REPUBLIC OF KENYA
MINISTRY OF ENVIRONMENT AND FORESTRY
KENYA FOREST SERVICE
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CAPACITY DEVELOPMENT PROJECT FOR SUSTAINABLE FOREST MANAGEMENT IN THE REPUBLIC OF KENYA PROJECT COMPLETION REPORT

NOVEMBER 2021

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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Project Completion Report

Capacity Development Project for Sustainable Forest Management in the Republic of Kenya

(June 2016 – October 2021)

Alfred N. Gichu, Project Director
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Submission Date: 10th October 2021

January 2020, JCC held at Board Room, Ministry of Environment and Forestry

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Abbreviation and Acronyms

AESA	Agro-Ecological Analysis
AD	Activity Data
AI-CD	African Initiative for Combating Desertification
AR-CDM	Afforestation/Reforestation Clean Development Mechanism
ASALs	Arid and Semi-Arid Lands
ASS	Acacia seedling seed stand
CADEP	Capacity Development Project for Sustainable Forest Management
CBO	Community Based Organization
CG	County Government
CFA	Community Forest Association
Comp.	Component
CoP	Conference of the Parties
C/P	Counterparts
CS	Candidate Plus Trees (CPTs)
DAC	Development Assistance Committee
DERP	Dryland Eco-region Research Programme
DNA	Deoxyribonucleic Acid
DNFP	Draft National Forest Policy
DRSRS	Department of Resource Surveys and Remote Sensing
EF	Emission Factor
Ex/Im	Export/Import
FAO	Food and Agriculture Organization of the United Nations
FCMA, 2016	Forest Conservation and Management Act, 2016
FFS	Farmer Field School
FIP	Forest Information Platform
FMA	Forest Management Agreement
FRL	Forest Reference Level
FTBC	Forest Tree Breeding Center
GoK	Government of Kenya

GoJ	Government of Japan
HoA	Horn of Africa
ICFRA	Improving Capacity in Forest Resource Assessments
IPCC	Intergovernmental Panel on Climate Change
ITC	Information Technology Center
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
LPT	Local Planning Team
KALRO	Kenya Agricultural and Livestock Research Organization
KEBS	Kenya Bureau of Standards
KEFRI	Kenya Forestry Research Institute
KEPHIS	Kenya Plant Health Inspectorate Service
KFS	Kenya Forest Service
KRA	Kenya Revenue Authority
LCC	Lansing Community College
MoEF	Ministry of Environment and Forestry
MoU	Memorandum of Understanding
MRV	Measurement Reporting Verification
NCCRS	National Climate Change Response Strategy
NFMS	National Forest Monitoring System
NFProgramme	National Forest Programme
NGO	Non-governmental Organization
O & M	operating and maintenance
OP	Output
PaM	Policies and Measures
PDM	Project Design Matrix
PFMP	Participatory Forest Management Plan
PO	Plan of Operation
PTS	Progeny Test Site
RCMRD	Regional Centre for Mapping of Resources for Development
REDD	Reducing emissions from deforestation and forest degradation
RS/GIS	Remote Sensing and Geographic Information Systems

SLEEK	System for Land-Based Emission Estimation in Kenya
SSR	Simple Sequence Repeat
TA	Technical Assessment
The Project	Capacity Development Project for Sustainable Forest Management
TICAD	Tokyo International Conference on African Development
ToR	Terms of Reference
TWG	Technical Working Group
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WDCD	World Day for Combating Desertification

Executive Summary

1. Background

Since 1980's, the Government of Japan (GoJ) and JICA has supported KEFRI and KFS in social forest development in Arid and Semi-Arid Lands (ASALs) of eastern Kenya. As the result of this cooperation, farm forestry techniques and extension methodology has started to be disseminated in Kenya. In addition to this, Japanese technical cooperation for Project on "Development of Drought Tolerant Trees for Adaptation to Climate Change in Drylands of Kenya" and Third Country Training Program on "Adaption to Climate Change in Africa through Social Forestry" were implemented by KEFRI as counter-part organization.

In light of achievements made by the Kenya-Japan past and on-going cooperation in forestry sector, the Government of Kenya (GoK) requested the GoJ to support the country to promote sustainable forest management for contributing to the Kenyan Constitution and the economic blueprint Vision 2030, aiming at achieving a minimum 10% forest cover by 2030. Both countries agreed to start a new project; "Capacity Development Project for Sustainable Forest Management (CADEP or CADEP-SFM)" from 2016 to 2021 with the implementation agencies of the Ministry of Environment and Forestry, KFS and KEFRI, aiming at capacity building for sustainable forest management in Kenya through five outputs: policy support, forestry extension in ASALs, REDD+ readiness, tree breeding, and regional cooperation.

2. Activities

Output 1: Policy Support (Component 1)

This Project started in 2016, followed by the launch of "National Forest Programme (NFP) 2016-2030". In 2019, "National strategy for achieving over 10% tree cover by 2022" was released with concrete activity plan until 2022. Component ("Comp.") 1 team discussed how to deal with NFP which is targeting 10% forest cover by 2030, and prepared a paper describing that MoEF should postpone the NFP revision planned in 2021 to 2023 for strategic policy implementation while maintaining policy coherence.

As for "The Forest Conservation and Management Act (FCMA), 2016", Comp.1 focused on the "Part VII of FCMA (Licencing and trade in forest products)" and held stakeholders' workshops to analyse gaps focusing on the situation of county governments' forestry legislation. Through the discussion and field surveys, "Draft forest products export and import rules, 2021" was prepared.

Other than the activities above, Comp.1 prepared a report analysing County Governments' forestry legislations, and conducted policy briefing to high-level officers of the MoEF, KFS

and KERI and introduced lessons learnt from forestry and forest administration in Japan such as forest management using drone etc.

Output 2: Forestry Extension in ASALs (Component 2)

Component 2 aimed at 1) capacity development of pilot county governments, 2) promotion of collaboration among stakeholders in enhancing tree growing in ASALs, and 3) promotion of improved *Melia volkensii* growing in ASALs. Under the first objective, the Project conducted Farmer Field Schools and formulated Participatory Forest Management Plans in two (2) pilot counties, namely Embu and Taita Taveta Counties, aiming at involving pilot county staff and strengthening their skills and experiences on sustainable forest management to support forest administration by the counties. Due to the delay of employment of county staff for forestry in the pilot counties, capacity development of them was conducted at the latter part of the project implementation period. Still, the project presented valuable outcomes and lessons regarding capacity development of county governments in forestry sector, which can be referred to by other counties. For the second objective, a workshop for collaboration among stakeholders was conducted, Memorandum of Agreement (MoA) for collaboration in research and development on *Melia volkensii* was signed by KEFRI, a private company and the Project, and technical information such as growth curve of *Melia volkensii* was prepared and provided to private companies. For the third objective, the Melia growing guidelines were published and revised, 14 trainings and seminars for Melia growers were conducted, Melia growing by farmers and schools were supported, Melia products market survey was conducted, and the direction for promotion of Melia plantation was prepared.

Output 3: REDD+ Readiness (Component 3)

The main activities of Component 3 are to support Kenya for developing the Forest Reference Level (FRL) and National Forest Monitoring System (NFMS) which are two of four requirements for result-based payment to be obtained through implementation of REDD+. Kenya submitted the first FRL to UNFCCC in January 2020 and modified FRL in August 2020 responding result of the technical assessment by UNFCCC with making the series of discussion with many stakeholders through mainly organizing REDD+ Technical Working Group (TWG) meetings. Kenya proposes a FRL of 52,204,059 (tCO2/year). Kenya through this project also has developed the NFMS consisting of monitoring function and data management function. The NFMS aims to monitor1) forest cover and forest cover change for Activity Data, 2) forest carbon stock for Emission Factor, 3) near-real-time forest cover change, 4) policies and measures (PaMs), 5) biodiversity and 6) REDD+ and Afforestation/Reforestation Clean Development Mechanism (AR-CDM) Projects. The data management of the NFMS is operationalized by a portal web site named Forest Information

Platform (FIP).

Output 4: Tree Breeding (Component 4)

Component 4 aims at developing capacity of tree breeding techniques for drought tolerant and good growth trees, *Melia volkensii* (Melia) and *Acacia tortilis* (Acacia). Tree breeding in Kenya has been on the first stage with 2 Melia seed orchards and its 12 progeny test sites (PTS) established in the previous project. The project analysed growth and other traits using the data of PTS and seed orchards assessed by counterparts (C/Ps) and developed a draft of plus tree traits tables. The Comp. 4 implemented for a further step the on-site selection of 400 individuals of 2nd generation Melia. Some experiments of cutting propagation technique which has not been established completely was implemented. The capacity of pollen collection and artificial crossing technique have been strengthened through the technology transfer. For Acacia, thinning of stands were implemented for improvement, while selecting of plus trees has been partly implemented. The Comp. 4 contributed to build a breeding research ability in Kenya to accomplish the cycle of tree breeding.

Output 5: Regional Cooperation (Component 5)

This Component is harmonized with the objectives of Africa Initiative for Combating Desertification to Strengthen Resilience to Climate Change in the Sahel and Horn of Africa (HoA) (AI-CD) which was launched in a side event during the TICAD VI held in Nairobi, Kenya. The initiative is implemented by 7 countries namely; Djibouti Eritrea, Ethiopia, Kenya, Somalia, South Sudan and Sudan. Kenya is the hub for HoA with strong ownership from MoEF and KEFRI. AI-CD objectives are set to be achieved through three major pillars namely; Building Network, Knowledge Sharing and Improving Access to Finance.

With the regard of three AI-CD pillars, the Comp. 5 implemented the Regional Fora for HoA which emphasized on the need to address the countries challenges using their local solutions which can be found within each country and by utilizing knowledge and sharing experiences. Specifically to strengthen knowledge sharing within Kenya and Sub-Sahara Africa, the Comp. 5 developed the system to collect, document and share the good practices reaching to wider stakeholder as a method of internet based and non-internet based to provide solutions towards combating desertification.

3. Outputs and indicators

The Project has five Outputs as described in above chapter. There are twelve indicators to evaluate the achievement of the five outputs. As a result, all indicators were judged "achieved" or "almost achieved".

4. Project Purpose and indicators

To evaluate the Project Purpose "Capacity at the national and county level for sustainable forest management is strengthened", the Project Purpose has five indicators. As a result, four indicators out of five were judged "achieved". Indicator no.5 "Distribution system of seeds and seedlings of improved *Melia volkensii* is improved" was judged "not achieved".

5. Result of review based on DAC evaluation criteria

According to the guideline for Project Completion Report, it is necessary to review the implementation results of this project from the perspectives of the five criteria – Relevance, Effectiveness, Efficiency, Impact, and Sustainability. As a result, four criteria out of five was judged high, but the Efficiency was judged middle. The main reason of the result of Efficiency is the input of JICA side exceeded the original budget.

I. Basic Information of the Project

## 1. Country

Republic of Kenya

2. Title of the Project

Capacity Development Project for Sustainable Forest Management in the Republic of Kenya (CADEP or CADEP-SFM)

3. Duration of the Project

12th July 2016 – 11th October 2021 (actual)

(12th July 2016 - 11th June 2021 (planned))

The project duration was extended till October 2021 due to recover some critical activities delayed implementation of COVID-19.
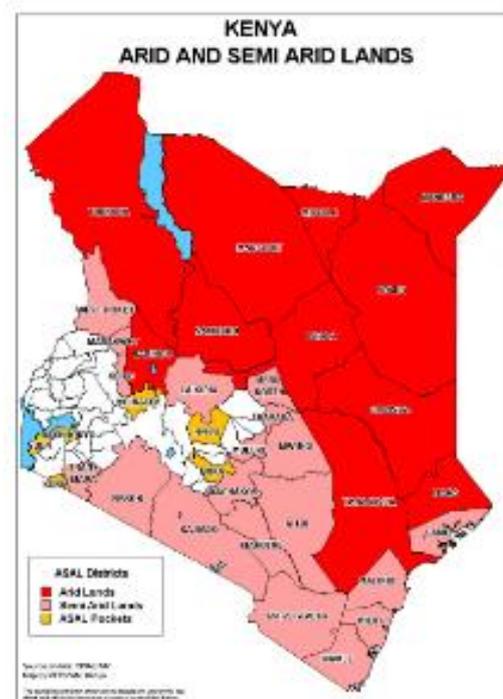
Arid and Semi-Arid Lands in Kenya

4. Background

  Over 80% of Kenya's land area is either arid or semi-arid areas (ASALs) where over 10 million pastoralists and agro-pastoralists inhabit. Demand from industry and households for fuel wood, agricultural expansion, overgrazing through population increase have accelerated the decrease of natural resources and degradation of soil in recent years. Under the circumstance, the Kenyan Constitution and the economic blueprint, Vision 2030, require the country to work towards achieving a forest/tree cover of at least 10% of the land area to ensure sustainable resource use, growth and employment creation. The forest cover in 2016, however, was still 7.4% (TaskForce, 2018).

  The mandate and functions of the forest sector are enunciated by the FCMA. Further, under the provisions of the Constitution in the Fourth Schedule, the function of forestry and environment is a concurrent function assigned to both National and County Governments. In this regard, capacity building of CGs is quite important especially for private forest sector including farm forestry to achieve 10% target.

  Climate change, which is defined as a permanent shift in weather patterns, is now a reality in Kenya. It is projected that in the next 100 years, the average temperature in the East Africa region could increase by 3 ℃ as a result of climate change. Moreover, frequency and intensity of extreme climate events such as droughts and floods will also increase in the future. Accordingly, the promotion of REDD+ is considered crucial not only from the viewpoint of increasing the forest cover but also from climate change mitigation policy in Kenya.

Since 1980's, the Government of Japan (GoJ) and JICA has supported KEFRI and KFS in social forest development in Arid and Semi-Arid Lands (ASALs) of eastern Kenya. As the result of this cooperation, farm forestry techniques and extension methodology has started to be disseminated in Kenya. In addition to this, Japanese technical cooperation for Project on "Development of Drought Tolerant Trees for Adaptation to Climate Change in Drylands of Kenya" and Third Country Training Program on "Adaption to Climate Change in Africa through Social Forestry" were implemented by KEFRI as counter-part organization.

In light of achievements made by the Kenya-JICA's past and on-going cooperation in forestry sector, the Government of Kenya (GoK) requested the GoJ to support the country to promote sustainable forest management for contributing to the Kenyan Constitution and the economic blueprint Vision 2030, aiming at achieving a minimum 10% forest cover by 2030. Both countries agreed to start a new project; "Capacity Development Project for Sustainable Forest Management (CADEP)" from 2016 to 2021 with the implementation agencies of the Ministry of Environment and Forestry, KFS and KEFRI, aiming at capacity building for sustainable forest management in Kenya through five outputs: policy support, forestry extension in ASALs, REDD+ readiness, tree breeding, and regional cooperation.

5. Overall Goal and Project Purpose

Overall goal: Sustainable forest management is promoted in Kenya towards the national forest cover target 10%.

Project Purpose: National capacity at the national and county level for sustainable forest management is strengthened.

6. Implementing Agency

Ministry of Environment and Forestry (MoEF),
Kenya Forestry Research Institute (KEFRI),
Kenya Forest Service (KFS),
County Governments (Embu and Taita Taveta)

II. Results of the Project

1. Results of the Project

1-1. Input by the Japanese side

Input by the Japanese side, both long and short-term, is mentioned as follows (refer to Table II-1 and Table II-2);

All the items were input according to the plan in a timely manner.

