and evaluation is mainstreamed in the sector to guide the implementation of seed delivery systems. The roles and responsibilities of the private sector stakeholders will be institutionalized through the regulatory framework, the forum, and the network. Where it is appropriate, specific agreements with stakeholders will be made (e.g. in the form of Memorandums of Understanding - MoUs) to ensure mutual trust and benefits in the production and delivery pathways of seed and seedlings.

The investment in PATSPO 2016-2020 of 8 million USD will be followed by subsequent maintenance and running costs required from GOE to continue delivery of services from the institutional structure established in support of the restoration programme. Within the perspective of CRGE and the geographical coverage of PATSPO, these subsequent running costs is estimated to be in the order of 0.2 million USD per year which in turn can be sustained by the government based on the benefits generated by the restoration programme. Within the larger perspective of the full restoration programme for the whole of Ethiopia, further investments in the sector beyond 2020 may be required.

PERFORMANCE MEASUREMENT FRAMEWORK (PMF)

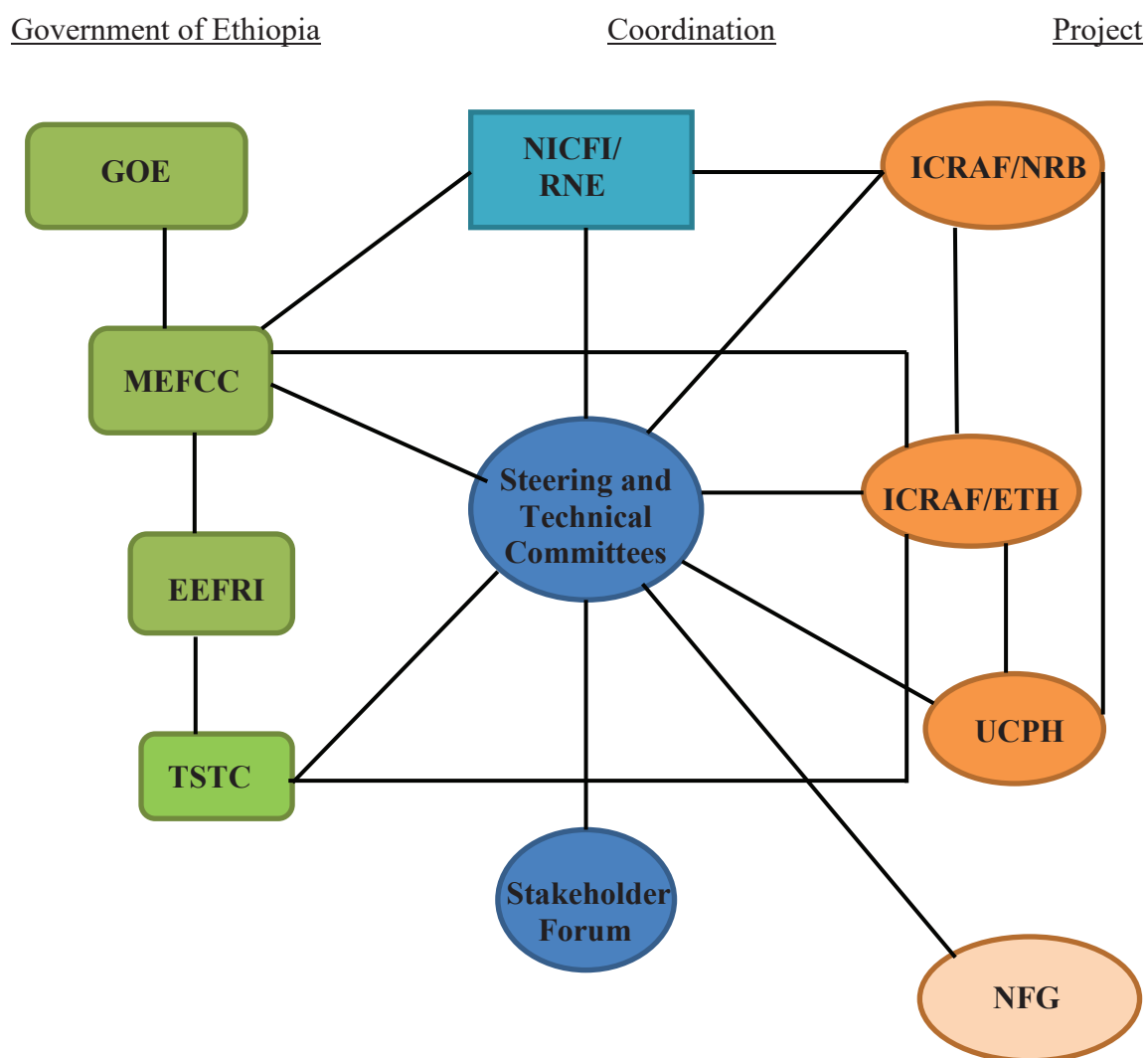
The performance targets are indicatively quantified when possible and will be further specified during the 6 months inception period of the project. Targets in the PMF which cannot be quantified at present will be quantified during the inception period, ref. section 6 and work plan for the inception period in *annex 7*. Please refer to main text, section 6 and 10, for more detailed description and interpretation of indicators and targets.

Planning Level	Performance Indicators	Performance Targets	Means of Verification	Verification Frequency	Responsibility
<i>Impact</i> Ethiopia's national forest restoration targets for the next 20 years and beyond are reached	Area restored using quality tree seedlings raised from quality seed	The specific target in hectares will be assessed, during the inception phase of the project, based on ongoing and planned landscape restoration initiatives in the different provinces of Ethiopia.	Assessment reports based on data from MEFCO and other government institutions.	Yearly	ICRAF/MEFCC
<i>Outcome</i> Tree seed sector in Ethiopia enabled to provide high quality tree seeds of priority species for large-scale restoration plantings.	Amount of quality tree seed of priority species made available (produced and delivered) for restoration plantings in Ethiopia	Target = Estimate of the additional seed procurement capacity required in the tree seed sector, to meet future demand, based on present capacity of TSTC (EEFRI), provincial seed centres, major NGOs and major private seed dealers (to be assessed during inception).	Assessment reports based on data and statistics from stakeholders in the tree seed sector in Ethiopia.	Yearly	ICRAF/TSTC
<i>Output I:</i> Tree seed sector developed, including seed delivery systems	Tree seed delivery system elements in place.	Assessed and upgraded strategies and policies for the tree seed sector in place, - done in close collaboration with MEFCO. Demand and supply scenarios in place. Established and well-functioning tree seed network and – forum for the tree seed sector in place.	Analysis reports. Technical reports. System reports. Seminar- and meeting reports.	Yearly	ICRAF/TSTC
<i>Output II:</i> Tree seed and seedling knowledge and information systems in place	Technical knowledge and information system for the tree seed sector available.	Maps and related tree planting recommendation domains covering all provinces of Ethiopia in place. Species/seed source selection portal/system (“What to plant where”) in place.	Manuals for the systems. Technical reports. Progress reports on use of the systems and knowledge.	Yearly	ICRAF/TSTC