1-1-1. Personnel for long-term experts

Table II-1: List for long-term experts

Name	Designation	Duration
Mr. Kenichi Takano	Chief Advisor/ Forest Policy	10th June 2016-31st July 2018
Mr. Keiichi Takahata	Chief Advisor/ Forest Policy	11th July 2018 –13th September 2021
Ms. Naomi Matsue	Forestry Extension	29th July 2016 – 28th July 2018
Mr. Katsuro Saito	Deputy Chief Advisor/ Forestry Extension	2nd July 2018 – 11th October 2021
Ms. Yuki Honjo	Regional Cooperation/ Project Coordination	8th July 2016 – 11th October 2021

1-1-2. Personnel for short term experts

Table II-2: List for short-term experts for Output 2,3 and 4

Output 2（Tree Growing in ASAL s）	
Name	Designation
Mr. Shinji Ogawa	Farm Forestry Extension
Output 3（REDD+ Readiness）	
Name (From Company)	Designation
Mr. Kazuhisa Kato (Asia Air Survey)	Leader / National forest monitoring system (NFMS) / Measurement Reporting & Verification (MRV)/FRL (June 2016 - Oct. 2021)
Mr. Kei Sato (PASCO)	Forest remote sensing / GIS (June 2016 - October 2021)
Mr. Kazuhiro Yamashita (JOFCA)	FRL / Forest inventory (January 2017 – September 2018)

Mr. Kohei Yamamoto (PASCO)	Data base (June 2016 – July 2017)
Mr. Shintaro Ishizuka (PASCO)	Date base (June 2017 - July 2020)
Mr. Kenji Shindo (PASCO)	Data base (2) (June 2018 – July 2018)
Mr. Akinobu Sembo (PASCO)	Data base (3) (September 2019 - September 2021)
Ms. Sahori Fujimura (Asia Air Survey)	Forest remote sensing / GIS assistant (September 2016 - December 2017)
Mr. Yoshihiko Sato (Asia Air Survey)	NFMS (2) / FRL (2) / Forest remote sensing / GIS assistant (June 2017 – October 2021)
Ms. Sachiko Takinaga (Asia Air Survey)	Coordinator (June 2016 – July 2016)

Output 4 (Tree Breeding)	
Name (Organization)	Designation (mainly dispatched with a short term)
Dr. Masatoshi Ubukata (FTBC)	Team leader (2017.9〜2021.3)
Dr. Hiroo Yamada (FTBC)	Team leader (2021.4〜2021.10))
Dr. Koichiro Gyokusen (Kyushu University)	Drought tolerance (2017.9〜2021.10)
Dr. Eiji Goto (Kyushu University)	Drought tolerance(2017.9〜2019.3)
Dr. Hisaya Miyashita (FTBC)	Tree breeding (2017.9〜2021.10)
Dr. So Hanaoka (FTBC)	Artificial crossing (2017.9〜2021.10)
Dr. Michinari Matsushita (FTBC)	Artificial crossing (2017.9〜2021.10)
Dr. Eitaro Fukatsu (FTBC)	Tree breeding (2020.4〜2021.10)
Mr. Koji Hashimoto (FTBC)	Tree breeding (2017.9〜2019.3)
Mr. Taiki Kobayashi (FTBC)	Tree breeding (2019.4〜2021.10)
Mr. Yoshinori Takakura (FTBC)	Tree breeding (2017.9〜2020.3)
Mr. Ryo Furumoto (FTBC)	Tree breeding (2019.4〜2021.10)
Mr. Hideki Kawato (FTBC)	Project Management (2017.9〜2018.3)
Mr. Yutaka Kawashima (FTBC)	Project Management (2018.4〜2020.3)
Mr. Tatsuo Inamoto (FTBC)	Project Management (2020.4〜2021.10)
Mr. Shizuo Kamizore (FTBC)	Project Management (2017.9〜2019.5)
Mr. Hidetaka Ichikawa (FTBC)	Project Management (2019.4〜2021.3)
Mr. Yoshiki Takahama (FTBC)	Project Management (2021.4〜2021.10)

1-1-3. Counterpart Trainings

Refer to ANEEX 1 – JICA's Co-Creation Knowledge Programme trainings and CADEP Counterpart's trainings. The list of the training in the Table II-3 and 4, respectively.

Table II-3: List of JICA's Co-Creation Knowledge Programme trainings

No.	Title of training	Duration
1	Policy planning skills for implementation of REDD+ (for Government executives)	28th May to 6th June,2017
2	GIS and Remote Sensing Utilised for Biodiversity information	21st May to 29th July, 2017
3	Combating Desertification to strengthen resilience to Climate Change in Sub-Saharan Africa	19th Nov. to 2nd Dec., 2017
4	Remote sensing of Forest resources	19th Aug. to 6th Oct., 2018
5	Proceeding ability of policy making for sustainable forest management	21st Aug to 20th Sep., 2018
6	Combating Desertification to strengthen resilience to Climate Change in Sub-Saharan Africa	25th Nov. to 8th Dec., 2018
7	Remote sensing of Forest resources	13th May to 28th June, 2019
8	Combating Desertification to strengthen resilience to Climate Change in Sub-Saharan Africa	27th Oct. to 15th Nov. 2019
9	Sustainable forest management with community participation	16th Sep, to 15th Nov.,2019
10	Online training: Tropical forest management using the JJ-Fast, AN ALOS-2 based forest monitoring system and other satellite technologies	1st to 16th Feb., 2021

Table II-4: The list of CADEP Counterpart training

No.	Title of training	Duration
1	Capacity Development Project for Sustainable Forest Management in Kenya	6th to 17h Nov.,2017
2	Capacity Development Project for Sustainable Forest Management in Kenya (The training was cancelled due to COVID-19)	2nd to 13th March, 2020

1-1-4. Machinery, Equipment and Materials

Refer to ANNEX 1 – Machinery and Equipment

1-2. Input by the Kenyan side

1-2-1. Counterparts from Kenya government

Counterparts from Government of Kenya are shown in Table II-4. Details are shown in ANNEX 1.

Table II-5: CADEP Project Director, Manager and Output managers

for CADEP	Name	Designation
Project Director	Mr. Gideon Gathaara	Conservation Secretary, MoEF (up to 2019)
	Mr. Alfred Gichu	Conservation Secretary, MoEF
Project Manager/ Output 1 Manager	Mr. Hewson Kabugi	Director of Forest, MoEF (up to 2018)
	Mr. Steven King'oo	Assistant Director Forest Conservation, MoEF
Output 1 Focal Point	Mr. Gordon Sigu	Principal Research Scientist, KEFRI (up to 2020)
	Ms. Beatrice Atemo	Senior Forester, KFS
Output 2 Manager	Mr. Peter Nduati	Assistant Chief Conservator of Forests, KFS
Output 3 Manager		
Output 4 Manager	Dr. Gabriel Muturi	Deputy Director, Biodiversity and Environment Management, KEFRI (up to 2020)
	Dr. James Ndufa	Deputy Director, Biodiversity and Environment Management, KEFRI
Output 5 Manager	Dr. Ebby Chagala-Odera	Deputy Director, Technical Support Service/ Forest Research Support Services, KEFRI (2016- 2020)
	Dr. Musingo Mbuvi	Deputy Director, Forest Research Support Service, KEFRI (2020-2021)

1-2-2. Land and Facilities
（1）Project offices in MoEF, KFS KEFRI are well provided.
（2）Orchards, stands, progeny test sites in eight sites have been established since 2012, when the project of Development of Drought Tolerant Trees for Adaptation to Climate Change in Drylands of Kenya (collaboration with KEFRI and JICA) was started. The activities of the previous project were handed over as Output 4 of the current Project. The below Table II-5 shows the orchards, stands and progeny test sites and Figure II-1 shows the location of project site.

Table II-6: List of the orchards, stands and progeny test sites

No.	Location	Orchard, Stand and Progeny Test Site
1	Tiva	*Melia volkensii* / Orchard
		Melia volkensii / Progeny Test site
		Acacia tortilis /Stand
2	Marimanti	*Melia volkensii* / Progeny Test Site
3	Gaciongo	*Melia volkensii* / Sub Progeny Test Site
4	Makima	*Melia volkensii* / Sub Progeny Test Site
5	Kibwezi	*Melia volkensii* / Orchard
		Melia volkensii / Progeny Test site
		Acacia tortilis /Stand
6	Kasigau	*Melia volkensii* / Progeny Test Site
7	Voi	*Melia volkensii* / Sub Progeny Test Site
8	Yikithuki	*Melia volkensii* / Sub Progeny Test Site

1-3. Activities (Planned and Actual)

1-3-1. Output 1: Policy support
(Implementing and monitoring capacities of forest-related policies/strategies at the national level are enhanced.)

1.1. Review existing/planned forest-related policies/strategies
This activity was carried out as a first step of the "Policy Support" to identify in which topic Comp.1 should focus on. Thirteen (13) forest-related acts/strategies such as

1. The Forest Conservation and management Act, 2016
2. Environmental Management and Coordination (Amendment) Act, 2015
3. The Energy Act, Cap 314, 2006
4. Wildlife Conservation and Management Act, 2013
5. Agriculture, Fisheries and Food Authority Act, 2013

were reviewed and summarized in the first Project year. After that some were added and modified in accordance with each policies/strategies situation. The report was presented for use as a good textbook for wider stakeholders.

1.2. Conduct gap analysis between the existing forest-related policies/strategies and their actual implementation at field level
Project Purpose of CADEP is "Capacity at the national and county level for SFM is strengthened". Capacity building on forest policy formulation/implementation for county governments (CGs) is important as well as for national government.

In Dec. 2020, when Comp.2 team visited Taita Taveta county, the County Minister requested CADEP to support the formulation of the "Taita Taveta County Forest Policy". CGs may formulate their own forestry legislation (Policy, Law etc.) through the Constitution and FCMA,2016. Considering this situation, Comp.1 team made a decision to start Activity 1.2 "gap analysis" focusing on the situation of CGs forestry legislation. Comp.1 team conducted survey of six CGs. Each CG situation was as follows. (Table OP1-1)

	Forest Policy	Forest Act
Taita Taveta	△	×
Kilifi	○	○
Makueni	×	×
Elgeyo Marakwet	○	△
Vihiga	△	×
Embu	×	×

○····completed
×····not yet
△····draft completed

Main field survey was conducted from Feb. to Oct. 2020. Additional telephone interview was followed to update information.

The main reasons for the delay in the formulation of County forestry laws and policies were: (1) Lack of capacity and (2) budgetary constraints. Other gaps included;

1. Lack of an authoritative National forest policy to guide the formulation of County laws. The drafting of the National Forest Policy is however underway.
2. Inadequate awareness and public participation- There is need for enhanced civic education on County forestry legislation.
3. Inadequate prioritization of forestry at the County level- There is need for the creation of forestry structures at County level and employment of adequate forestry staff at County level.

Whilst it is recognised that the County Governments face budgetary and capacity constraints, the potential benefits in terms of forest conservation and restoration and livelihoods necessitate sound and agreed legislative frameworks.

In addition, Comp.1 team was able to find some inconsistency in documents which seems possible to be improved. For example,

➢ Taita Taveta County Forest Policy use the word "county forest" although the Policy should cover not only county forest but also private forest.
➢ Vihiga Draft County Forest Policy was prepared in Nov. 2019, but rejected by the County Assembly because of the lack of required formulation steps established in Kenya Law Reforms Commission.
➢ Some County Forest Policy are too general, like a copy of national version, lack of unique information although such information is sometimes written in Transition Implementation Plan (TIP), Participatory Forest Management Plan (PFMP) etc.
➢ National Forest Policy is under the process of drastic revise, but only 24% of the interviewee know about the national level situation.

Elgeyo Marakwet County Forest Policy is very detail and well organized, but there was a development partner's (UNDP) support behind. It would be quite inefficient if each CG formulate their own Forest Policy individually. Comp.1 team agreed that formulating guideline is important so that CGs can prepare their own Policies even if they cannot obtain big financial support.

In Aug. 2021, Comp.1 team met with Embu County (yet to establish County Forest Policy) forest officers and explained about the report not only for one of the dissemination activities but also for the capacity building process for one of the Comp.2 pilot counties. Lessons learnt written in this report is expected to contribute to formulation process of Embu county forest

policy.

1.3. Support planning and monitoring of National Forest Programme and other forest-related policies/laws

Outline of the transition of the of Activity 1.3 based on the forest policy situation
The Constitution, 2010 requires this country to increase tree cover at least 10%. Vision 2030 stipulates that the target year of achieving 10% forest cover as 2030. In this regard, "National Forest Programme 2016-2030" was prepared and launched in 2017.
It was almost the same time that CADEP started. Accordingly, NFP was prioritized in the Comp.1 activity. At that time (P.O. ver.1), three activities
>   A; Support the updating of the National Forest Programme in 2019.
>   B; Support baseline data collection for monitoring and evaluation based on National Forest Programme strategic framework.
>   C; Support training in participatory Monitoring &Evaluation processes on forest related policies/strategies.

Were set up, and then, on the P.O. ver.2,
>   D; Support making the action plan of National Forest Programme
Was added as a fourth activity under Output 1.

After that, in 2018, presidential directive to increase tree cover to 10% by 2022 came into effect, and MoEF prepared "National strategy for achieving and maintaining over 10% tree cover by 2022". In this regard, CADEP Mid-term Review Report (Feb. 2019) prepared by the joint review team (GoK side and JICA HQs) suggested that Comp.1 should prioritize activities considering the recent forest policy situation. After all, activities A, B, C and D (see above) were reorganized into 3 activities as;
>   1.3.1. Support making the action plan of National Forest Programme
>   1.3.2. Review monitoring and evaluation process of the National Forest Programme
>   1.3.3. Support revising "Draft National Forest Policy, 2015" and "The Forest Conservation and Management Act, 2016"

Activity D remained unchanged as 1-3-1 because it was already completed.

1.3.1. Support making the action plan of National Forest Programme
Comp.1 team conducted this activity through consultant contract and 3 times Stakeholder WS from 2017 to 2018, and the Draft Action Plan was finalized in mid-2019. But as already mentioned, target year of 10% tree cover had changed from 2030 to 2022, and the "New Strategy" was released in May 2019. Accordingly, to avoid confusion and duplication of the

forest sector M/E process, Comp.1 team suggested that MoEF should discontinue this process.

1.3.2. <u>Review monitoring and evaluation process of the National Forest Programme</u>
Comp.1 team prepared a report named "Review monitoring and evaluation process of the NFP(2016-2030)", and explained it in the JCC in Jan. 2020 (It is listed in ANNEX 2).
The conclusion of the report is as follows;

> The monitoring table of the NFP shows that the forest cover target in the year 2030 as 10%, as well as 7.5% in 2020 and 8.5% in 2025. There are also indicators other than forest cover, but such indicators are more or less related to forest cover. So, it may not be worth spending much resource to carry out monitoring along with NFP monitoring table.
>
> NFP describes in general, what is required for the forest sector. On the other hand, "New Strategy" which was released in May 2019 describes dozens of activities with indicators necessary to achieve 10% tree cover by 2022 (ex; establish seed sources in all the eco-regions, 50 ha in 4 years) in the implementation matrix.
>
> That is to say, NFP plays a role as general forest sector guideline, and the New Strategy (and its monitoring framework) plays a role as concrete "action plan" for 4 years to achieve 10% by 2022. The relationship between NFP and New Strategy can be shown as organogram below.
>
> It would be better not to carry out NFP monitoring planned in 2020. If carried out it, it will be duplication of two monitoring work, and many people will be confused. In addition, updating NFP would not be necessary before 2022.
>
> After 2022, MoEF is supposed not only to review whether 10% target is achieved or not, but also to reflect on four years' lessons learnt. To implement NFP process on the ground level after 2022, it would be better for MoEF to prepare "action plan" with concrete activities from 2023 to 2030. If necessary, NFP itself could be revised in 2023.
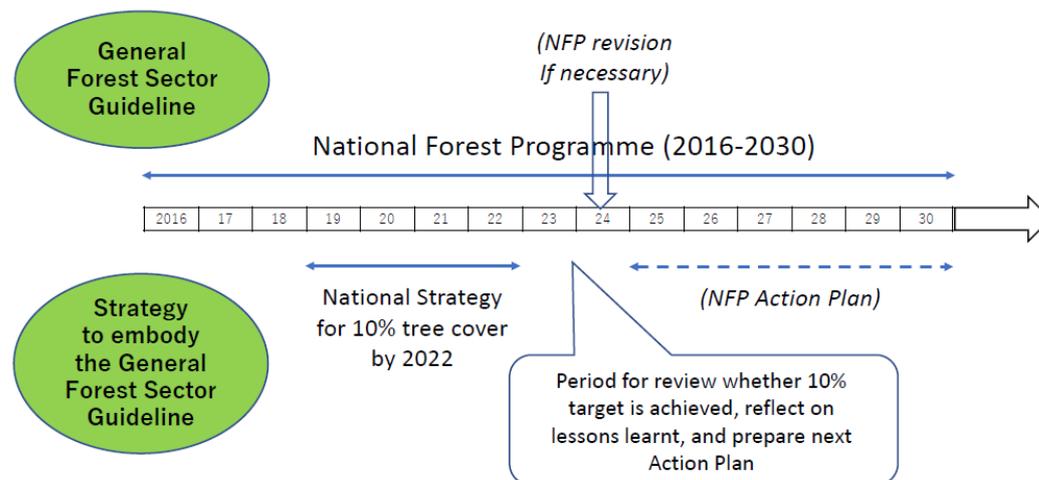
1.3.3. Support revising "Draft National Forest Policy, 2015" and "The Forest Conservation and Management Act, 2016"

This activity was fixed based on Mid-term Review recommendation, but it turned out that UNDP was ready to full support for the revision of DNFPolicy and FCMA,2016. So, Comp.1 team had to consider the demarcation between the UNDP support.