Planning Level	Performance Indicators	Performance Targets	Means of Verification	Verification Frequency	Responsibility
		Field trials to support development of superior seed sources in place and analysed. Genomic studies of priority species to support development of superior seed sources performed.			
<u>Output III:</u> Tree genetic resources for the future mobilized and developed	# of existing seed sources upgraded and in use. # of new seed sources (BSOs) established and in use.	National tree breeding programme for priority tree species covering 80-90 % of the seed demand (base of seed sources). 150 BSOs of the priority tree species established. 4-500 seed sources identified and described in existing forests and plantations throughout Ethiopia. Between 250 - 1000 tons of quality tree seed of priority species procured annually by the tree seed sector, ref. section 10a in this document (output of seed sources).	Breeding programme documents. Seed source assessments/ descriptions. Seed source/BSO establishment reports. Seed collection reports.	Yearly	ICRAF/TSTC/ PSEs/NGOs
<u>Output IV:</u> Capacity of national institutions in management of tree genetic resources improved	# of staff and stakeholders trained (at training courses and through extension activities). # of (relevant) training- and extension material produced.	1000 staff members from stakeholder institutions in the tree seed sector trained in technical subjects through 10 annual training courses with 25 participants per course. 4000 user group members reached through extension activities, - 10 extension events per year with min. 100 attendants per event. 10 - 15 technical guidelines/notes and 40 - 50 extension briefs/leaflets produces annually, - in total 200 - 350 publication during the project period.	Training course reports. Guidelines, training- and extension material published.	Yearly	ICRAF/TSTC/ PSEs/NGOs

TENTATIVE PROJECT ORGANOGRAM

To be updated/revised during inception (cf. *annex 7*)



The lines indicate project coordination/information channels.

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SELECTED PRIORITY SPECIES

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Scientific name	Priority Tree (T) or shrub (S)	Native (N) or Exotic (E)	Current uses	Type of management system	Remark on NWFPs and other uses	Environmental service value	Distribution: widespread (W), Rare (R) or Local (L)	Type of threat (code)	Threat categories	Red list Status	Red list – regional occurrence	Mean quantity Of seeds used (kg)	Quantity of seeds from documented sources	Potential number of seedlings to be produced	Genetic variability studies	In situ conservation	Ex situ field	Ex situ bank	Tree improvement	Seed production areas	Seed stands Native species	Import of varieties	Priority for conservation SW forests
<i>Acacia albidia</i>	T	N	3,4,5	AF	fodder	1,2,3						232.8	✓	2148579			3	7			6		
<i>Acacia drepanolobium</i>	T	N			Invasive												4	4					
<i>Acacia senegal</i>	T	N	3,4	Nf	Gum	1, 3						137.9	✓	1266270	✓		4	4	✓		3		
<i>Adansonia digitata</i>	T	N	4	Nf	food																		
<i>Arundinaria alpina</i>	S	N	1,3,4	Nf	food, fodder		W	5	Med							1							
<i>Boswellia papyrifera</i>	T	N	4	Nf	frankincense		R	1,5	High														
<i>Catha edulis</i>	S	N	6	AF	stimulant																		
<i>Coffea arabica</i>	S	N	6	Nf, P	stimulant	1, 4									✓	6							71
<i>Commiphora myrrha</i>	T	N	4	Nf	myrrh																		
<i>Cordia africana</i>	T	N	1,4, 5	Nf, AF	Food, fodder	1, 2,3,4, 5,7	W	1, 2, 3, 5	High			793.6	✓	2760830	✓		27	40	✓	1	8		4
<i>Cupressus lusitanica</i>	T	E	1	P		1,7						411.4	✓	43988449						1			
<i>Eucalyptus camaldulensis</i>	T	E	1, 3	P								515.3	✓	450270952	✓				✓				

Scientific name	Priority Tree (T) or shrub (S)	Native (N) or Exotic (E)	Current uses	Type of management system	Remark on NWFPs and other uses	Environmental service value	Distribution: widespread (W), Rare (R) or Local (L)	Type of threat (code)	Threat categories	Red list Status	Red list – regional occurrence	Mean quantity Of seeds used (kg)	Quantity of seeds from documented sources	Potential number of seedlings to be produced	Genetic variability studies	In situ conservation	Ex situ field	Ex situ bank	Tree improvement	Seed production areas	Seed stands Native species	Import of varieties	Priority for conservation SW forests
<i>Eucalyptus globulus</i>	T	E	1, 3, 5	P								179.7	✓	50607540	✓		1	10	✓	5			
<i>Grevillea robusta</i>	T	E	1, 3, 5	P, AF		1						5.0	✓	329598									
<i>Hagenia abyssinica</i>	T	N	1, 4, 5	Nf, P	medicine	1, 5	W	1, 3, 5, 7	High			61.2	✓	9004788	✓	1	4	7	✓	1	7		1
<i>Juniperus procera</i>	T	N	1	Nf, P		3, 5	W	1, 3, 5	High			89.8	✓	1789985	✓		4	11	✓	2	8		
<i>Oxytenanthera abyssinica</i>	T	N	1, 3, 4	Nf	food		W	5, 12	Med							1	5	20					
<i>Podocarpus falcatus</i>	T	N	1	Nf		3, 4, 5, 7	W	1, 3, 5	High			196.8	✓	174257		2	3	5			14		
<i>Pouteria adolfi-friederici</i>	T	N	1	Nf		1	R	1, 3, 5	High							1					2		64
<i>Prosopis juliflora</i>	T	E			Invasive																		
<i>Rhamnus prinoides</i>	T	N	4	AF	beverage												1	2					15
<i>Tamarindus indica</i>	T	N	4, 5	Nf, P	food	1, 2, 3, 7						60.7	✓	53523			6	5			2	1	
<i>Vitellaria paradoxa</i>	T	N	4	Nf	food	1, 7	L	1, 5	High														
<i>Ziziphus mauritiana</i>	T	N	4	Nf	food	1																	

LEGEND

Current use:

1 Solid wood products, 2 Pulp and paper, 3 Energy (fuel), 4 Non wood forest products (food, fodder, medicine, etc.), 5 Used in AF systems, 6 Other uses (stimulant)

Services and values include:

1 Soil and water conservation including watershed management, 2 Soil fertility, 3 Biodiversity conservation, 4 Cultural values, 5 Aesthetic values, 6 Religious values, 7 Shade

Type of threat:

1 Forest cover reduction and degradation, 2 Forest ecosystem diversity reduction and degradation, 3 Unsustainable logging, 5 Competition for land use, 7 Habitat fragmentation, 12 Forest fires, 13 Drought and desertification

Distribution in Ethiopian Floristic Region (s):

BA (Bale), GD (Gonder), GG (Gamo Gofa), GJ (Gojam), HA (Hararge), IL (Iluababor), KF (Kafa), SD (Sidamo), SU (Shewa), TU (Tigray), WG (Welega) and WU (Welo)

POSSIBLE FORMATS FOR PLANNING, MONITORING AND REPORTING

I. PROJECT INCEPTION REPORT AND IMPLEMENTATION PLAN (PIP)

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	List of Abbreviations and Acronyms
	Map of Project Area
1	INTRODUCTION
2	ETHIOPIAS STRATEGY FOR SUPPLY OF TREE SEED
3	PROJECT OBJECTIVES AND OUTPUTS.....
3.1	Impact (Development goal)
3.2	Outcome (Immediate objective).....
3.3	Outputs.....
4	OVERALL PROJECT STRATEGY
4.1	Approach and Priorities
4.2	Target Levels and Groups
4.3	Technical Assistance Support
5	IMPLEMENTATION STRATEGY
5.1	Institutional Development and Strengthening.....
5.2	Development of the Human Resource Base.....
5.3	Awareness Raising.....
5.4	Support to Technical Fields
5.5	National, Regional, and International Co-operation
6	PROJECT IMPLEMENTATION
6.1	Project Inputs
6.2	Major Project Activities
6.3	Planning of Activities
6.4	Provision of Technical Assistance
7	ORGANISATION AND MANAGEMENT
7.1	Institutional Setting.....
7.2	Project Coordination Committee
7.3	Management and Administration Procedures
7.4	Technical Assistance Modalities.....
8	PROJECT MONITORING
8.1	Monitoring System and Responsibilities
8.2	Quality Assurance System
8.3	Reporting.....
8.4	Review
8.5	Financial Monitoring
9	MAJOR RISKS AND ASSUMPTIONS
9.1	Risks.....
9.2	Assumptions.....

APPENDICES

1. Performance Measurement Framework Matrix
2. Tentative Manning Schedule for Technical Assistance
3. Activity Schedule
4. Elements of Training Programme
5. Terms of Reference for the Project Coordination Committee
6. Format for Annual Work Plan and Semi-annual Progress reporting
7. Technical Subjects Eligible for Project Support

II. ANNUAL WORK PLAN (AWP)

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- List of Abbreviations and Acronyms
- Summary of Work Plan for
- 1. MAJOR CHANGES SINCE LAST PLAN
- 2. OBJECTIVES AND OUTPUTS
- 3. WORK SCHEDULE FOR THE YEAR
 - 3.1 Major Fields of Support
 - 3.2. Planned Activities and Expected Results
 - 3.2.1 Training and Extension Programme
 - 3.2.2 Support to Technical Subjects
 - 3.2.3 Institutional Development
 - 3.2.4 Regional Co-operation (S.E. Africa)
- 4. INPUTS REQUIRED FOR THE YEAR
 - 4.1 Equipment and Materials
 - 4.2 Vehicles
 - 4.3 Short Term Consultants
 - 4.4 Counterpart Inputs
- 5. ASSUMPTIONS AND RISKS
- 6. PROJECT IMPLEMENTATION
 - 6.1 Project Coordination Committee Meetings
 - 6.2 Co-ordination of Project Activities
 - 6.3 Project Monitoring
 - 6.4 Reports Foreseen
- 7. IMPLEMENTATION SCHEDULE
- 8. BUDGET IMPLICATIONS FOR THE YEAR

APPENDICES

1. Activity Plan and Implementation Schedule
2. Manning Schedule for Short Term Technical Assistance
3. Terms of Reference for Short Term Consultants

One-Year Work Plan Matrix
(Part of the AWP)

OUTPUT I:																	
MAIN ACTIVITY I.1:				Fiscal Year xxxx-xxxx												Remarks	
Sub-Activity	Expected Result	Inputs	Person(s) Responsible	J	F	M	A	M	J	J	A	S	O	N	D		
I.1.1																	
I.1.2																	
I.1.3																	
...																	
...																	
...																	

III. SEMI ANNUAL PROGRESS REPORT (PR)

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	List of abbreviations.....	
	Executive Summary.....	
1	INTRODUCTION.....	
2	PROGRESS OF NATIONAL LANDSCAPE REHABILITATION PROGRAMME.....	
3	PROGRESS OF PROJECT	
3.1	Objectives and Outputs	
3.2	Organisational, Administrative and Managerial Aspects and Activities.....	
3.3	Activities and Approach	
3.4	Inputs	
4	FINANCIAL STATUS	
5	ASSUMPTIONS AND RISKS.....	
6	RECOMMENDED ACTIONS.....	

APPENDICES

1.	Progress of Activities for the Period (Matrix)	
2.	Consultancy Inputs.....	
3.	Financial Input.....	

PROGRESS MATRIX
(PART OF THE SEMI ANNUAL, PROGRESS REPORT)

OUTPUT I:																
MAIN ACTIVITY I.1:			Fiscal Year XXX-XXX													
Sub-Activity	Expected Result	Progress Reporting	J	F	M	A	M	J	J	A	S	O	N	D	Inputs	
I.1.1.																
I.1.2																
I.1.3																
I.1.4																
II.1.1.																
II.1.2																
II.1.3																
II.1.4																
Etc.																

Work plan for a 6 months inception phase

Introduction

The work plan includes activities related to organizational- , management/ planning- and technical issues. The work plan will enable a swift start-up of the activities. It will be further refined and a number of issues, elements and activities will be added and others made more detailed as stipulated in the plan during the first months after the project has started, like:

- Complete project staff plan (incl. TOR and assignment),
- Consultancy plan (incl. TOR),
- Detailed planning and reporting modality,
- Establishment of office facilities for the project, and
- Procurement of equipment.