In Apr. 2020, Comp.1 Expert returned to Japan due to the COVID-19 pandemic. In May, Draft National Forest Policy, 2020 was released for public call for submission. JICA experts in Japan prepared "Comment paper" and submitted it in June 2020. Among these comments, for example, comments below were accepted and reflected.

> 2.3.4 At present tree cover on farms is increasing, especially in more densely populated areas with higher agricultural potential. (p19)
> (Is there any evidence data to show this trend? If there's no data to prove this trend, this sentence should be reviewed.)

> Add "Information disclosure and statistic release" as one of the "3.3 Guiding Principles". (At present, even the very important statistic information like forest cover (ha) or plantation (ha) is not released on the KFS homepage. Facts and trend based on the statistic information must be the key indicator for the important decision making such as introducing new restriction.)

> As for other chapters such as chapter 6, sub-chapter 6.1 starts just after the chapter title (Forestry services). But chapter 5 has comprehensive explanation between the title (Management of trees outside forests) and sub-chapter 5.1. Therefore, there is considerable overlap explanation in chapter 5.

> Add information about "Agriculture (Farm Forestry) Rules, 2009" through which the government promotes the planting of trees to maintain 10% of ones land by all farmers.

The Expert returned to Kenya in Nov. 2020. Through the discussion including KFS, it was agreed that the activity 1-3-3 focus on the Part VII of FCMA (Licencing and trade in forest products), analysing gaps, and establishing forest products export/import rule based on FCMA,2016 section 60(1). One of the reasons is from the aspect of promoting *Melia volkensii* export.

Figure OP 1-1: Pine imported from Tanzania

Figure OP 1-2: One stop boarder office in Namanga

Through the field survey and the consultation of key stakeholders (MoEF, KFS, KEFRI, KEPHIS, KRA, KEBS etc.), "A Framework for the Formulation of Forest Products Export and Import Rules" which contains important points as below were prepared and agreed.

➢ The new export (ex)/import (im) rule targets not only timber but also all forest products including Gums, Resins and Charcoal.

➢ " Charcoal rules, 2009" and "Draft Gums and Resins rule, 2021" have articles of the procedure of export and import (permission etc). So, these articles should be deleted at the time of the new ex/im rule Gazettement.

➢ " Charcoal rules, 2009" and "Draft Gums and Resins rule, 2021" have articles regarding the Licence for those who wish to produce/trade charcoal. But as for timber, there is no licence procedure in the any rules. So, the licence for all forest products will be stipulated in the new ex/im rule.

➢ Grading certification be included as one of the requirements to obtain export permit.

➢ The names of particular species to be exempted from ex/im (e.g., sandalwood) will not be included in the new ex/im rule. That will be separately gazetted in line with section 61 of FCMA,2016.

In Aug. 2021, CADEP made a contract with a consultant, and in September, the consultant submitted "Draft Forest Products Export and Import Rules, 2021" in line with the Framework.

In this country, stakeholders' participation process is necessary for the Draft Laws/Rules to be gazetted as a formal version. But CADEP is going to come to an end before this process because of the time restriction.

1.4 Prepare policy briefs based on project activities

Comp.1 team, together with other Component members, had prepared

➢ Lessons learnt from CADEP activities (for wider stakeholders' version), and

➢ Lessons learnt from CADEP activities (policy brief paper).

The former one (for wider stakeholders' version) is a set of manuals, guidelines and other documents of each component activity over 5 years. This would enable GoK to share outcomes and lessons from the project implementation to wider stakeholders in Kenya, Africa and even further.

The latter one (policy brief) is a set of project outcomes, lessons learnt and recommendations especially for GoK high-level officials. Policy briefs prepared by five Components were submitted to the following high-level officials in September 2021.

➢ Mr. Alfred Gichu, Forest Conservation Secretary of MoEF (Project Director)

➢ Mr. Julius Kamau, Chief Conservator of Forests, KFS

➢ Dr. Joshua K. Cheboiwo, Director, KEFRI

➢

1-3-2. Output 2: Forestry Extension
(Capacities of public and private sectors, and NGOs/CBOs to promote tree growing in ASALs are enhanced through forestry extension activities.)

In the original PDM, the Output 2 was described as "Capacities of selected county governments, private sector, NGO and CBO are enhanced through implementing pilot forest management activities." in which emphasis was placed on capacity development of the pilot counties, i.e., Embu and Taita Taveta Counties, to promote devolution process in the forestry sector. However, due to the delay of employment of forestry officers by the pilot counties, capacity development of the counties did not take place as scheduled. Taking such situation into consideration and through the discussions during the Mid-term Review in 2019, the focus of Output 2 was shifted from capacity development of pilot counties to pilot activities with KFS, who has a mandate to support county governments, through promotion of Melia growing in ASALs by wider range of players. Through this change, the Project intended that outcomes and lessons would be well utilized when the pilot counties hired foresters as planned to enhance their capacities.

As a result, many achievements were made such as preparation and revision of the guidelines for Melia growing in ASALs, market survey of Melia products, the first Melia growth curve in the country, directions for promotion of Melia growing among others. Besides, a number of individual farmers, schools and other entities have newly started growing of *Melia volkensii* in ASALs.

As for the pilot counties, despite challenges of the delay of allocation of the county officers, three Participatory Forest Management Plans (PFMPs) were formulated, three Forest Management Agreements (FMAs) were concluded, the first of their kind that were agreed between the county governments and the Community Forest Associations (CFAs), and 47 Farmer Field Schools (FFSs) were assisted with 979 graduates, 70% of whom were female. In addition, though it was not scheduled in the Plan of Operations, one-week induction training was conducted for the county forest officers who were finally recruited by the pilot counties in 2020, the last year of the project duration.

Based on the experiences of Output 2 Activities, following findings and lessons were drawn.

- ✓ Assignment of county forest officers is the fundamental prerequisite for enhancing devolution in the forestry sector. Without their presence, forest policy formulation and implementation by the counties will not be autonomous nor sustainable.
- ✓ Market of Melia products is still small and underdeveloped. Melia is not even known to the big consumers in Nairobi or Mombasa. Trade volume of Melia timber is limited and supply do not meet potential demand. Increase of supply, development and application of proper silvicultural treatment, creating awareness on the value of Melia timber, and

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development of Melia timber market are strongly needed.

2.1. Conduct a feasibility study and examine the approach for pilot implementation and select pilot Counties.

2.1.1. Review and adopt the approaches provided in the project design document

Three approaches, namely through 1) County Governments, 2) Private Sector and 3) NGOs/CBOs, were examined and identified for pilot implementation.

2.1.2. Prepare criteria to select pilot Counties.

As a result of consultations and discussions among stakeholders, the following 11 criteria were identified.

1) Areas of arid and semi-arid (ASAL) County
2) Areas where *Melia volkensii* (Mukau) grows naturally
3) County with less than 10% of forest cover
4) County that has signed the Transition Implementation Plan (TIP) is ready in terms of having employment of County foresters and a clear future plan of forestry development and recruitment
5) County that has budgetary provision geared towards forestry development
6) Areas with diverse ecological and climatic conditions
7) Areas where JICA forest project has not been in operation for less than ten years
8) County with the adequate number of foresters to implement forestry activities and budgetary provision for recruitment
9) Areas where JICA's security code for Japanese Experts allows
10) Number of forestry supporting donors
11) Number of NGO that works in the forestry sector

2.1.3. Select 2 pilot Counties based on the criteria.

Based on the criteria as identified through Activity 2.1.2., 10 candidate counties were assessed and scored. The assessment and scoring led to identification of five (5) priority candidate counties where field surveys were also conducted to enable final selection of two (2) counties. As a result of the above process, Embu and Taita Taveta were selected as the pilot Counties and approved at the 1st JCC in November 2017.

2.1.4. Conduct inception workshop in each pilot County

Inception workshops have been conducted in Embu on 19th January 2017 and in Taita Taveta on 24th January 2017. Discussions and interactions were made on the following agenda.
1) Stakeholder Sensitization on the CADEP project.

2) Identify areas of collaboration of each stakeholder (Government, private sector, NGOs/CBOs and farmers) in implementing CADEP activities.

3) Share information on the improved *Melia volkensii* (Mukau).

37 participants from Embu and 34 from Taita Taveta attended the workshops.

2.2. Assist formulation of PFMP in the pilot Counties

Three forests were identified for formulation of Participatory Forest Management Plan (PFMP). They included: Kiang'ombe and Kianjiru Forests in Embu, and Mwambirwa and Mbololo Forests (jointly called as Mwambo Forest) in Taita Taveta.

2.2.1. Conduct trainings and meetings for formulation of the PFMP

The following trainings and meetings were conducted at each stage of formulation of PFMP.

1) Sensitization barazas (community meetings) for all the forests were held between December 2017 and January 2018.

2) Scoping workshops in Embu and Taita Taveta were done in February 2018.

3) Trainings of Local Planning Team (LPT) were held in March 2018 for Kiangombe and Kianjiru and November 2018 for Mwambo.

4) Forest resources assessment and household surveys were carried out in May 2018 for Kiangombe and Kianjiru and January 2019 for Mwambo.

5) Workshops on the zero draft PFMP was held in July-August 2018 for Kiangombe and Kianjiru and May 2019 for Mwambo

6) Workshops on validation of draft PFMP was held in September 2018 for Kiangombe and Kianjiru, and August 2019 for Mwambo.

2.2.2. Provide technical input for preparation of the PFMP

Almost all draft and final versions of PFMP were prepared by KFS counterparts. Besides, through the meetings, trainings and workshops as shown in 2.2.1. above, technical inputs were provided by the Project for preparation process of PFMP.

2.2.3. Follow up the processes of PFMP authorization and launching, Community Forest Association (CFA) registration and conclusion of Forest Management Agreement (FMA).

The Project followed up and assisted the processes of PFMP authorization and launching, CFA registration and FMA signing as shown below.

1) Kiang'ombe
   - Registration of CFA (March 2019)
   - Launching of PFMP (March 2019)

- Signing of FMA (October 2019)
2) Kianjiru
  - Registration of CFA (March 2019)
  - Launching of PFMP (March 2019)
  - Signing of FMA (October 2019)
3) Mwambirwa and Mbololo (Mwambo)
  - Registration of CFA (August 2019)
  - Launching of PFMP (December 2020)
  - Signing of FMA (December 2020)

Figure OP 2-1: Launching of Mwambo PFMP

2.2.4. Monitor and support implementation stage of PFMP and FMA

After launching of PFMP and signing of FMA, the Project supported CFAs to start implementing the projects that were planned in the PFMP. Through consultation with the CFAs, it was agreed that all 3 CFAs will establish a tree nursery with support from the project. The following trainings were conducted to equip the CFAs with necessary nursery skills and ability to manage CFA.

1) CFA nursery establishment and management training at KEFRI Kitui Centre (May 2021)
2) CFA governance training in Embu and Taita Taveta (June 2021)

Procurement of tools and equipment, and nursery establishment work will be done towards the end of the Project cooperation period.

2.3. Support farmers to conduct FFS in strategic collaboration with implementation of PFMP in the Pilot Counties

In the first two rounds of FFS, FFS siting was conducted without connection to participatory forest management. However, during the third round of FFS (2019-2020), FFS groups were selected from the adjacent areas of the PFMP forests so that a synergy between PFMP and FFS would be produced and enhanced. FFS participants were taught about the linkage between tree growing and conservation of trees in the forest.

2.3.1. Conduct Training of FFS Facilitators

The following training of FFS Facilitators were conducted.

1) FFS Facilitators Training (July 2017)
2) FFS Farmer Facilitators Training (July 2017)
3) FFS Farmer Facilitators Training (August 2018)
4) Consultative Meeting with FFS Facilitators

Figure OP 2-2: Refreshers Training at Melia PTS

（October 2018）

5） Refreshers Training for FFS Facilitators (October 2019)

2.3.2. Support planning and implementation of FFS

Based on the manuals and guidelines of FFS, the Project supported planning and implementation of FFS on the following steps.

1） Ground working
2） FFS group organisation
3） Selection of enterprise and host farm
4） Enterprise planning and enterprise site establishment
5） Weekly sessions and Agro-Ecological System Analysis (AESA)
6） Field day
7） Participatory evaluation
8） Graduation

Figure OP 2-3: FFS Graduation in Embu

As a result, the project had assisted 47 FFS groups which graduated 851 participants through three rounds of FFS.

Round	Period	Embu		Taita Taveta		Total	
		No. of groups	No. of graduates	No. of groups	No. of graduates	No. of groups	No. of graduates
1st Round	2017-2018	10	216	6	107	16	323
2nd Round	2018-2019	13	217	6	77	19	294
3rd Round	2019-2020	8	174	4	60	12	234
Total		**31**	**607**	**16**	**244**	**47**	**851**

Table OP 2-1: Number of groups and graduates of FFS

2.3.3. Conduct technical backstopping for FFS

Regular Monthly Meetings were held by the Project staff and the FFS Facilitators to review the progress, sort out the problems and discuss the way forward.

On site backstopping visits were also conducted by the Project staff. The Project staff visited the selected FFS host farms and observed the actual FFS sessions. The Project staff provided technical guidance and recommendations to the FFS facilitators and participants.

Figure OP 2-4: FFS backstopping in Taita Taveta

2.3.4. Conduct survey on learning outcome of FFS graduates and impact of FFS on PFMP implementation.

The Survey on Learning Result/Impact of FFS was conducted from August to October 2019 with findings and recommendations as shown below. Some of the recommendations were adopted to improve the 3rd round FFS in 2019-2020. The survey was entrusted to the Department of Agricultural and Resource Economics, Jomo Kenyatta University of Agriculture and Technology (JKUAT).

【Findings】

- Out of 4,375 trees planted by the 163 respondents after graduating from FFS, 1,656 trees were surviving (survival rate=37.9%). From these results, it was estimated that 8,669 trees were planted by 323 graduates and 3,281 trees are surviving.
- The tree survival rate was not high as expected and estimated number of trees planted by all FFS graduates was not substantial.
- There was no strong correlation observed between number of trees planted per respondent and income, farm area, gender and other factors of respondent.

【Recommendations】

- Enhancement of practical training for woodlot and nursery enterprises.
- Strengthening of awareness on market potential for *Melia volkensii*
- Development of demonstration woodlots to serve as good models for farmers

Figure OP 2-5: Survey Report on Learning Result/Impact of FFS

- Supporting the development of local nurseries

2.3.5. Conduct trials on other forestry extension approach/methodology

Aside from PFMP and FFS, forestry extension approaches through individual farmers, schools and a private company were tested. The following number of improved Melia seedlings were provided to them.

Farmers	20,694
Schools	8,770
Company	300

Table OP 2-2: Number of improved Melia seedlings distributed

Figure OP 2-6: Students are planting improved Melia seedlings at schoolyard

2.4. Promote collaboration among government institutions, private entities and NGOs/CBOs in enhancing tree growing in ASALs

2.4.1. Facilitate collaboration between government institutions and private entities for growing improved *Melia volkensii* and other species of trees in ASALs

The following interventions were conducted

1) A workshop for collaboration with private sector and NGOs in tree growing was organized, where participants from government institutions, private sector and NGOs shared experiences and visions, and discussed possible ways for further collaboration. (April 2019)

2) The Project coordinated and mediated the signing of MOU between KEFRI and Komaza on collaboration in research and development. At the same time, the project signed, as a witness, the MOU between KEFRI and Komaza on collaboration in research and development on *Melia volkensii*. (September 2019)

2.4.2. Support private entities and NGOs/CBOs in growing improved *Melia volkensii* and other species of trees in ASALs.

1) Melia Promotion Seminar was conducted for private companies and NGOs/CBOs to disseminate technology, skills and knowledge on growing and management of *Melia volkensii*. (May 2017)

2) 300 improved *Melia volkensii* seedlings were provided to a private company (GreenPot Enterprises) for trial plantation. (March 2020)

3) The Project prepared growth curve of non-improved *Melia volkensii* and provided it to private companies that are growing Melia. (April 2021)

2.5. Promote tree growing of improved *Melia volkensii* in ASALs

2.5.1. Develop/revise Melia plantation guidelines

"Guidelines to On-Farm *Melia volkensii* Growing in the Dryland Areas of Kenya" was developed. It is intended to be used for training and extension activities.

The Chapter 6 of the Guidelines, "COST AND BENEFIT ANALYSIS OF GROWING MELIA" was revised to show the step-by-step guide on calculation of cost, benefit and profit of Melia growing project.
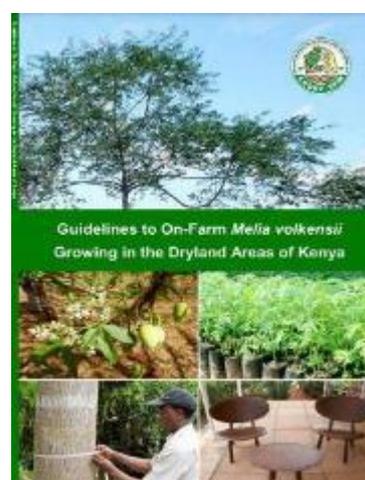
Figure OP 2-7: Melia Growing Guidelines

2.5.2. Conduct seminar/training on plantation, management and utilization of *Melia volkensii*

The following seminars, trainings and workshops were held to introduce plantation, management and utilization of *Melia volkensii.*

No.	Title of seminar/training	Time	Participants/trainees (number)
1	Inception Workshop on Pilot Implementation (Embu)	Jan. 2017	Government officials, members of private sector and NGOs/CBOs, farmers (37)
2	Inception Workshop on Pilot Implementation (Taita Taveta)	Jan. 2017	Government officials, members of private sector and NGOs/CBOs, farmers (34)
3	1st Round FFS	Oct. 2017 – Sep. 2018	FFS participants (323)
4	Melia Promotion Seminar (Embu)	May 2018	farmers, companies and NGOs (44)

5	Melia Promotion Seminar (Taita Taveta)	May 2018	farmers, companies and NGOs (31)
6	Melia Promotion Seminar (Nairobi)	Jun. 2018	researchers, policy makers and senior officers (35)
7	2nd Round FFS	Oct. 2018- Sep. 2019	FFS participants (423)
8	Facilitators' Training for 3rd round FFS	Oct. 2019	FFS facilitators (12)
9	3rd Round FFS	Oct. 2019- Sep. 2020	FFS participants (233)
10	Melia Growing Farmers' Training (Embu, Tharaka-Nithi and Kitui)	Nov. 2019	farmers who are to receive Melia seedlings (24)
11	Melia Growing Farmers' Training (Makueni, Taita Taveta, Kilifi and Kwale)	Nov. 2019	farmers who are to receive Melia seedlings (14)
12	Induction Training for County Officers	Mar. 2021	Newly recruited county forest officers in Embu and Taita Taveta (31)
13	Training for School Teachers	Apr. 2021	School teachers who received Melia seedlings (28)
14	Training for CFA on Nursery Establishment and Management	May 2021	Members of Kiang'ombe, Kianjiru and New MWAMBO CFAs (15)
Total Number of Participants/Trainees			**1,284**

Table OP 2-3: List of seminar/training to introduce plantation, management and utilization of *Melia volkensii*

2.5.3. Support selected farmers in growing improved *Melia volkensii*

As an alternative approach of extension for growing improved *Melia volkensii*, individual farmers were targeted for improved *Melia volkensii* seedlings distribution. The table below shows the number of farmers who received the seedlings.

No.	Time of seedling distribution	Beneficiaries	Counties	No. of beneficiaries	No. of seedlings provided
1	Nov. 2018	Farmers	Embu, Tharaka Nithi, Kitui, Makueni, Kwale, Kilifi	20 farmers	1,014
2	Nov. 2019	Farmers	Embu, Tharaka Nithi, Kitui	25 farmers	1,250
3	Nov. 2019	Farmers	Taita Taveta, Kwale, Kilifi	11 farmers	1,100
4	Nov. 2019	Farmers	Embu, Tharaka Nithi, Kitui	24 farmers	1,200
5	Nov. 2019	FFS members	Embu	2 FFS	250
6	Oct. - Nov. 2020	Farmers	Embu, Tharaka Nithi, Kitui, Makueni, Taita Taveta, Kwale	27 farmers	9,600
7	Oct. - Nov. 2020	FFS members	Embu, Taita Taveta	10 FFS	1,050
8	Nov. 2020	Farmers	Embu, Tharaka Nithi, Kitui	25 farmers	1,200
9	Nov. 2020	FFS members	Embu	2 FFS	250
10	Mar. 2021	Farmers	Embu, Kitui, Kwale	5 farmers	2,988
11	Apr. 2021	Farmers	Kitui, Makueni, Taita Taveta, Kwale	7 farmers	2,342

Farmers	20,694
FFS members	1,550
Total	22,244

Table OP 2-4: Number of beneficiary farmers and seedlings distributed

The Project conducted surveys for monitoring the performance of distributed seedlings every year from 2018 to 2021. The final result surveyed in 2021 showed that the combined survival rate was 43.3%.

Melia survival rate (Farmers)				
2018	2019	2020	2021	Combined
42.4%	44.5%	43.0%	35.4%	43.3%

Table OP 2-5: Survival rates of improved *Melia volkensii* seedlings distributed to farmers

2.5.4. Conduct basic market research on products of *Melia volkensii*

Basic Melia product market survey was conducted from July to September 2021. The major findings of the survey is show below. The survey was entrusted to the Department of Agricultural and Resource Economics, Jomo Kenyatta University of Agriculture and Technology (JKUAT).

Figure OP 2-8: Interview with a Melia trader

【Findings】

- Melia timber is not known to buyers and consumers in major timber markets such as Nairobi and Mombasa.
- Market size and trade volume of Melia is very small when compared to other commercial timber species. Melia timber value chain is at its primitive stage.
- Melia value chain is highly localised. Melia is sourced from producers in the area and sold to the users (carpenters and furniture makers) in towns in the same area. They are rarely exported to other areas.
- Pricing mechanism of Melia timber is not fully established. Direct negotiation between the producer and buyer is the most common means to determine the price.
- Prices of Melia timber is not always higher than other commercial timber species.
- Most of the Melia plantations are still young and have not reached their maturity, which means insufficient supply of timber into the market.
- There is no/few sawmills in the Melia growing areas. Melia is sawn by power saws which makes recovery rate very low.
- Many producers are not concerned about the quality of trees. Due to lack of de-budding and pruning, the trees are not growing straight which will result in low selling price to the buyers.
- Cooperative of producers is dormant or absent.

2.5.5. Prepare strategy to promote *Melia volkensii* plantation in ASALs

Based on the findings and achievements made through the implementation of Activity 2.5, a note for promotion of *Melia volkensii* growing, trade and utilisation was prepared. On-line workshops to discuss the current situation and way forward for Melia promotion were held for three times to prepare the note. The major recommendations are as follows.

[For producers]

- Increase the number of Melia growing farmers/institutions to assure constant and adequate timber supply to the market.
- Draw producers' attention to quality of trees and timber.
- Assist producers in forming groups and cooperatives.

[For traders and users]

- Create awareness on quality and advantages of Melia timber and promote utilisation.
- Enhance capacity in value addition of Melia timber.
- Promote the establishment of saw mills near the timber growing areas.

[For government institutions]

- Continue with in depth analysis of the Melia timber market and value chain.
- Determine silvicultural treatments, including the ideal spacing, rotation year, watering, pruning and thinning for Melia planting.
- Continue with breeding of improved Melia, determine and disseminate information on the advantages of improved Malia against non-improved Melia.
- Enhance further studies on Melia timber properties.
- Upscale and out scale research on Melia timber value addition.
- Conduct further research on site-species matching for Melia growing.
- Enhance linkages and collaboration with private companies through exchange information for promotion of Melia growing.
- Undertake physical, mechanical and chemical characterisation of the improved and the non-improved Melia in terms of the physical, mechanical and chemical characteristics inherent to the two. This extends to further studies on the properties of Melia azedarach in comparison to *Melia volkensii*.
- Undertake census/an inventory of existing Melia farmers and/or woodlots in Kenya in partnership with private companies and NGOs, and other institutions with an interest in Melia to carry out an inventory of existing Melia farmers and/or woodlots in Kenya.

2.5.6. Improve accessibility to seeds and seedlings of improved *Melia volkensii*

At least 7 candidate nurseries were inspected as possible distribution points of improved *Melia volkensii* seedlings. However, none of them satisfied the requirements, such as staffing, management including funding, technical skills, security and others. Further survey for other

candidate nurseries was disturbed by the COVID-19 situation.

2.5.7. Designate existing well-managed Melia plantations as demonstration sites to showcase good practice of Melia plantation.

This activity was not completed by the end of the Project period, because of limited number of presentable Melia woodlots and land tenure issue that may disturb long-term use of a land for demonstration.

2.5.8. Preparation of Melia growth curve (additional activity)

Since growth curve of *Melia volkensii* was not established so far, the Project prepared it with technical supervision and support by a short-term expert of Component 4. Data were collected from Melia plantations at KEFRI Kitui Centre and private farms. This growth curve non-improved Melia shall be a baseline for assessment of tree breeding effects of improved Melia.
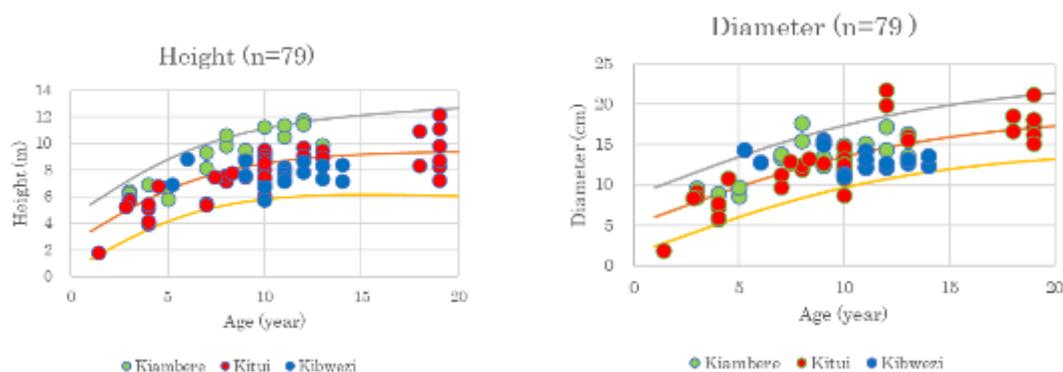
Figure OP 2-9: Height and diameter growth curves of non-improved *Melia volkensii*

1-3-3. Output 3; REDD+ Readiness

(Technical capacities for REDD+ readiness activities and forest monitoring for sustainable forest management in KFS are strengthened.)

3.1. Design, develop and test NFMS for Kenya

In regard to national forest monitoring system (NFMS) development in Kenya, the Project discussed the purpose, structure and design content of NFMS with C/P, technical working group (TWG) and other stakeholders. At that time, the UNFCCC decision on NFMS development and the guideline of UN-REDD+ were referenced. As a result, it was decided that NFMS aims to: 1) Collect and store accurate and transparent data and information in forest management; 2) Share the necessary information with relevant forest stakeholders to contribute to REDD+ implementation and sustainable forest management in Kenya; and 3) Use the information for reporting in the international requirements. In addition, it was agreed that NFMS in Kenya consists of two functions that are monitoring function and data management function as shown in the following figure. There are 6 items under the monitoring function of NFMS in Kenya and Forest Information Platform (FIP) developed in the Project plays the role of data management function in the NFMS.
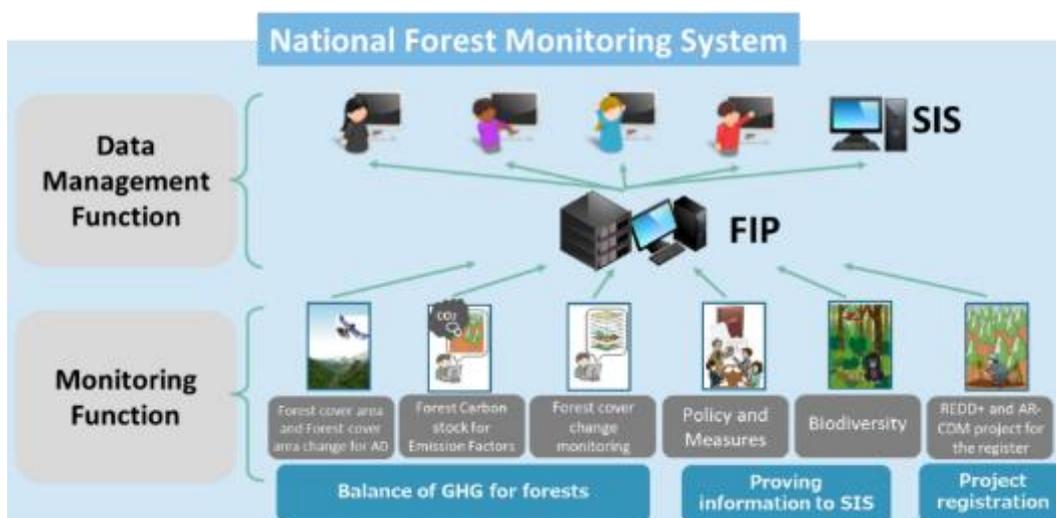
Figure OP 3-1: Structure of NFMS in Kenya

For the continuous implementation, operation and management of the NFMS in Kenya, the "NFMS Document" was prepared. It describes the structure of the NFMS to be developed in Kenya and the methodologies for each of the monitoring and data management functions. Table OP 3-1 below shows the table of NFMS document contents.

Table OP 3-1: Contents of NFMS document

Chapter	Contents	Sub-Title
Chapter 1	Background and Purpose of NFMS document	1.1 Background
		1.2 Milestones in Forest Sector Legal Legislation
		1.3 UNFCCC Requirements for NFMS
		1.4 The Purpose of the NFMS document
Chapter 2	Basic Considerations of Kenya's NFMS	2.1 Land use categorization
		2.2 Forest Definition
		2.3 Forest Stratification
		2.3.1 Montane and western rain forests
		2.3.2 Coastal and Mangrove Forests
		2.3.3 Dryland forests
		2.3.4 Plantation forests
		2.4 Carbon pools
		2.5 Scope gas
		2.6 REDD+ in Kenya
		2.6.1 Scale
		2.6.2 Selected REDD+ activity
		2.6.3 Definition of REDD+ activities
Chapter 3	Conceptual design of NFMS in Kenya	3.1 Introduction
		3.2 Composition of NFMS
		3.2.1 Monitoring function
		3.2.2 Data management function
		3.3 The Phased Approach to NFMS implementation
Chapter 4	Monitoring Function of the NFMS	4.1 Forest cover and forest cover change for AD
		4.1.1 Forest cover area based on SLEEK programme
		4.1.2 Forest cover change area based on Land cover / Land use change maps
		4.2 Forest Carbon Stock for Emission Factor
		4.2.1 National forest inventory
		4.2.2 Conversion of the inventory data into carbon stock data
		4.3 Forest cover change monitoring
		4.3.1 Detection of deforestation area using radar image (ALOS-2) by JICA-JAXA Forest Early Warning System in the Tropics (JJ-FAST)
		4.3.2 Detection of deforestation area using optical image (Sentinel 2) by NRTFAS
		4.3.3 Field report by ground truth using Survey 123
		4.4 Policies and Measures (PaMs)
		4.5 Biodiversity
		4.6 REDD+ and AR-CDM projects
Chapter 5	Data Management Function of the NFMS	5.1 Component and contents of the FIP
		5.2 Linkage with FMIS
		5.3 Operation of FIP
		5.3.1 Operational Structure
		5.3.2 Update of data and information
		5.3.3 Management of equipment and software
Chapter 6	Institutional arrangement for NFMS	6.1 Institutional arrangement for the monitoring function
		6.2 Institutional arrangement for data management function
Chapter 7	Calendar of NFMS	
Chapter 8	Future Improvement	8.1 Improvements in the NFMS based on

Chapter	Contents	Sub-Title
		proposals in the FRL
		8.2 Improvement on the NFMS based on Proposals from National REDD+ Strategy
		8.3 Participatory approach