The complete work plan for the inception phase will follow the structure of the performance measurement framework (ref. Annex 1 of the project document) and some of the activities in the inception work plan may extend after the first 6 month and thus be included in the first annual work plan.

I. Organizational Issues											
Main-activities	Sub-activities	Remarks	Indicators	Means of verification	First 6 months of project implementation						Progress (to be reported at the end of the inception phase)
					1	2	3	4	5	6	
I.1. Establish PATSPO steering- and technical coordination committees.	I.1.1. Identification of members of the steering- and technical coordination committees for PATSPO	In close consultation with MEFCC and representing the major stakeholders/ collaborators of PATSPO.	Organogram	Minutes from meetings	X	X	X				
	I.1.2. Preparation of draft TOR for the management- and the technical coordination committee.	The TOR identifies the members, the tasks and responsibilities of the committees and frequency of meetings.	TORs	Minutes from meetings.	X	X	X				
	I.1.3. Outline and describe the operational modality for the two committees	Defines roles, function and responsibilities of the committee members.	Note on operational modalities.	Progress reports and minutes.	X	X	X				
	I.1.4. Prepare agenda and call for the first meetings in the two committees.	ICRAF will act as secretary to both committees	Agenda and minutes from the committee meetings.	Progress reports.		X	X				
I.2. Establishment of a ministerial 'FLR information sharing forum'.	I.2.1. Assist MEFCC in setting up a 'FLR information sharing forum'.	To be initiated by MEFCC and RNE.	Statues and ToR of the Forum available	Progress reports and minutes.		X	X	X			
I.3. Establish management structure for PATSPO, including office, staffing, etc.	I.3.1. Select location for PATSPO Office.	Likely to be part of the ICRAF country office in Addis Ababa.	Office identified and operational	Physical infrastructure	X						
	I.3.2. Identify and engage key staff at the PATSPO Office.	National and international staff.	TORs and contracts.	Progress reports.	X	X	X				

II. Management and Planning Issues											
Main-activities	Sub-activities	Remarks	Indicators	Means of verification	First 6 months of project implementation						Progress (to be reported at the end of the inception phase)
					1	2	3	4	5	6	
II.1. Establish planning, reporting and management modality for PATSPO.	II.1.1. Prepare management manual for PATSPO.	The manual will include: Staff's roles and responsibility, management routines (meetings, information, etc.)	Manual.	Progress report.			X	X	X		
	II.1.2. Prepare accounting manual for PATSPO.	Defining accounting procedures (GOE, NICFI, ICRAF), fixed asset register, etc.	Manual.	Progress report.			X	X	X		
	II.1.3. Prepare 4 year Project Implementation Plan.	To include: i) Project Planning Matrix; ii) Activity Schedule; iii) Format for Annual Work Plan; iv) Tentative Manning Schedule for TA; v) Training Programme; etc.	Project Implementation Plan.	Progress report.				X	X	X	
	II.1.4. Prepare Annual Work Plan for 2017.	To include: i) Work plan for 2017; ii) Inputs required for 2017; iii) Budget for 2017; iv) Coordination, monitoring and reporting; v) Assumptions.	Annual Work Plan.	Progress report.				X	X	X	
	II.1.5. Establish monitoring and reporting modality for PATSPO.	To meet requirements of GOE, NICFI and ICRAF.	Technical report.	Progress report.				X	X	X	
	II.1.6. Prepare communication plan for PATSPO.	To enhance collaboration and information sharing among stakeholders.	Communication plan.	Progress report.				X	X	X	

III. Technical Issues										
Main-activities	Sub-activities	Remarks	Indicators	Means of verification	First 6 months of project implementation					
					1	2	3	4	5	6
III.1. Identify priority species and related seed demand for landscape restoration in Ethiopia.	III.1.1. Implement stakeholder meeting/seminar for identifying priority species for Ethiopia.	Major stakeholders to participate: MEFC, MoA, EEFR, Regional Seed Centres, private seed dealers, NGOs, NFG, ICRAF, etc.	Spp. priority lists.	Minutes from meetings and lists.		X				
	III.1.2. Compile ongoing and planned landscape restoration initiatives (projects/programme) in the different provinces of Ethiopia and their tree planting targets in ha.	In collaboration with and based on data from MEFC, MoA, EEFR, Regional Seed Centres, private seed dealers, NGOs, NFG, ICRAF, etc.	Province wise restoration /tree planting targets.	Compilation reports.		X	X			
	III.1.3. Estimate seed demand based on province wise planting targets.	Based on 'standardized' species priority packages for the provinces.	Quantified seed demand for each province in Ethiopia.	Technical reports.		X	X			
	III.1.4. Assess present and future seed available (quantity and quality wise) at TSTC (EEFR), provincial seed centres, major NGS and major private seed dealers.	Based on data available on seed stored at seed producing institutions.	Seed stock data for all major seed producers.	Technical reports.		X	X			

III. Technical Issues										
Main-activities	Sub-activities	Remarks	Indicators	Means of verification	First 6 months of project implementation					
					1	2	3	4	5	6
III.2. Mobilise and build tree genetic resources for the future and ensure best possible quality seed available as soon as possible (if possible for the planting season 2017).	III.1.5. Assess how big a part of the seed demand that can be met with seed from the established seed sector.	Estimations based on present and future seed demand and ditto potential supply.	Demand-supply scenarios	Technical reports.		X	X			
	III.2.1. Compile and assess the existing seed sources, their locations and actual status/ usefulness and possible need for maintenance and upgrading.	Based on data available at MEFCC, MoA, EEFRI, Regional Seed Centres and private seed dealers.	Numbers of existing seed sources and their status	Technical reports.		X	X			
	III.2.2. Estimate the need for additional seed sources (incl. BSOs) for the priority species and locations for their establishment.	Based on estimates from sub-activity III.1.3.	Targets for BSO establishment	Technical reports		X	X			
	III.2.3. Compile information about seed available at Regional Seed Centres, EEFRI, NGOs and major private seed dealers.	Based on data available on seed stored at seed producing institutions.	Seed in stock at seed producing organisations.	Lists of spp. and amounts of seed available, incl. information for each seed lot.		X	X			
	III.2.4. Assess seed demand of priority species for the major agro-ecological zones for planting season 2017	A big task for a very short period of time. Result depends of data availability.	Demand of seed for priority species.	Lists of demand and reports.		X	X			