FIP, which plays role of data management function in the NFMS, is the portal web site for providing the various forest related information. The Project has designed/implemented the FIP and discussed/improved how to display various data including maps and documents effectively on FIP (Figure OP 3-2).
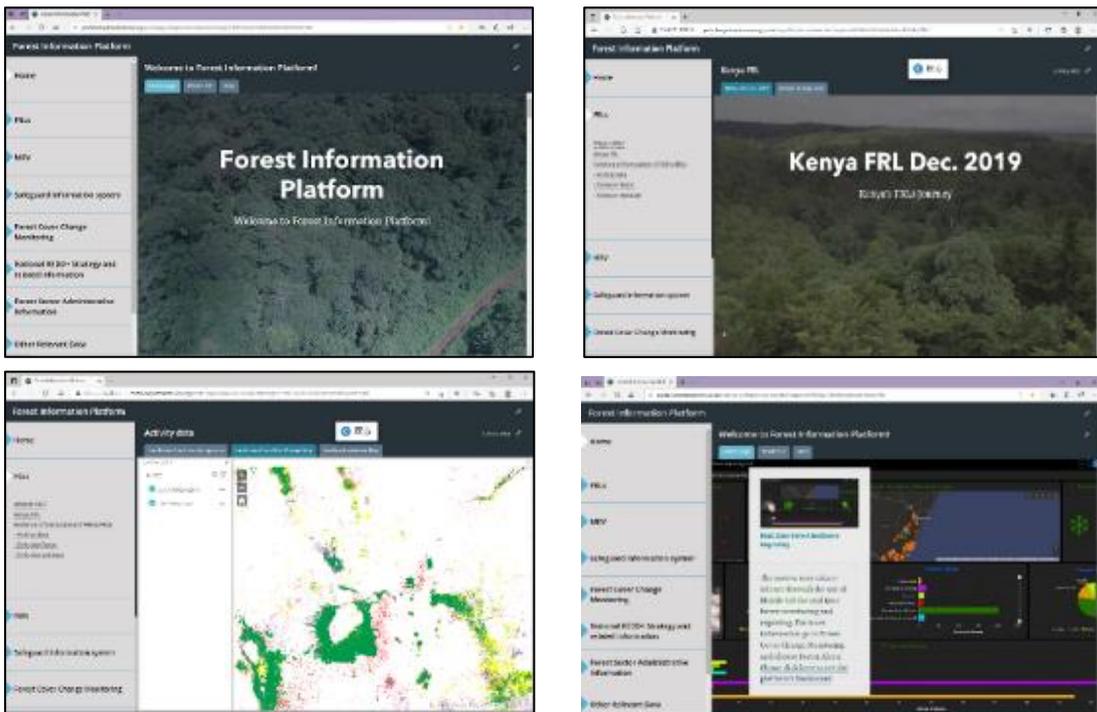

Figure OP 3-2 Over view of FIP

Figure OP 3-3 shows the main 8 components of FIP
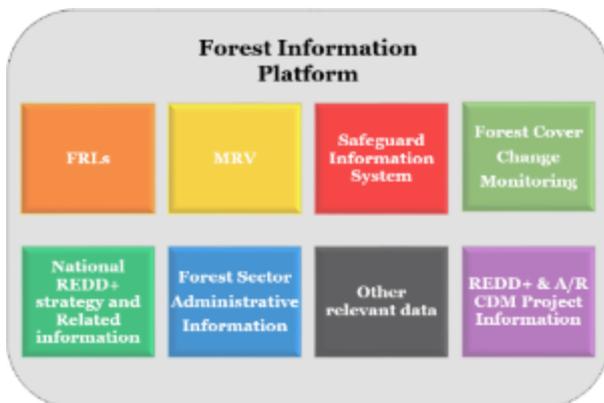
Figure OP 3-3 Main 8 components of FIP

3.2 Operationalize the Forest Information Platform

1) Review and improvement of the Forest Information platform.

For more usability, the Project continued to improve the FIP.

1-1) Updating the server software and improvement of the user interface

By updating the server software from 10.7 to 10.8, FIP secured a better template for rich user interface (Figure OP 3-4). This template allows containment of the movies, slideshow, maps and other type of contents into a single page. This helped modernize the FIP interface.
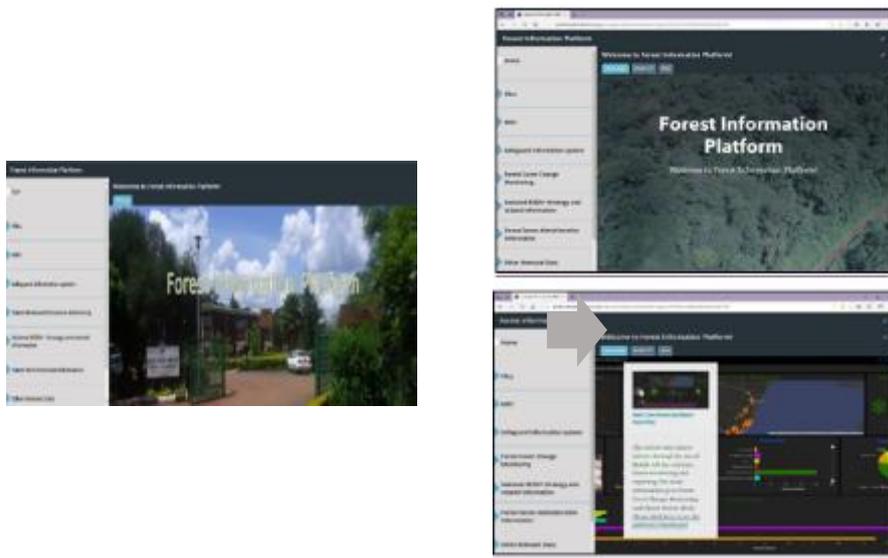
Figure OP 3-4 New Interface with version 10.8

1-2) Modification of the user interface

The contents of FIP are classified by the information type. Early version of FIP had the tab style interface. However, in some cases, this style limited the area of information (especially in the deep level). By combining the tab and tree style, FIP secured a wider area for data display without changing the hierarchical structure of contents (Figure OP 3-5).
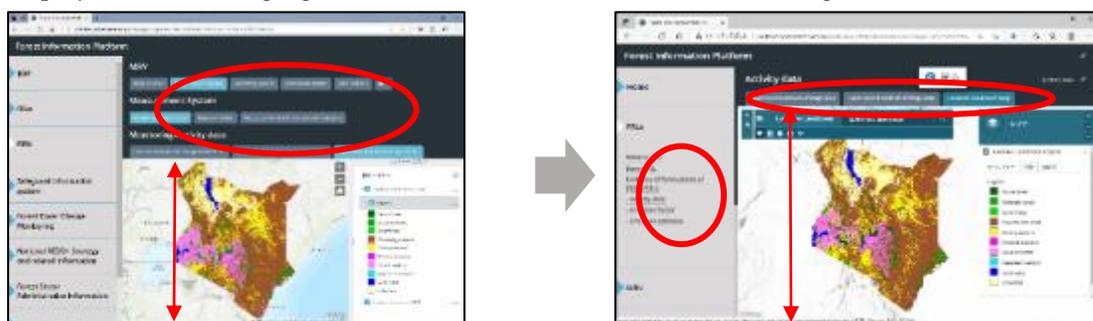
Figure OP 3-5 UI modification (wider area for contents)

1-3) Adopting ArcGIS Pro for FIP management

To realize management of map data on FIP, the Project adopted ArcGIS Pro for designing and uploading the data into FIP (Figure OP 3-6). Working with ArcGIS pro, FIP administrator can design the cartography of the map and upload the designed map directly to FIP. This reduces and simplifies the data management task of the FIP administrator.
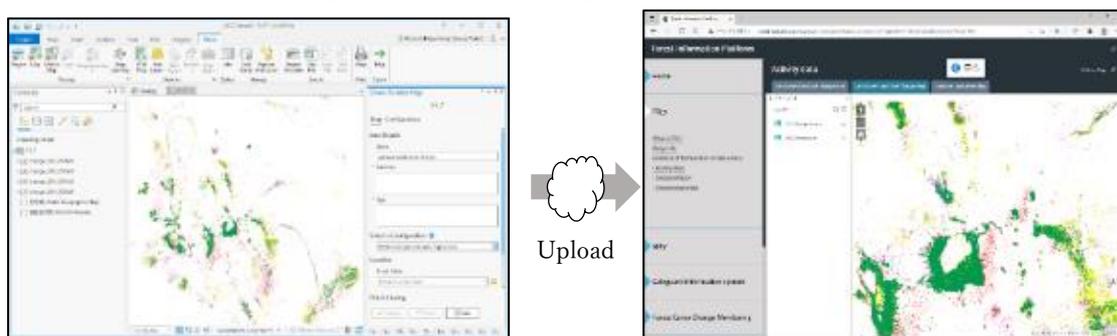
Figure OP 3-6 Design and upload the contents from ArcGIS Pro.

1-4) Add, Modify and Update the contents

The Project continued to add, modify and update the contents of FIP like the Forest Alerts (data from sentinel satellite and field reports), Forest Restoration (data from reports) and REDD+ & A/R CDM Project information (Figure OP 3-7).
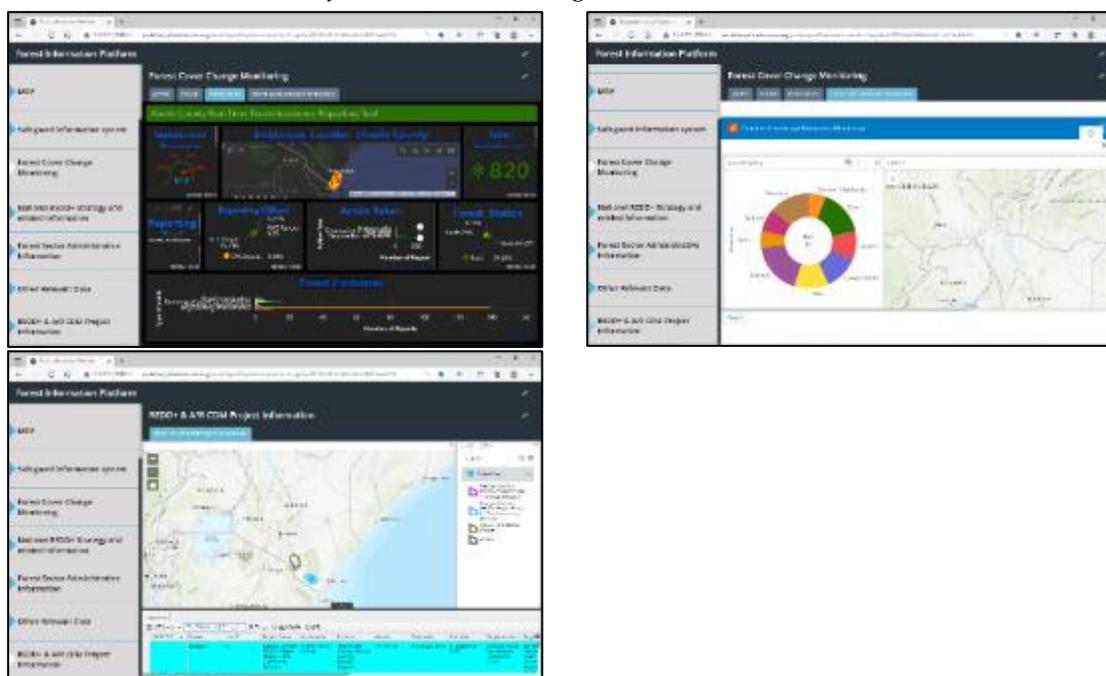
Figure OP 3-7 Contents update

1-5) Development of the additional tools for carbon stock calculation and JJ-FAST

The Project developed 2 additional tools for FIP. One is the biomass calculation tool. This tool will estimate the amount of biomass based on the field survey data. The other one is the data retrieval tool for JJ-FAST. This tool monitors the data folder of JJ-FAST and when new data is added, it receives automatically and appends it to the FIP data set.
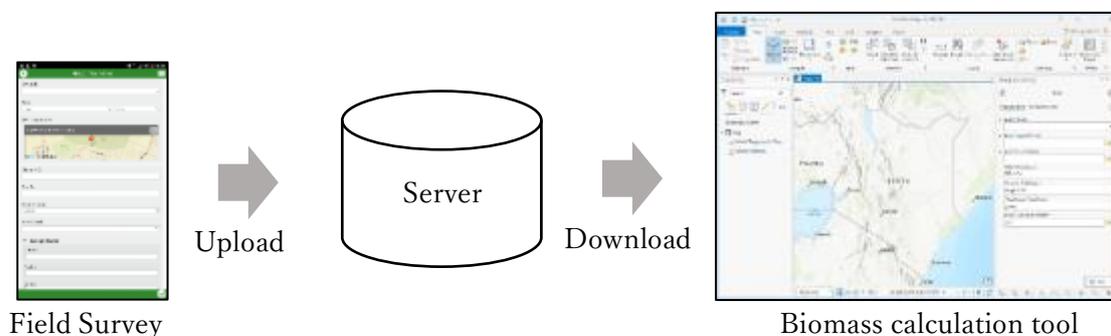
Figure OP 3-8 Diagram of biomass calculation tool
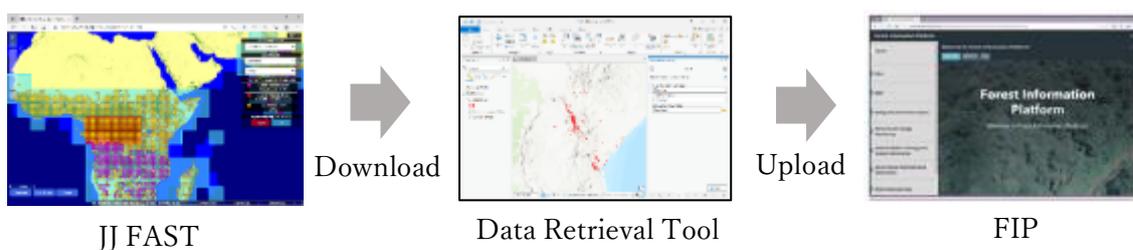
Figure OP 3-9 Diagram of data retrieval tool for JJ-FAST

2) Develop the operation method of Forest Information Platform and practice the operation method

For sustainable operation of FIP, the Project established the management structure of FIP. The Project also suggested and agreed with KFS about the workflow of content publication. Figure OP 3-10 shows the basic diagram and data flow of FIP from data preparation i.e. Data Collection and Registration (left side) to publication for the User (right side). For smooth operation, technicians, IT systems and FIP operation and management section should work together. In this case, it is necessary to establish a solid role and rules.
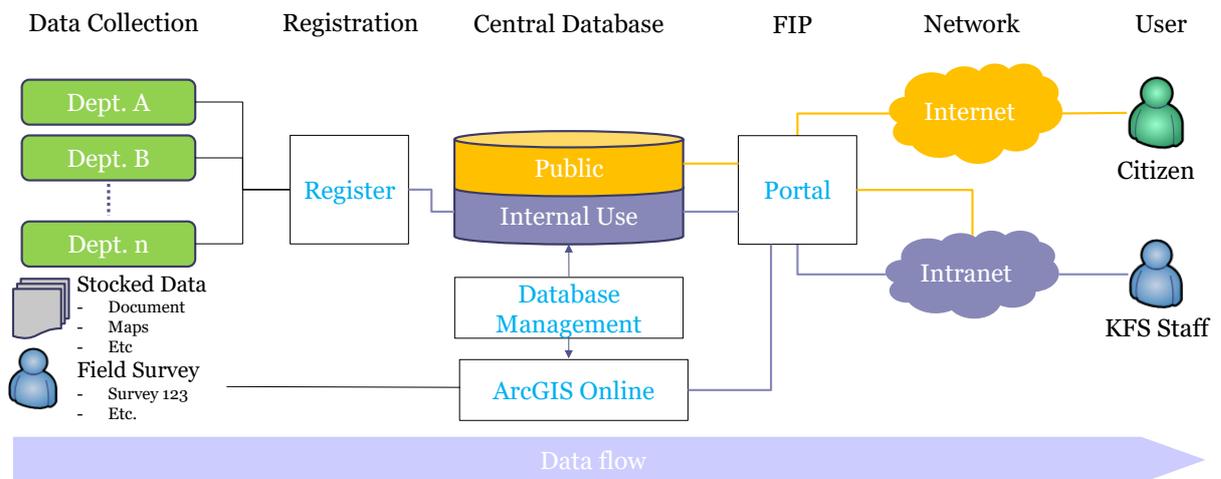
Figure OP 3-10 The structure of data management related to FIP