III. Technical Issues										
Main-activities	Sub-activities	Remarks	Indicators	Means of verification	First 6 months of project implementation					
					1	2	3	4	5	6
III.3. Analyse the tree seed sector and tree seed delivery system.	III.2.5. Support exchange of seed according to demand and availability in the agro-ecological zones.	The exchange will most likely have to be organized directly between the users and the producers of the seed, based on recommendations from the project.	Amount of seed exchanged	List/reports on seed exchange.			X	X	X	
	III.3.1. Assess existing policies, legal framework for and organisation of the tree seed sector, - and needs for modifications and changes.	Lead by MEFCC with support from the project.	Review of current regulation	Assessment reports.			X	X		
	III.3.2. Assess the present seed demand-supply scenario for the most demanded tree species in order to optimize the most appropriate channels of seed supply.	In collaboration with and based on data from MEFCC, MoA, EEFR, Regional Seed Centres, private seed dealers and NGOs.	Review and analysis of demand-supply scenarios	Assessment reports.			X	X		
III.4. Develop tree seed and seedling knowledge and information system.	III.4.1. Assess which and when information- and knowledge systems and 'tools' should be developed, e.g. systems like potential vegetation maps, field trials, genomic studies and species selection portal.	In collaboration with and based on data from MEFCC, MoA, EEFR, Regional Seed Centres, private seed dealers and NGOs.	Plan for systems and tools development	Assessment reports.			X	X	X	

III. Technical Issues											
Main-activities	Sub-activities	Remarks	Indicators	Means of verification	First 6 months of project implementation						Progress (to be reported at the end of the inception phase)
					1	2	3	4	5	6	
III.5. Training of staff from key institutions and upgrading of physical facilities.	III.5.1. Implement training needs assessment for key staff from major stakeholder institutions and organizations.	To be made in close coordination with MEFCC and EEFRI.	Staff selected for identified training.	Training needs assessment report.			X	X	X		
	III.5.2. Based on training needs assessment done during the inception phase determine: i) technical contents, numbers of training courses to be implemented; ii) technical attachments (no. and institutions); and iii) type of extension activities (topics and no.).	Includes selection of means of training (project training course and other means of training)	Courses and participants.	Plans for training.			X	X			
	III.5.3. Initiate training activities according to plan.	Based on availability of time and external training institutions.	Selected courses and participants	Course plans, etc.				X	X		
	III.5.4. Assess and describe the training and extension materials (subject areas and volumes) to be prepared and published.	Based on training plan and technical subjects included.	Plan for preparation of written materials.	Progress reports				X	X		

III. Technical Issues											
Main-activities	Sub-activities	Remarks	Indicators	Means of verification	First 6 months of project implementation						Progress (to be reported at the end of the inception phase)
					1	2	3	4	5	6	
	III.5.5. Assess the requirements and make plans for upgrading of the physical facilities at TSTC (EEFRI) and the provincial tree seed centres (4).	Based on close dialogues with TSTC (EEFRI) and the provincial tree seed centres (4).	Plans for upgrading of facilities, incl. list of equipment to procure.	Progress reports			X	X			

Additional project justification considerations related to climate, environment and livelihoods

1. Cost benefit considerations for investing in adequate planting material for Forest Landscape Restoration in Ethiopia

General considerations

When the aim of scaling up is to reach tens or hundreds of thousands of farmers, it is essential not to underestimate the importance of quality planting material in scaling-up processes, even for relatively low-value tree crops.

Plantation forestry illustrates the value that proper attention to delivery of tree planting material to growers can provide. In plantation forestry, **internal rates of return of 10 %** from tree domestication are common.

Seed source selection can provide physical gains of 10-30 %. Selection within a seed source may add 10-25 % and further gain of 15-25 % can be added by breeding. Through a fairly simple process it is thus possible to achieve **35-80% gain** with very high returns of investment.

The increased cost of using genetically superior germplasm is well justified, especially as it is typically only a small fraction of total establishment costs.

Relatively few agroforestry species have been tested for their performance but two of the most widely planted agroforestry species in East Africa, *Calliandra calothyrsus* and *Gliricidia sepium*, demonstrate wide differences between provenances for wood and leaf biomass (the main product), where the most productive provenances produced about *2 to 3 times the yield* of the poorest provenances. For *Bauhinia purpurea* in Nepal, **annual gains of 2-5 %** more biomass (including fodder) has been demonstrated through simple phenotypic selection.

The problems of inbreeding and genetic deterioration, documented for unmanaged exotic land races of many timber trees, will eventually develop also for agroforestry tree species, once local natural forests are lost or inaccessible and on-farm trees become the dominant seed sources, resulting in significant losses, unless care is taken to avoid the genetic impoverishment in the domestication process.

When matching of planting material to planting site is inadequate, huge losses of higher productivity opportunities are common. The loss may be complete, when plants simply die, or may be in the form of severely reduced productivity if they survive. Adding up the loss from careless choice and the additional opportunities of gain from well planned domestication can easily provide for manifold improvements. For example, widely planted species of acacia illustrate the importance of utilising the right material, where the careful choice of an improved variety developed from superior natural provenances versus using an (inbred) landrace can provide up to **four times higher** volume growth.

The cost of the planting material to restore 20 million ha of land in Ethiopia over the next 20 years will at current prizes of supply be in the order of 70 billion Birr or around 3.5 billion US\$. To ascertain that this investment results in survival and adequate productivity will - based on

experience from elsewhere - raise the cost of the planting material in the order of 5%, but also assure survival and physical productivity increases in a magnitude of 60%. A catalytic investment in this project of around 0.2% of this total cost during the first four years (2016-2020) of the restoration period will enable these returns to materialize, provided adequate follow-up also in the longer term. The potential productivity benefits in the sector will be in the order of several 100 millions of USD. The investment in this institutionalisation of the tree seed sector will be analysed based on the development of a business plan during the course of the project.

Forestry and carbon sequestration in Ethiopia

PATSPO is designed to support the large forest and landscape restoration programme, which is part of the 'green growth strategy' (CRGE) of the GOE (p. iv) aiming at a 64 % emissions reduction (INDC) compared to business as usual by 2030, of which forestry is planned to be responsible for more than half of the reduction (p. 3-4). The project will ensure forest restoration projects and tree planting actors having high quality seed of the most important tree species used for forest landscape restoration and all other tree planting activities in Ethiopia (p. iv).

To be successful restoration will have to provide climate adaption and mitigation, but also provide economic as well as social return (p. 2, p. 5 on impact and indicators).

Emissions from the Forestry sector are mainly caused by human beings, and are driven by deforestation for agriculture and forest degradation from fuelwood consumption and logging. Under the business as usual (BAU) scenario, emissions from forestry will increase from 53 Mt CO₂e in 2010 to 88 Mt CO₂e in 2030 (CRGE 2011).

Estimates in the recent "Ethiopia's Forest Reference Level (FRL) Submission to the UNFCCC" (Anonymous 2016) is largely in accordance with the numbers in CRGE (2011). The FRL submission set the Forest Reference Emission Level at approx. 20 Mt CO₂/year from deforestation in the period 2000-2013, and the Forest Reference Level for removals of carbon from the atmosphere at approx. 10 Mt CO₂/year in the major forest biomes of the country (Anonymous 2016).

Abatement measures in the Forestry sector include Fuelwood efficient stoves (34 Mt CO₂e reduction potential/year by 2030), Fuel shift stoves (17 Mt CO₂e reduction potential/year by 2030), Afforestation/reforestation (32 Mt CO₂e reduction potential/year by 2030), and Forest management (10 Mt CO₂e reduction potential/year by 2030).

Afforestation/reforestation and forest management are the largest contributors to this improvement (CRGE 2011), an assessment supported by the scientific literature (e.g. for Ethiopia, Watson et al. 2013). By 2030 a net emission can be reduced to an annual net sequestration of 42 Mt CO₂e based on intervention at 7 million ha.

In contrast to the positive effect on the carbon balance, CRGE (2011) consider that afforestation/reforestation and forest management initiatives will not yield a positive economic return in the timespan considered (20 respectively 50 years) due to high investment and operating costs; and concludes that these initiatives need to be supported by grant or pay-for-performance schemes. Annual per hectare costs of forestation are estimated to be in order of 50 USD over 20 years, and for forest management about 3 USD over 50 years. Expected income is set as low as 7 **USD/ha/year** for forestation and only USD 3.50 ha/year. NPV will obviously be negative.

These economic estimates are no doubt extremely conservative. A recent World Bank study shows for instance that trees deliver sizeable economic benefits to rural households (Miller et al 2016). A study published by IUCN (Weldesemaet, 2015) show that the annual per hectare net-value (i.e. after restoration costs have been paid back) of restoration in Kanat, Amhara, Ethiopia amounts to almost 14,000 USD per year over 20 years, of which about 8,000 USD is attributed to carbon sequestration tCO₂e (at a fairly high average African carbon market price of approx. 10 USD per tCO₂e); and a product value income of **6,000 USD per ha per year** arise from the tangible production of fodder, fuelwood and timber. Even leaving out the payment for carbon, would still result in a significant return on investment. Given the uncertain price of carbon credits, the tangible livelihood benefits will constitute the major community incentive for engaging in restoration. The restoration investment cost is approximately 10,000 USD per ha or 500 USD per ha per year.

This mean cost value was obtained from the restoration of areas in the study region. The expense line included all expenses from initial land survey to last maintenance of damaged physical structures or vegetation cover; including wages for experts and labourers throughout the whole project period; and materials and equipment used during restoration (Weldesemaet, 2015)

The added value of appropriate genetic resource management

The implementation plan of CRGE with respect to forestation and forest management is shown in the table below with three scenarios for carbon sequestration.

CRGE (2011) estimates the cost of forestation to be 5USD/t CO₂e and the cost of management to be 1.5 USD/t CO₂e (average for forest and woodlands) in the CRGE scenario. The cost estimates include planting material and stand management costs. Over the 20 year period, total cost will - based on this -amount to around 1.8 billion USD.

Abatement measure	Area by 2030 (1000 ha)	Sequestration potential t CO ₂ /ha/year		
		Scenario		
		CRGE	CRGE -50%	CRGE ++
Forestation of pastureland	2,000	10.75	5.38	13
Forestation of degraded land	1,000	10.75	5.38	13
Management of forests	2,000	3.24	1.62	4
Management of woodlands	2,000	1.62	0.81	2

Abatement potential Forestry	Area (1000 ha)	Sequestration potential t CO ₂ /year		
		Scenario		
		CRGE	CRGE -50%	CRGE ++
Total 2020	3,500	20,985	10,493	25,500
Total 2030	7,000	41,970	20,985	51,000

The achievement of the abatement potential will depend on the quality of the planting material, the planting itself, post-planting management and subsequent stand management. Without investing in appropriate planting material, the CRGE scenario is unlikely to materialize; a level of CRGE -50% or less is then more likely. In that sense, PATSPO can be considered a necessary condition (but of

course not a sufficient one in itself) to achieve the ambitions of CRGE. PATSPO should, however, further enable that a higher abatement potential (CRGE++) can be reached and thus add to the value of the investment. The CRGE++ scenario is based on a 5% increase in a 5-year cycle from tree improvement. The investment in PATSPO 2016-20 of 8 million USD will be followed by subsequent capital and running costs to continue delivery of services in support of the restoration programme. Within the perspective of CRGE, this is likely to be in the order of 0.2 million USD per year. With the larger perspective of the full forest landscape restoration programme of Ethiopia, further investments and a phase II of PATSPO is however likely to be required.

As indicated by the case of Kanat referred to above, the values of the investment do however go far beyond carbon. PATSPO will also contribute to enable positive economic NPV of the restoration effort as compared to current negative estimates of CRGE.

2. The geographic location of the project

The project will focus its development activities in the four regions where regional tree seed centres have been established (Amhara, Oromia, SNNPR and Tigray) and where significant tree planting/restoration is ongoing. Other regions have very important forest and woodland resources as well; the requirements for development of the tree seed sector in these regions will be assessed by the project.