For operating and maintaining (O&M) the FIP, two important aspects are required. One is the institutional arrangement for O&M while the other one is data reliability. The Project prepared a diagram that shows the role and responsibility for FIP management as shown in the Figure OP 3-11 and discussed it with KFS. This management team within KFS requires experts in two fields: the forest and related information expert for portal service and IT expert for IT management (for example, Hardware and network maintenance, web page design, etc.). In addition, upper level commission should be established when the FIP contains and provides the agency with a wide database. The upper level commission assumes the total responsibility of the FIP. They should check and control the quality of the content and discuss the policy of the FIP on a regular basis. Establishment of the upper level commission will take some time because all stakeholders should participate in this commission. Therefore, the upper level commission will be established in the future.
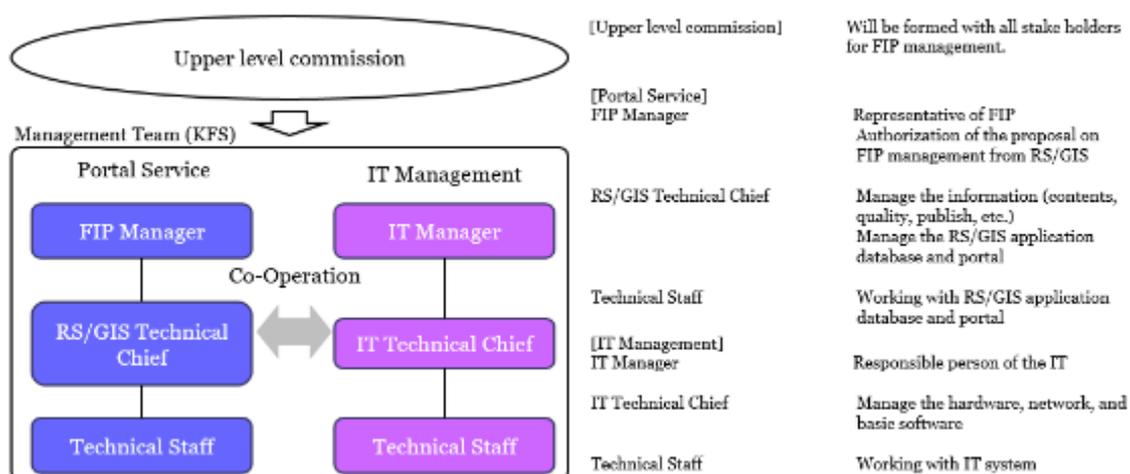
Figure OP 3-11 The framework of O&M for FIP

In regard to data reliability, Figure OP 3-12 shows the workflow of data publication and responsibility under each task. The manager and/or technical chief should be responsible for the published database.
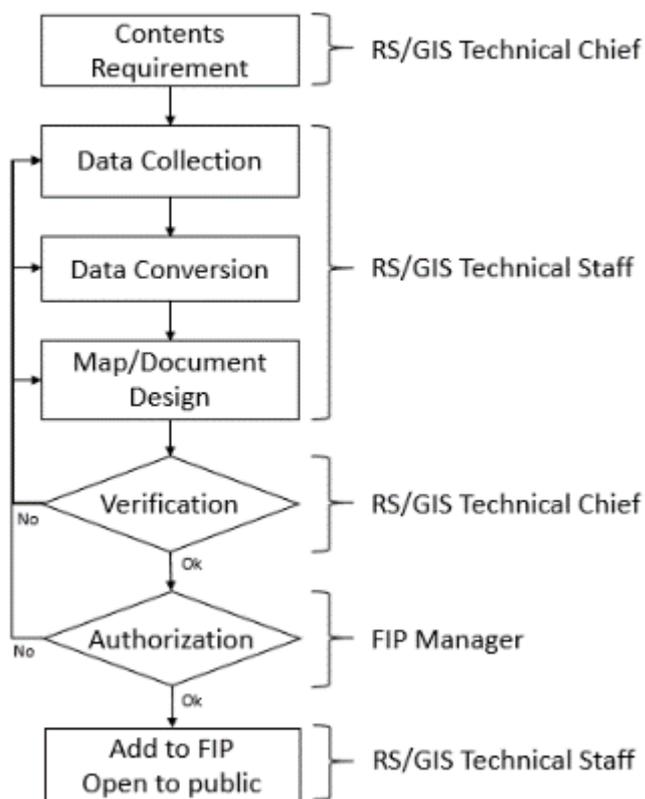

Figure OP 3-12 The workflow of contents publication (draft)

3-3 Conduct accuracy assessment of 2014 Land Cover/Land Use Map which is developed by SLEEK (System for Land-Based Emission Estimation in Kenya)

The Project conducted the accuracy assessment of 2014 Land Cover/Land Use Map developed by SLEEK Lansing Community College (LCC) Mapping Program Implementing team which consisted of KFS, Department of Resource Surveys and Remote Sensing (DRSRS), Survey of Kenya (SOK) and Regional Centre for Mapping of Resources for Development (RCMRD). For the assessment, the Project investigated method of image analysis as classification process, quality of the utilized LANDSAT satellite image and verified the classification result. For the assessment result, the teams in the SLEEK used reasonable method for the creation of 2014 Land Cover/Land Use Map, which is the basic satellite remote sensing image analysis method. The benefit of this method is to create the land cover/land use map semi-automatically within limited number of operators, cost and period for entire Kenya. Therefore, it is possible to continuously produce land cover/land use map

on yearly or bi-yearly basis sustainably. For the quality of LANDSAT satellite image, it was utilized for cloud ratio 3.75% as NO-DATA gap for the entire Kenya, and it was of good quality level. As for the verification of classification result of 2014 Land Cover/Land Use Map, the overall accuracy was 75.1%. The obtained result was acceptable and achieved a typical accuracy percentage for image analysis classification as satellite remote sensing. Therefore, as an assessment result, it was totally satisfactory and not necessary to look for another method or re-creation.

The Project conducted an additional assessment of the utilized historical LANDSAT satellite image for time series Land Cover/Land Use Map after assessment reporting result for 2014 Land Cover/Land Use Map at Technical Working Group (TWG) meeting on March, 2017. The reason for the additional assessment was that the results of assessment is important information for deciding on reference years of FRL because the quality of image affects accuracy of land cover/land use maps. Therefore, the Project conducted screening to all the utilized LANDSAT satellite images as an additional assessment. The result of additional assessment found that stripe gap was observed on the LANDSAT 7 satellite image. This stripe gap occurred due to sensor's mechanical problem of LANDSAT 7 since May, 2003. Therefore, those stripe gap images are non-recommendable data to use for the Time Series Land Cover/Land Use Map.

3-4 Create land cover/land use change maps using 4 historical data of land cover/land use maps

The Project initially created the 3 epochs of land cover/land use change maps for 1990 – 2000, 2000 – 2010 and 2010 – 2014 based on the initial reference years for FRL setting. The Project additionally created the land cover/land use map for the period between 2000 and 2014. This was done because the reference year of FRL was considered as two points in time i.e. 2000 and 2014.

On the third year, the Kenyan government organized SLEEK mapping team at DRSRS, and they produced the 2015 and 2018 Land Cover/Land Use Maps. Therefore, the Project created the land cover/land use change map between 2002 and 2018. However, during the discussion for FRL setting, the reference years and periods were finally decided to 4- year intervals from 2002 i.e., 2002 – 2006, 2006 – 2010, 2010 – 2014 and 2014 – 2018 as shown in the Figure OP 3-13. Therefore, the Project conducted the re-creation of the land cover/land use change maps again with 4 -year-interval change maps.
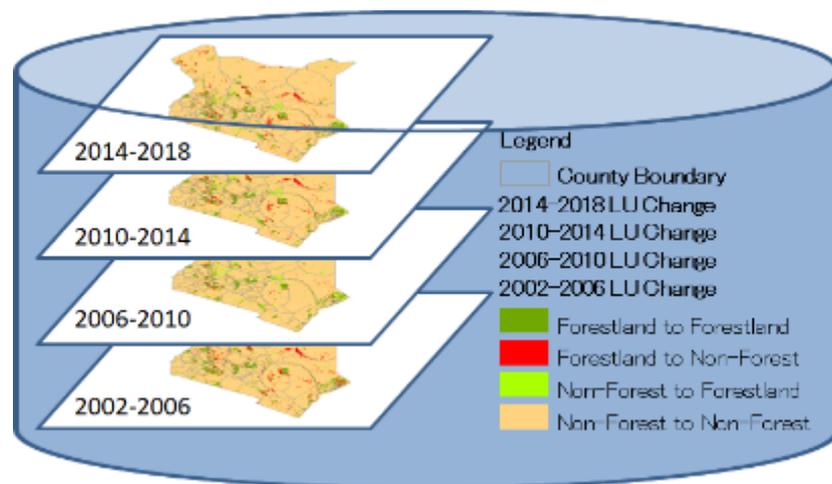
Figure OP 3-13 4-years-interval land cover/land use change map

3-5 Collect information on emission factors, set emission factors and develop 2014 Carbon Map

For the collection of data on Emission Factor (EF), the information of the pilot forest inventory data was collected from Improving Capacity in Forest Resources Assessment in Kenya (ICFRA). The data was examined and selected based on its consistency with SLEEK stratification to count the number of plots which can be used for calculation of country data for development of EF. In calculating the average of biomass amount in each forest strata on EF development, the Project conducted additional pilot forest inventory in the forest strata with insufficient sample size. To set EF of FRL setting in Kenya, two sets of data were used to generate Emission Factors; stock change (country data) and growth rates (IPCC guideline default data). EF due to stock change were estimated as the differences in carbon stocks in an area changed from a land cover/land use stratum to a different land cover/land use stratum at two points in time (e.g., 2002 and 2006). EF due to forest growth were classified into conversion of non-forests into forests and improvement of forest stock due to canopy enhancement, and were calculated based on the net biomass growth in IPCC 2006 guidelines.

The Carbon Map 2014 was created based on Land Cover/Land Use Map of 2014 after the filtering and zoning in order to suit the forest definition. For the creation of 2014 Carbon Map, the Project extracted area size of each forest type (ha) and calculated the carbon stock volume based on unit of carbon stock (t/ha). They calculated carbon stock volume at each county level. The calculated carbon stock volume was taken as attribution information to the 2014 Carbon Map. This 2014 Carbon Map has attribution information which is not only total carbon stock volume as county level but also forest area size and carbon stock volume by each forest type. It was stored in the FIP and from where it can be displayed.
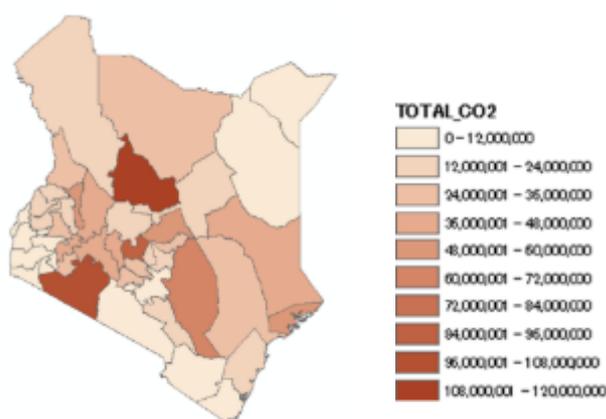
Figure OP 3-14: Carbon map 2014

3-6 Analyse the land cover/land use changes based on the 4-time historical data of land cover/land use maps

The analysis of the Land Cover / Land Use Change was conducted using Land Cover / Land Use Change maps of three periods: 1990-2000, 2000-2010 and 2010-2014 based on the initial FRL reference periods in 2017. The reference period for FRL was ultimately re-set in the FRL version submitted to UNFCCC in January 2020. Therefore, the analysis of land cover/land use change was carried out again at four year intervals from 2002 to 2006, 2006 to 2010, 2010 to 2014 and 2014 to 2018 based on the reference years and periods for FRL setting. Throughout the period 2002-2018, the maps exhibited the following characteristics: (1) The areas where Land Cover / Land Use Changes related to the forest were detected, are located especially in the southern part of Kenya, (2) Many of the areas that are maintained as large forest are forest reserves, and (3) The area which was detected as enhancement and degradation was small compared to the area of no change in forest land.

As observed from fluctuation of the area of each Land Cover / Land use classification, Cropland has the highest rate of increase area since 2002 in Kenya. In developing countries, the increase in demand for food and firewood materials (household fuels) due to population

growth has led to the conversion of Forest to Cropland and excessive consumption of firewood. This may contribute to deforestation and forest degradation. Population trends and human activities in Kenya seem to be the underlying causes of deforestation and forest degradation of the land cover/land use change.

3-7 Develop and evaluate FRL with stakeholders

For the setting of FRL, the Government of Kenya (MoEF) made a series of discussions with many stakeholders mainly through organizing REDD+ TWG meetings as shown in the below table.

Table OP 3-2: Summary of REDD+ TWG meetings

No.	Item	Date	No. Person	Agenda
1	REDD+ Technical Working Group (TWG)	24th - 25th November 2016	22	・ Policy discussion on how to establish the FRL ・ Presentation on the process of developing the 2014 national forest and land cover map and change detection ・ Presentation, discussion and decision on the 2014 forest cover change detection and statistics ・ Presentation of forest cover changes (Deforestation, forest degradation and enhancement)
2	Stakeholders Workshop	28th - 29th March 2017	34	・ Confirmation of setting method of AD and EF ・ NFMS document ・ Calculation method of carbon stock/ha of each forest type. ・ Teir1 data and country data ・ Reference period and data point ・ Soil carbon pool
3	REDD+ TWG	28th June 2017	28	・ FRL setting(Outline of FRL and Setting of AD, EF and other requirements) ・ FRL documentation ・ System for Forest Information Platform
4	REDD+ TWG	29th – 30th November 2017	28	・ FRL setting. Reset the reference time period ・ Report of the land cover / land use change analysis ・ Report of examination of National circumstances ・ Development of NFMS
5	Stakeholders Workshop	1st December 2017	36	・ FRL setting: Report of AD, EF, National circumstances and Carbon Emission ・ Development of NFMS and FIP
6	REDD+ TWG	20th - 21st September 2018	24	・ Discussion for Further Improvement of FRL ・ Work Plan for further improvement of FRL development. ・ Current Status of NFMS ・ Way forward on development of NFMS
7	REDD+ TWG	16th - 17th July 2019	24	・ Discussion for Further Improvement of FRL ・ Work Plan for further improvement of FRL development and submission to UNFCCC.
8	Stakeholders Workshop	9th - 10th December 2019	24	・ Discussion for Further Improvement of FRL ・ Work Plan for further improvement of FRL development and submission to UNFCCC.

Lastly, elements for the setting FRL were decided as follows,

Table OP 3-3: Summary of the setting FRL

Elements	Decision
Forest definition	A minimum 15% canopy cover; minimum land area of 0.5 ha and potential to reach a minimum height of 2 meters at maturity in situ. Perennial tree crops like coffee and tea are not considered as forests.
REDD+ activities	➢ Reducing emissions from deforestation ➢ Reducing emissions from forest degradation ➢ Sustainable management of forests ➢ Enhancement of forest carbon stocks
Carbon pools	➢ Above-ground biomass ➢ Below-ground biomass
Scale	National level
Greenhouse gases	Only Carbon dioxide gas (CO2)
Reference years and period	The period 2002 – 2018 with 4 years interval The reference years 2002, 2006, 2010, 2014 and 2018
Activity data (AD)	AD set by making change matrix based on land cover/land use change maps (2002-2006, 2006-2010, 2010-2014, and 2014-2018) prepared by programme of the System for Land-Based Emission Estimation in Kenya (SLEEK) with fitting of minimum area of forest (0.5 ha).
Emission Factors (EF)	EF set using country data for carbon stock of forest based on the pilot forest inventory data (no national forest inventory implemented in Kenya) and IPCC default data for growth rate for each of the forest strata and carbon stock of non-forest.
Construction method of FRL	Average method of historical values of emission estimated between 2002-2006, 2006-2010, 2010-2014, and 2014-2018.

The FRL report was prepared mainly based on the elements mentioned in the above table and submitted to UNFCCC on 6th January 2020. Then, the Technical Assessment (TA) by UNFCCC was conducted from June 8 to 12 for Kenya's FRL remotely although it was postponed due to the COVID-19 pandemic.