Statistics on forest and woodland resources of Ethiopia are available from various documents. The most recent country report to the forest resources assessment of FAO (FRA 2015), give the figures in the table below:

Land Category (area in hectares)	2000		2005		2010		2015	
	ha	%	ha	%	ha	%	ha	%
Forest	3,651,935	3.2	3,337,988	2.9	12,295,847	10.2	11,527,356	10.0
High woodland area	10,049,079	8.8	9,632,616	8.4	9,030,578	7.5	8,466,166	7.4
Plantations	509,422	0.4	509,422	0.4	509,422	0.4	972,000	0.8
Low woodland + Shrub land	46,297,530	40.4	46,297,530	40.4	44,649,764	37.2	40,631,285	35.3
Other land	53,169,093	46.4	53,899,503	47.1	52,685,000	43.9	52,685,000	45.8
Inland Water	828,277	0.7	828,277	0.7	799,000	0.7	828,277	0.7
Total	114,505,336	100	114,505,336	100	119,969,610	100	115,110,084	100

Source: FAO/MEF 2014

The table reveals some of the problems in characterising the resource. Two different classification systems are used in the table. These are FAO's forest resource assessment (FAO 2010, 2014) and the Woody Biomass Inventory and Strategic Planning Project (WBISPP, 2004 and 2005), which are the two most commonly used sources of information for describing Ethiopia's forest resources (cf. Bekele et al. 2015). The increase in forest area from 2005 to 2010 reflects a difference in definition of forests from one based on stand structure (WBISPP) to one based on crown coverage (FAO). A mistake in the table seems to be apparent from the different totals. A new definition of forest was adopted by Ethiopia in February 2015 (cf. Anonymous 2016, used for estimating Ethiopia's Forest Reference Level Submission to the UNFCCC submitted in January 2016) to better capture dry and lowland-moist vegetation, but is not yet reflected in available statistics.

The distribution of forest and woodlands to regions in 2000 is shown in the next table (also taken from FAO/MEF 2014, original source being WBISPP; percentage columns added here).

Region (year 2000)	Forest		High Wood-lands		Plantations		Low wood + Shrub lands		Other		Water		Total	
	10 ³ ha	%	10 ³ ha	%	10 ³ ha	%	10 ³ ha	%	10 ³ ha	%	10 ³ ha	%	10 ³ ha	%
Oromia	2,206	60.4	5,258	52.3	63	12.3	9,806	21.2	18,422	34.6	261	31.5	36,015	31.5
SNNPR	740	20.3	560	5.6	237	46.6	1,349	2.9	7,667	14.4	153	18.5	10,707	9.4
Gambella	492	13.5	900	9.0	0	0.0	422	0.9	1,372	2.6	0	0.0	3,185	2.8
Dire Dawa	0	0.0	0	0.0	0	0.0	37	0.1	92	0.2	0	0.0	129	0.1
Harari	0	0.0	0	0.0	0	0.0	7	0.0	25	0.0	0	0.0	33	0.0
Amhara	93	2.5	842	8.4	199	39.2	7,863	17.0	6,456	12.1	310	37.5	15,764	13.8
Tigray	9	0.3	0	0.0	1	0.1	2,136	4.6	2,789	5.2	6	0.7	4,940	4.3
Beneshangul	68	1.9	2,472	24.6	0	0.0	1,416	3.1	955	1.8	15	1.8	4,927	4.3
Afar	39	1.1	0	0.0	0	0.0	3,170	6.8	6,329	11.9	82	9.9	9,620	8.4
Somali	4	0.1	18	0.2	1	0.3	20,090	43.4	9,007	16.9	1	0.1	29,122	25.4
Addis Ababa	0	0.0	0	0.0	8	1.6	0	0.0	54	0.1	0	0.0	62	0.1
ETHIOPIA	3,652	100	10,049	100	509	100	46,298	100	53,169	100	828	100	114,505	100

Source: FAO/MEF 2014

The relative cover of the different classes of forest and wood lands in the table above is shown in the following table:

Region (year 2000)	Total area (1000 ha)	% of total land	All land classes with trees		% of land class including trees in the region			
			% of class in the country	% of land in the region	Forest	High Wood Land	Plantations	Low Wood and Shrub Land
Oromia	36,015	31.5	28.6	48.1	6.1	14.6	0.2	27.2
SNNPR	10,707	9.4	4.8	27.0	6.9	5.2	2.2	12.6
Gambella	3,185	2.8	3.0	56.9	15.4	28.2	0.0	13.3
Dire Dawa	129	0.1	0.1	28.4	0.0	0.0	0.0	28.4
Harari	33	0.0	0.0	23.7	0.7	0.0	0.0	23.0
Amhara	15,764	13.8	14.9	57.1	0.6	5.3	1.3	49.9
Tigray	4,940	4.3	3.5	43.4	0.2	0.0	0.0	43.2
Beneshangul	4,927	4.3	6.5	80.3	1.4	50.2	0.0	28.7
Afar	9,620	8.4	5.3	33.4	0.4	0.0	0.0	32.9
Somali	29,122	25.4	33.2	69.1	0.0	0.1	0.0	69.0
Addis Ababa	62	0.1	0.0	12.7	0.0	0.0	12.7	0.0
ETHIOPIA	114,505	100.0		52.8	3.2	8.8	0.4	40.4

Source: FAO/MEF 2014

Mean growing stock, mean annual increments, aboveground carbon density and total carbon stocks of forest categories of Ethiopia are given in the table below (after Moges et al. 2010). The estimate of carbon stock given here is larger than other estimates. The estimation of C from volume via weight seems to lack an intermediate result of going from green wood to dry matter and would therefore be overestimated (for wood density levels, see e.g. Anonymous 2016).

Forest Category	Growth stock/ free bole volume/ m ³ ha ⁻¹	MAI (m ³ ha ⁻¹ yr ⁻¹)	Free-bole biomass (tons ha ⁻¹) (A)	Biomass Expansion Factor (tons ha ⁻¹) (B)	Aboveground biomass C (tons ha ⁻¹) (A*B*0.5*)	Area (million ha)	Total C Stock (million tons)
High forest	131.5	5.65	131.5	2.74	106.68	4.07	434.19
Woodland	21	0.79	21	6.9	42.75	29.55	1,263.13
Plantation	178.8	12.5	178.8	2.33	123	0.5	61.52
Lowland bamboo	26	1.3	26	6.19	47.5	1.07	50.8
Highland bamboo	83	3.9	83	3.44	84.23	0.03	2.53
Shrub land	14.9	0.5	14.9	8.2	36.04	26.4	951.54
Total C							2,763.70

Sources: WBISPP (2005), Sisay et al. (2009), Brown (1997). Here after Moges et al 2010.

The plantation area has approximately doubled over the last 10-15 years. Its distribution to regions and type of plantation is given in the table below (after FAO/MEF 2014 following Bekele 2011).

Regional State	Industrial plantation (ha)	Non-industrial small scale private plantation (ha)	Per-urban energy plantation (ha)	Total Plantation area (ha)
Oromia	78,800	27 800	26,700	133,300
Amhara	44,600	639,400	0	684,000
SNNPR	27,300	64,000	0	91,300
Tigray	39,700	23,700	0	63,400
Total	190,400	754,900	26,700	972,000

Sources MEF/FAO 2014, Bekele 2011

Some current restoration plans in the regions include the following pilot areas:

Region	Zone	Woreda	Degraded Land (ha)	Population	Population Density (persons/km ²)	Agroforestry (ha)	Forest (ha)	Total (ha)
Amhara	South Gonder	Semada	9,356	247,655	2.65	3,118	6,238	9,356
Tigray	South-eastern	Saharti Samre	5,640	124,340	0.74	1,880	3,760	5,640
Oromia	East Shoa	Bora	6,070	210,179	1.62	2,023	4,047	6,070
SNNPR	Sidama	Boricha	7,060	131,431	2.8	2,284	4,776	7,060
Total			28,126	373,440		9,305	18,821	28,126

Source: MEF 2015 (Tigray BoA, Bora Office of Agriculture, Amhara BoA , Boricha OoA)

Subsequent plans include replicating the activities in 86 woredas of the four regional states.

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Supplementary information on management systems and capacity of ICRAF

1. Financial management

ICRAF is a member of the CGIAR Consortium³ for international agricultural research. Overall ICRAF follows the financial management guidelines of the CGIAR as set out in its financial guidelines:

- CGIAR Financial Management: Financial Guideline Series no.1, February 28, 2007
- CGIAR Accounting Policies and Reporting Practices Manual: Financial Guidelines Series no. 2, February 15, 2006
- CGIAR Auditing Guidelines: Financial Guidelines Series no. 3, October 1, 2010
- CGIAR Cost Allocation Guidelines: Financial Guidelines Series, no. 5, December 1, 2008
- CGIAR Procurement of Goods, Works and Services Guidelines: Financial Guidelines Series no. 6, April 28, 2008

These guidelines are available at: <http://www.cgiar.org/resources/cgiar-financial-guidelines-serie/>; main legal documents of the CGIAR: <http://www.cgiar.org/resources/main-legal-documents-of-cgiar/>; and CGIAR annual financial reports at <http://www.cgiar.org/resources/cgiarfinancial-reports/>.

Within this framework a comprehensive set of more specific policies, guidelines and procedures as adopted by the ICRAF Board of Trustees is followed to direct and serve its operation to comply with international humanitarian, social, and environmental standards. Specifically on financial management and procurement:

- Financial Services Unit Policies and Procedures Manual (with 12 chapters covering Policies, System, Controls, Financial Transactions Processing, Fixed Assets, Inventory, Debtors, Payroll, Financial Reports, Security and a Grant Management System)
- Financial Authorization Guidelines (Nov-2009)
- Fraud Prevention Policy (Jun-2014)
- Partner Financial Management Capability Assessment Policy (Apr-2013)
- Donor Reporting Guidelines (Sep-2009)
- Procurement Policy (Mar-2015) with a Procedures Manual (Mar-2015)

The Audited Financial Statements 2015 are available at

<http://www.worldagroforestry.org/about/corporate-documents>. In addition to presenting the Centre's financial position, this document reports on our corporate governance and corporate social responsibility activities as well as analyzing the Centre's performance over the past five years.

2. Risk Management

Risk factors and responses thereto by the project have been identified (section 12b with risk management table). They will be monitored as part of the general project monitoring and reporting. One of the tasks of the project is to develop the legal (regulatory) framework of the tree seed sector, including a monitoring and evaluation protocol to measure impact (see also note on Monitoring and Evaluation).

Furthermore, ICRAF has instituted a

- Risk Management Policy (Nov-2014, 11pp).

³ <http://www.cgiar.org>

This is a Centre-wide policy and encompasses all operations in all countries within which ICRAF operates. Risk management at the ICRAF is based on ISO 31000: 2009 Risk Management – Principles and Guidelines (ISO 31000).

The ICRAF Board statement on risk management is included in the annual report 2014-2015, available at <http://www.worldagroforestry.org/about/corporate-documents>.

Periodic unrest in the country may be a cause of concern and may influence where it is possible to work. Implementation planning will have to take this into consideration. To prepare for external risks ICRAF has in place a

- Security Policy (Apr-2016, 6pp) with procedures for management (Apr-2016, 36 pp), evacuation and crisis handling (Jul-2012, 14 pp plus annexes).

3. Management of Safeguards, Inclusion of Stakeholders, and Anti-corruption

Overall the project is designed to provide for improvement of the environment as well as the welfare of people.

Environmental safeguards

The project will focus on building up the resource of indigenous species and ‘naturalized exotics’; no new species introductions are planned. Relevant ICRAF policies will be adhered to:

- ICRAF Policy on Invasive Alien Species (Nov-2014, 8pp)
- ICRAF Policy on Tree Genetic Resources (Nov-2014, 9 pp)

Social safeguards and stakeholders

Related to tenure, seed orchards will in general be established on government land. In addressing the needs and inclusion of stakeholders (section 9), the SHARED approach will be followed. SHARED refers to a “StakeHolder Approach to Risk-informed and Evidence-based Decision-making”, which is a demand driven, tailored and interactive engagement process for collaborative learning and co-negotiation of decisions to achieve mutually agreed upon development outcomes.

(http://www.worldagroforestry.org/sites/default/files/SHARED%20brochure_updated_no%20bleed.pdf).

ICRAF has instituted a comprehensive set of specific policies, guidelines and procedures (adopted by the ICRAF Board of Trustees) to direct and serve its operation to comply with international humanitarian, social, and environmental standards. Relevant in the context of social safeguards are:

- Partnerships Strategy and Guidelines (2013, 36 pp)
- Private Sector Engagement Policy (Apr-2014, 9 pp)
- Intellectual Assets Policy (Nov-2012, 6 pp)
- Research Ethics (Nov-2014, 5 pp)
- Local Knowledge (including indigenous and traditional knowledge) (Nov-2014, 5pp)
- Capacity Development Strategy 2013-2018 (2013, 24 pp).

These policies and strategies will be followed within the overarching framework provided by the safeguarding measures developed by MEFCC (cf. section 12c).

Anti-corruption

To avoid corruption ICRAF has put in place a

- Fraud Prevention, Monitoring and Response Policy (Jun-2014, 16pp),

based on five core principles: a) Awareness raising and training; b) a culture of honesty and ethical behaviour; c) risk monitoring; d) risk management and control; and e) effective oversight by internal audit. This policy focuses on activities or conduct that constitutes fraud, corruption or maladministration. The policy should be read in relation to other ICRAF policies, manuals, operational procedures and guidance notes on processes about acceptable standards in ICRAF operations. Scientific fraud is not dealt with in this policy as it is covered by a separate scientific fraud policy.



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