The modified FRL report based on the results of Technical Assessment (TA) by UNFCCC was submitted to UNFCCC in August 2020. See the report from the following URL.

https://redd.unfccc.int/files/kenya_national_frl_report-_august_2020.pdf

In the modified FRL report submitted to UNFCCC, the historical emission was not changed from initial FRL report submitted in January 2020, which are as follows.

Table OP 3-4: Historical Annual CO2 Net Emissions classified by forest strata (tCO2/year)

Forest Strata	Emissions (Tonnes of CO$_2$)				
	2002-2006	2006-2010	2010-2014	2014-2018	Average
Montane &Western Rain Forest	44,644,932	26,587,270	29,212,476	31,226,464	32,917,786
Costal & Mangrove Forest	4,824,805	2,015,603	5,196,054	9,712,528	5,437,247
Dryland Forest	10,631,166	7,666,989	14,132,878	12,239,340	11,167,593
Public Plantations	2,732,682	1,829,312	1,887,435	4,276,302	2,681,433
Total	62,833,585	38,099,174	50,428,843	57,454,634	52,204,059

Table OP 3-5 Historical Annual CO2 Net Emissions classified by REDD+ Activity (tCO2/year)

REDD+ Activity	Emissions (Tonnes of CO_2)				
	2002-2006	2006-2010	2010-2014	2014-2018	Average
Deforestation	54,755,246	39,143,087	48,736,134	50,033,292	48,166,940
Degradation	13,836,587	8,350,601	9,563,829	11,792,785	10,885,950
Sustainable management of forest	2,732,682	1,829,312	1,887,435	4,276,302	2,681,433
Enhancement	-8,490,930	-11,223,826	-9,758,555	-8,647,746	-9,530,264
Total (Emission estimates (Net)	62,833,585	38,099,174	50,428,843	57,454,634	52,204,059

Construction method of the FRL is based on historical average of emissions and removals between 2002 and 2018 with 4-year intervals. Therefore, according to the basis of the average annual historical emission in the tables above, FRL value is shown as below.

Forest Reference Level (tCO2/year): 52,204,059

The TA team prepared the draft TA report in the context of the modified FRL submission. The Kenyan stakeholders reviewed the draft report. The report was finalized based on the comments given and published through the following URL.

https://unfccc.int/documents/267566

3-8 Strengthen capacities for creating 2020 Land Cover/Land Use Map

The Project started to strengthen the creation capacity of land cover/land use map in second year i.e., September 2017. The Project prepared the guiding material and conducted the first training including lectures and exercises for six trainees. In the lecture, the Project covered role of the activity data for REDD+, basic remote sensing and image processing, methods of field survey and extraction of training data for classification, contents of SLEEK manual, supervised classification processing. In the exercise, the Project selected the pilot area within single scene of LANDSAT satellite image data, and utilized this scene image for image processing exercises which are pre-processing, ground truth survey, extraction of site training data and image classification.

The Project conducted the second training in October 2019 by use of the same pilot area used for the first training. For the lecture, the Project used the improved material including filtering and zoning processing for purposes of matching the forest definition and stratification, and knowhow to create the AD from land cover/land use map. For the purpose of filtering processing, it has to match the forest definition of minimum area of 0.5 ha. This filtering processing removes 5 pixel cluster area due to size of less than 0.5 ha. The purpose of zoning processing is to classify the forest area to forest strata which are Montane Western Rain Forest, Dryland Forest, Coastal and Mangrove Forest, and Plantation Forest. Those processing methods were added to the SLEEK manual as improvements.

The Project strengthened the capacity of KFS for creating 2020 Land Cover/Land Use Map by organizing the lecture and training. And the creation of Land Cover/Land Use Map of 2020 was started. In the creation, the Project supported the archive searching of LANDSAT8

satellite image data in 2020 and confirming the selected image data as quality check. Further, the selected image data was downloaded which covered the entire country. The downloaded image data was pre-processed for the geometric correction and radiometric correction based on terrain. And subsequent process was started on image classification and quality assurance for the classification result.

3-9 Train C/P for new technology or methodology of MRV (Measurement Reporting Verification) and test them for future development of MRV system in Kenya

Through the MRV training, the Project aimed at training participants to acquire REDD+ outline and the methodology of M of MRV in particular and developing human resources for appropriately conducting MRV on REDD+ implementation in Kenya. The project conducted the MRV training four times. The 1st and 2nd MRV trainings targeted beginners of REDD+ to get the basic knowledge of REDD+. The 3rd and 4th MRV trainings were planned for the KFS staff selected from among participants of the previous 1st and 2nd MRV training in order for them to strengthen their knowledge on REDD + and the progress of REDD+ readiness activities in Kenya. Table OP 3-6 shows the summary of each MRV training.

Table OP 3-6 Summary of MRV training

No.	Date	Venue	Participants	Contents
1st	5th–6th Jul. 2017	Naivasha	24	Outline of REDD+, Progress of Kenya's REDD+, Outline of NFMS as part of MRV's M, Measurement for Activity Data, Measurement for Emission Factor, etc.
2nd	4th–5th Jul. 2018	Naivasha	30	
3rd	21st–23rd Jan. 2020	Nakuru	20	Review of Outline of REDD+ and NFMS, FIP (including practice of use of FIP), FRL setting, Field practice for forest inventory, Introduction of Community Based Forest Biomass Monitoring, etc.
4th	7th–9th Jul. 2021	Nakuru	20	

1-3-4. Output 4; Tree Breeding

(The capacity of breeding techniques for drought tolerant trees in KEFRI is improved.)

(1) Basic Policy of activities

The previous tree breeding project "Project on development of drought tolerant trees for adaptation to climate change in drylands of Kenya (2012～2017)" implemented analysing genetic variation, tree breeding research, developing propagation techniques and drought tolerance research through introducing advanced breeding technology. Based on these works, CADEP component 4 started an advanced research activity for producing *Melia volkensii* second generation of plus trees which would complete a cycle of tree breeding. The final goal of the work is to build a breeding research ability to accomplish the breeding cycle.

1) Tree Breeding

Tree breeding in Kenya has been on the first stage with 2 Melia seed orchards[*1] and its 12 progeny test sites[*2] established in the previous project as a base for research activities. Data collection from the test sites begun and has been continuously implemented.

The main activity in this Component was therefore to provide a guidance on proper data collection in the progeny test sites and accurate analysis to select excellent trees, which would allow KEFRI staff to proceed in making second generation. This was to contribute to stepping-up their research ability by acquiring a capacity to accomplish an entire research cycle of tree breeding.

Another activity on breeding was for *Acacia tortilis* which followed the activities for Melia based on collection of data from 2 Acacia seed stands[*3]. Technical guidance was provided for Acacia seed stand management, to maintain the seed stand healthy and appropriate for efficient seed production.

2) Propagation techniques

In the former project, grafting technique of Melia has been established and transferred to KEFRI staff. Cutting propagation technique, however, has not been established completely though it was an important technique to reproduce superior clones and thus establish a seed orchard efficiently. Therefore, some experiments of cutting have been implemented and some of them was successful. Same work for Acacia was also conducted.

3) Artificial crossing of Melia

A study on artificial crossing of Melia to produce its next generation. This was to cross entomophilous flowers of Melia, which had been thought to be a challenge. Flowering

phenology and characteristic of seed production, as basic data collection, were studied first and study on pollen collection and preservation was also implemented.

4) Drought tolerance

Some candidate clones as drought tolerant trees had been selected through several experiments in the former project. Detailed investigation was conducted to develop indices on drought tolerance by the team of Kyushu University.

(Reference)

＊1：*Melia Volkensii* orchards were established in Tiva (Kitui) and Kibwezi (Makueni) in2012, 2013 and 2014, which has totally 6,000 trees, 21.6ha.

＊2：Progeny test sits(PTSs) were established in 2014, and 2015 at 12 different sites across four agro-ecological zones in Gaciongo, Marimanti, Makima, Tiva, Ikithuki, Kibwezi, Voi, Kasigau, which has totally 5,400 trees, 10.6ha.

＊3：*Acacia tortilis* seed stands were established in Tiva and Kibwezi in 2015 and 2016, which has totally 4,300 trees, 6.6ha.
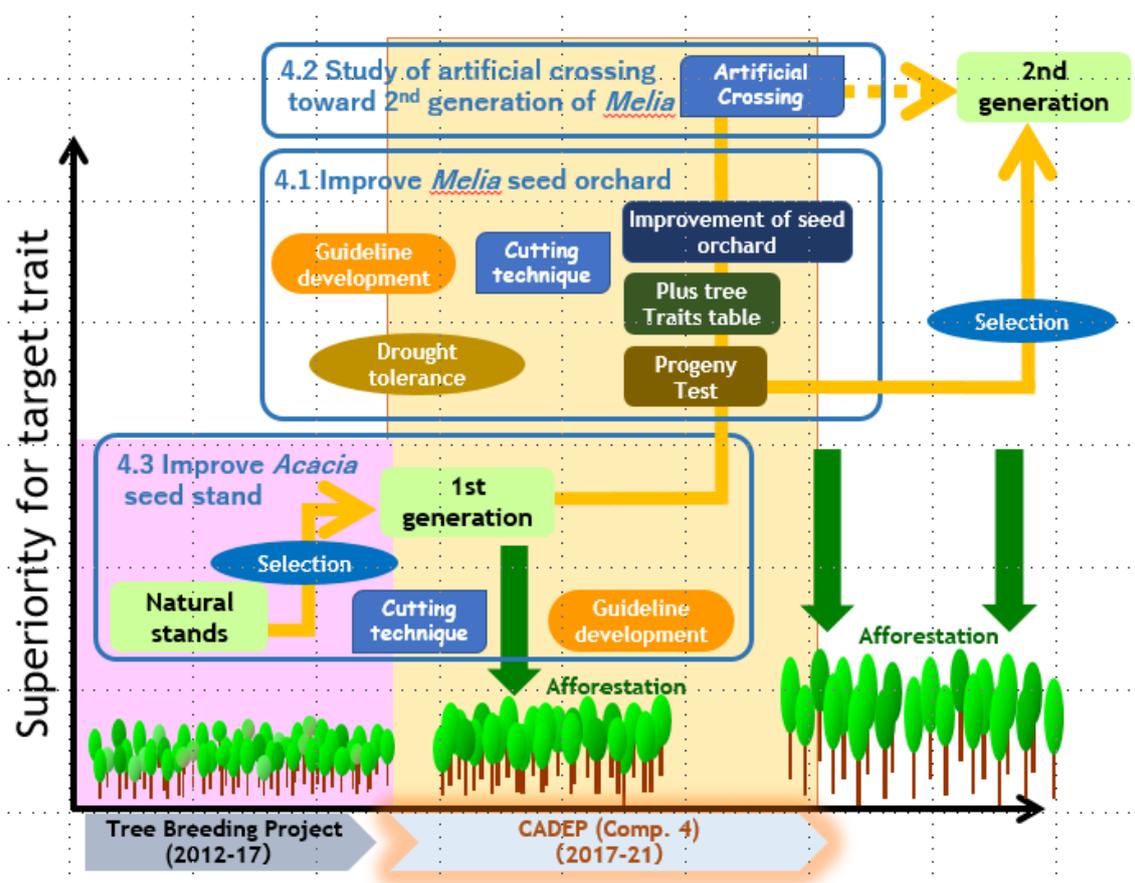
Figure OP 4-1: Flow Chart of Tree Breeding on Melia and Acacia

(2) Implementation of activities
4-1. Improve the quality of clonal seed orchard of *Melia volkensii*
This activity aimed at improving the quality of clonal seed orchards of Melia through selection of excellent plus trees based on drought tolerance indices and progeny test site data analysis.

4-1-1 Development and application of drought tolerance indices related to the growth of Melia

a. Comparison of the growth of superior and inferior clones selected from Candidate Plus Trees (CPTs) –seed orchard in Tiva and Kibwezi

In 2017, the seasonal stem growth patterns of superior and inferior clone were compared. The superior clone continued its growth under water stress, with the stem shrinkage smaller than that of the inferior clone. This result suggested that superior clone has some physiological features to reduce the effect of water stress. There was a possibility of related parameters being developed as indices for plus tree selection of Melia.

In 2019, stem volume growth of plus trees planted at Tiva and Kibwezi seed orchards was compared. There was a significant positive correlation between the volume each family has in Tiva and Kibwezi. This result suggests that the selected superior or inferior clone has a genetically high or low growth ability. There was also a significant positive correlation between stem volume of 2 years and 7 years old. This result suggests that we can select the superior clone in young stage.

b. Comparison of physiological features of superior and inferior clones selected from Candidate Plus Trees (CPTs) – nursery in Kitui centre

In 2017, the light-photosynthesis curve and leaf chlorophyll content of the superior and inferior plus tree growing at Kitui nursery investigated.
There was an obvious difference among maximum photosynthesis of each clone, which was from 9 to 18 μ mol $CO_2/m^2/s$.
However, the photosynthesis of superior clone was not necessarily larger than that of inferior clone, nor a remarkable difference among leaf chlorophyll contents.

c. Development of drought tolerance indices related to the growth of Melia

Characteristics of *Melia* seedling grown from open seeds of superior and inferior clone were studied from 2018 to 2020. Tree height (H) of superior clone was a little lower than that of inferior clone and the stem diameter at ground level (D) of superior clone was a little larger than that of inferior clone. As a result, the H/D ratio of superior clone was smaller. There was a possibility that H/D ratio of seedling were an available index for selecting the Melia plus tree.

Seedling from superior clone   Seedling from inferior clone

Figure OP 4-3: Comparison of the shape of superior and inferior clone

d. Classification of Candidate Plus tree into different drought tolerance levels

The superior clone seemed to have characteristics which were related to drought tolerance. In this regard, measurement of the morphological features related to drought tolerance by using seedlings from selected plus trees was conducted. Seedlings from 36 clones were compared, and the H/D ratio of superior clones was smaller than that of inferior clones. The result suggested that smaller H/D clone tended to more widespread in growth and that D was bigger in fast-growth clones. Consequently the H/D ratio of seedling seems to be an available index of drought tolerance for selecting the plus tree of *Melia volkensii.*

4-1-2 Evaluation of traits of plus trees

a. Assessment of PTSs

In 2017-2020, the assessment of PTSs is implemented by KEFRI principally twice a year in Jan-Feb. and Jul-Aug.

In 2018, short term experts made lectures to improve the capacity of trait measurement in PTS assessment, such as measurement procedure for indexing fecundity, healthiness, and stem form of Melia in PTS. By these lectures, the capacity of C/P in terms of data aggregation technic on research activity was strengthened.

b. Data analysis
b-1 Data analysis

FTBC input the assessment data on Feb. and Aug. 2018 into data file, and has carried out detailed analysis. Through the analysis on growth and seed production, superior clones showing both superior growth and good seed production were identified.

The results of breeding were as follows:

a) There was a significant growth variation among families, despite of large between- and within- site growth variation.

b) Based on the breeding analysis, performances of both growth and seed production were thought to be improved in the future.

c) The progenies of "good" families always showed faster growth across sites.

In 2021, KEFRI input the assessment data on June 2021 into data file. FTBC and KEFRI analysed the data for genetic evaluation of plus trees for preparation of plus trees traits table.

b-2 Training

Short term experts delivered lectures for data analysis of PTS assessment to KEFRI researchers, using common data analysis software on Dec. 2018 and Aug. 2019. These seminars should be of an intermediate level, which aimed at strengthening data aggregation technic, statistics analysis and drawing figures on forestry research activity.

FTBC and KEFRI shared the statistical analysis scripts for the evaluation of plus trees to enhance data analysis techniques for the subsequent data sets.

Figure OP 4-4: Training for data analysis of PST assessment

b-3 Selection of 2nd generation based on breeding values

FTBC and KEFRI selected 400 individuals of 2nd generation Melia. This activity was an advanced progress beyond the scope of CADEP.

On Dec.2019, short term expert and C/P took a step toward selection for next-generation, based on PTS assessment data with a lecture on the latest breeding analysis method.

According the capacity development activity [4-1-2a: assessment of PTSs], C/P of KEFRI had collected abundant data of multiple traits of *Melia*, including stem height, diameter, volume, stem form, fecundity and healthiness. Using these data of multiple traits, a selection which would improve multiple traits simultaneously had implemented.

FTBC and KEFRI analysed the PTS data and estimated genetic performance of *Melia* trees in PTS. The order of prioritizing traits in ranking families were; 1. volume, 2. stem straightness and healthiness, 3. fecundity. Meanwhile it was considered to select progenies in a way that the estimated genetic performance in each trait were kept as high as possible. FTBC also advised that it was important to balance improving multiple traits and keeping genetic diversity as wide as possible because the original breeding population size of *Melia volkensii* had been relatively small (100 CPTs of 1st generation).

With the principles above, KEFRI and FTBC researchers selected about top 10% trees in each PTS. These selected individual trees were marked with yellow paint. (Figure OP 4-5)
These activities were followed by discussions on a future Melia breeding plan setting up breeding population of 100 2nd gen individuals in each of 4 eco-regions (400 in entire Kenya), which were thought to be manageable breeding genetic resources in Kenya.

Figure OP 4-5: Selected 2nd generation trees with marking by yellow paint

b-4 Plus trees traits table

In 2020 FTBC and KEFRI analysed growth and other traits using the data obtained in PTSs and seed orchards, calculated breeding values and clonal values for each plus trees. FTBC and KEFRI compiled the result and developed a draft of plus tree traits tables.

Though the H/D ratio of seedling seemed to be an available index of drought tolerance in Activity 4-1-1, it was not incorporated in "Plus tree traits table of Melia" because the correlation between the H/D ratio and assessment data was not identified. In 2021, FTBC created the latest "Plus tree traits table of Melia" based on the statistical data which was sent by KEFRI.

c. Guidance on maintenance measures of PTSs
c-1 Efficient weeding
In 2017 and 2018, FTBC and KEFRI discussed how to implement efficient weeding on seed orchards and PTSs. FTBC suggested introducing bush cutters with engine, and accordingly the director of Kitui regional centre requested a purchase of the machines. In 2019 and 2020 weeding on each site was properly implemented.

c-2 Monitoring of all PTSs
In 2017-2020, a staff of site management monitored all sites including seed orchards and PTSs to check weed or any problems such as pests and diseases and reported the result to the chief advisor.

4-1-3 Improvement of seed orchards through rogueing
a. Stem cutting and branch pruning
In 2019, the methods of stem cutting and branch pruning in seed orchards are discussed.

b. Rogueing
In 2019, short term experts of FTBC lectured and proposed several ways of improving the "quality" of seed orchards in terms of tree breeding. Based on the results of the activity 4-1-2 [Evaluation of traits of Plus trees], a plan of rogueing of inferior Melia clones was planned.

In May 2020, FTBC and KEFRI made a meeting to improve seed orchard quality. According to the technical guidance of FTBC, inferior clones in seed orchards were planned to be rogued on May to Oct. 2020. However, it was hard to do that due to COVID.
In 2021, FTBC presented way of rogueing based on the trait table - result of statistical analysis in PTSs. FTBC and KEFRI discussed the future plan of rogueing and concluded to implement in the near future.

4-1-4 Development of a manual for maintenance of seed orchard
a. Development of manual
In 2021, KEFRI and FTBC prepared a maintenance manual of Melia seed orchard, the contents of which were selection of plus trees, establishment of clonal seed orchards, reducing pests and diseases, weeding and seed production.

b. Technical support

In 2017, FTBC provided a cracker for walnut for efficient removal of seeds from Melia fruits or nuts. It was tested to split or crack Melia nut but was found not successful and need to be improved, still it could be used for Melia green fruit to get seeds.

4-1-5 Study on clone propagation technique for Melia

a. Technical support

a-1 Cutting

From2017 to 2020, FTBC has supported development of cutting propagation technique on *Melia volkensii*. The study was carried out for specified clones and period to establish the technique. FTBC took a pre-test study on cuttings of *Melia azedarach,* a native tree species of the same genus in Japan. FTBC introduced some measures based on the study.

In 2018, three trials of *Melia volkensii* cutting were implemented using sand medium. The trials used scions collected from green branches and young sprouts in Tiva seed orchard. One of the trials were conducted in an appropriate time of the year (1 month after the beginning of rainy season), however, neither callus formation nor rooting could be confirmed. The other trials showed the same results.

Another two trials of Melia cutting were implemented in 2019. One of the trials was conducted based on the difference in the medium (old-cocopeat, sand and pumice). After 6 months, one of the scions (coco peat, no IBA) was rooting. In 2020 Melia cutting trail suspended due to the Pandemic.

Through the plural trials above rooting was confirmed in only one scion. More study will be needed to produce clones for efficient seed orchard establishment.

Figure OP 4-6: Scions from green branches (Apr. 2018)

Figure OP 4-7: Rooting scion (Feb. 2020)

a-2 Air layering

Short term experts tried air layering/marcotting to Melia in Kenya as the cutting test was not

successful. Air-layering / marcotting method trial was done in Tiva seed orchard in November 2019 with 24 branches of several mother trees selected randomly. It was done quickly as C/P of KEFRI were skilled at air-layering, having experiences and necessary equipment for air-layering, but the result was confirmed not successful in 2021.

b. Development of clone propagation manual

A "Guidelines for clone propagation of *Melia volkensii*" was made. The contents were grafting and other clonal propagation technique.

(Outcome of activity 4-1)

In 2021 the following guidelines were compiled.
- Plus trees traits table on *Melia volkensii* in the drylands of Kenya
- Manual for managing Melia seed orchards
- Guidelines for clone propagation of *Melia volkensii*

4-2 Study of artificial crossing towards second generation of *Melia volkensii*

This activity aimed to implement a basic study on crossing of *M. volkensii* in the seed orchards towards the second generation, including study of phenology

4-2-1 Study on mating system
a. Phenology

Observation of seed orchards for study on phenology was carried out from 2017 to 2020, from Aug. to Sep. and from Feb. to Mar. every year. The observation confirmed large variation among clones in phenology. In addition, nuts/seed production capacity of Kitui and Kibwezi seed orchards was investigated. Seeds have been collected three times a year since 2016, and fruiting were observed in almost all mother trees in 2017. In 2019, flowering in full bloom was observed throughout the both seed orchards.

b. DNA analysis for mating system

In 2017, short term experts of FTBC lectured several scientific approaches for producing next generation including artificial (hand) pollination, open pollination and within-tent pollination system.

In 2018, seed sampling for DNA analysis started but the germination rate was not sufficient. In 2019, 10-15kg of fruits were collected from 2 blocks of Tiva, however, the germination rate was about 30% which was still not enough for analysis. In the next season, more seeds collected and germination rate reached 60%, which finally provided 480 seedling samples from 10 mother trees.

In 2019 to 2020, DNA extraction from germinated seedlings was conducted by C/P. The extraction started in Dec. 2019 and materials were prepared in 2020. FTBC provided C/P with technical guidance of analysis so that DNA genotyping by using Simple Sequence Repeat (SSR) marker would be carried out. However, analysis delayed due to inadequate supply of consumables during COVID pandemic, and finally the planned DNA genotyping by SSR marker was not accomplished.

4-2-2 Study for effective methods of artificial crossing
a. Collection and preservation method of Melia pollen

Study on preservation of Melia pollen was conducted using a phial with silica gel. Artificial crossing was conducted to confirm the viability of stored pollen in Kitui orchard in 2018 through guidance of a short-term expert. The experiment found fruit production very low, suggesting that the collection of Melia pollen seemed to be possible but as difficult as known for other tropical tree species.

b. Searching effective methods of artificial crossing

Study for effective methods of artificial crossing was designed by C/P according to advises by short-term experts. In order to confirm self-fertilization, a bagging experiment at Kitui orchard was implemented since 2018. Unopened buds in inflorescence were covered with mating bags to prevent contamination of pollen from other trees by small insects. Pollen was collected from stamen and reserved in a bin, and then applied to pistil of another clone using a fine brush. After brushing, the pistil was covered by a mating bag to prevent contamination by other pollen. The fruit production was observed as being low level, suggesting that artificial crossing was technically possible, but actually not as its efficiency relative to labour (bagging inflorescences, collecting pollen from father clones, and conducting hand pollination to mother clones) was quite low.

According to the results of trials, short term experts of FTBC and C/P of KEFRI discussed that the open pollination system seemed to be better in terms of the efficiency - cost (labour, budget and time) balance - for producing next generation Melia.

Figure OP 4-8: Observation of processing on artificial crossing

(Outcome of activity 4-2)

Through these technology-transfer activities by short-term experts, the capacity of pollen collection and artificial crossing technique have been strengthened so that the mating experiment can be independently designed and conducted by C/P. In addition, the capacity of C/P to study mating system via genetic experiment was also strengthened. In 2021 Guidance of crossing technique towards second generation of *M. volkensii* was compiled.

4-3 Improve the seedling seed stands of *Acacia tortilis*

This activity aimed at improving the seedling seeds stands of Acacia through selection of excellent plus trees based on data analysis of progeny test sites.

4-3-1 Assessment of PTSs

In 2017-2020, the assessment was to be implemented twice a year on Jan-Feb. and Jul.-Aug., but actually done on Aug. 2017, Feb. 2018, Aug. 2018, Sep. 2019, Mar. 2020 and Mar./May. 2021.

4-3-2 Data analysis and evaluation of traits of plus trees (1st-4th year)

From 2017 to 2019, KEFRI staff filed the assessment data from PTSs with assistance from FTBC. FTBC analysed the data and gave a guidance to C/P. Traits on each family were evaluated with the data at the 2nd year after planting.

In 2019, FTBC discussed with KEFRI C/P how to assess the quality of Acacia wood. Upon the discussion, wood density was measured first, then carbon stock per tree was estimated from stem and branch weight in addition to digging up and weighing root biomass. The result of the research would contribute to the estimation of Green Carbon in planting activities.

In 2020-2021, apart from the thinning below, wood properties (density) data was collected using an equipment "pilodyn" as well as the measurement of woody biomass. 15 trees were selected per site five each from fast growing, medium growing and slow growing families. The total usable biomass collected and weighed per tree (figure 4-11). Disk samples were collected for carbonization and energy property tests.

4-3-3 Improvement of seed stands (Thinning of trees)

In 2018 the trees in Acacia seed stand showed very good performance, grew to self-standing stage. Upon that thinning of trees was planned by Dr. Ndufa (then Director of Kitui centre) and short-term expert to implement in Aug. to Nov. 2019 for stands-2015 and in the end of Nov. 2019 for stands-2016. However, the thinning was postponed to the following year due to the early started and prolonged rainy season in 2019 and so again due to the following COVID-19 pandemic.

In 2020 lighting condition of the branches of Acacia became unfavourable due to overgrowth. Making more space between trees was thought to be urgent issue despite covid-19 outbreak in Kenya. Upon this, in Nov. 2020 thinning was carried out for the 2015 stands in Kitui and Kibwezi. 250 trees were removed diagonally to half the trees in Tiva and 324 trees from Kibwezi site. The thinning of 2016 stands was done in March 2021 by the same method (figure 4-9,4-10). Promoting Acacia flowering is expected by the thinning.

While thinning was carried out as above, flowering condition continued to be low. FTBC and KEFRI discussed to postpone stand improvement to the year after 2022, when sufficient flowering would enable evaluation of fecundity.

Figure OP 4-9: Felling and clearing -Tiva

Figure OP 4-10: Cleared floor - Tiva

Figure OP 4-11: Weighing samples

4-3-4 Study on clone propagation technique for Acacia

Development of clonal propagation technique is required to establish next generation Acacia seed orchard.

A trial on grafting method of Acacia was done in 2018 using scions collected from 5 year Acacia in Kitui nursery with instructions from short term expert to select and prepare scions. However, the result was not satisfying. Another trial on grafting was done in 2019 using scions from three better growth families on Tiva seed stand. The grafts were kept under cheesecloth, watered twice a day (AM/PM), which were basically the same way as these with Melia. The result was not good again.

In 2019 'Fukurotugi' method (bark grafting) which never tried before for Acacia was carried out in November 2019. The grafts were kept under cheesecloth in Tiva nursery. However, the result was not good. More study will be necessary to realize clone propagation of Acacia for establishing next generation efficiently. All the while, KEFRI staff already understood the grafting method so technical transfer was thought to be achieved.

Figure OP 4-12: Grafting by KEFRI staff
(Jan. 2018)

Figure OP 4-13: Grafting Guidance
(Nov. 2019)

（Outcome of activity 4-3）

The seedling seed stands showed good growth despite poor flowering. The biomass measurement will give an important information for its fuel usage. Stand thinning will pave towards healthy stand condition and better flowering in the near future which will be assessed and evaluated. The clone propagation was found not successful with current grafting methods. In 2021 Guideline for establishment and Management of *Acacia tortilis* Seed Stand in Kenya was compiled.

1-3-5. Output 5: Regional Cooperation

(Capacity of regional cooperation in KEFRI is intensified by promoting knowledge sharing and transfer of technologies for strengthening the resilience to climate change and drought in Sub-Sahara Africa.)

The project's Regional Cooperation output is harmonized with the objectives of Africa Initiative for Combating Desertification to Strengthen Resilience to Climate Change in the Sahel and Horn of Africa (AI-CD) which was launched in a side event during the 6th Tokyo International Conference for African Development (TICAD VI) held in Nairobi, Kenya. During the launch, an AI-CD statement was signed by the government of Kenya, government of Senegal, UNCCD and JICA. In the Horn of Africa, the initiative is implemented by 7 countries namely; Djibouti Eritrea, Ethiopia, Kenya, Somalia, South Sudan and Sudan. Kenya is the hub for Horn of Africa (HoA) with strong ownership from Ministry of Environment and Forestry (MoEF) and KEFRI (refer to Output 5 implementation structure is in the Figure OP 5-1). KEFRI is the counterpart institute of the project and the implementor for AI-CD within HoA as well. In the Sahel region, the AI-CD participating countries are Burkina Faso, Cameroon, Chad, Mali, Mauritania, Niger and Nigeria with Senegal being the hub.

Figure OP 5-1: Output 5 implementation structure
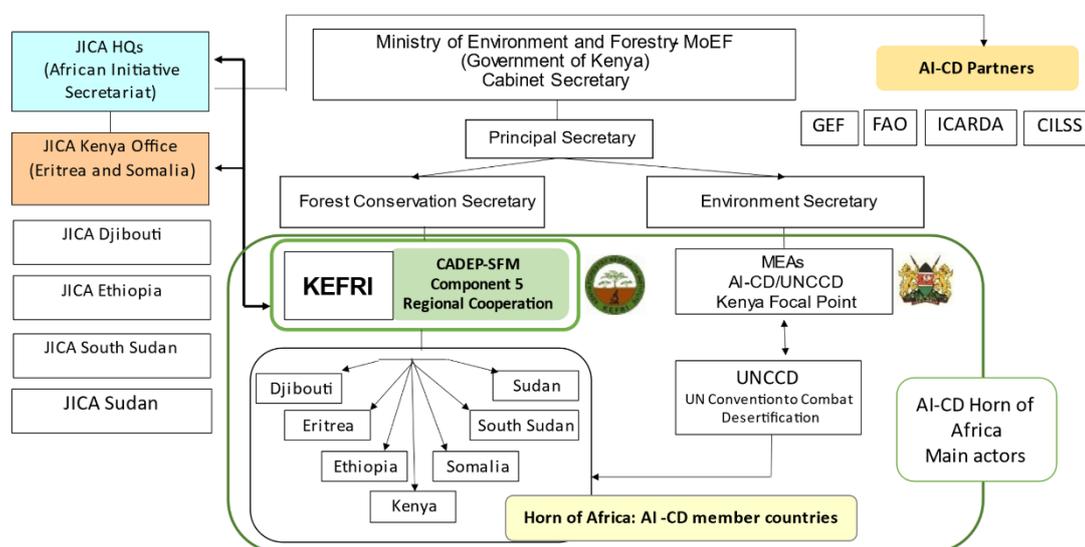
The mandate of AI-CD is to contribute to enhance sharing of knowledge and experiences, and to facilitate technology transfer among Sub-Sahara African countries in order to collectively combat desertification. AI-CD objectives are achieved through three major pillars namely; Building Network, Knowledge Sharing and Improving Access to Finance.

The project's output 5 aims to enhance capacity for promoting knowledge sharing and transfer of technologies for strengthening resilience to climate change and drought within Sub-Saharan Africa.

The project activities and achievements on output 5 are as follows;

5.1. Design the scope and prepare Terms of Reference (TOR) for cooperation for networking with related countries

Before starting implementation of activities on the ground, the Project prepared draft Terms of Reference (TOR) to have common view and own the process for AI-CD member countries from Horn of Africa to work together and collectively to achieve the goals. The draft TOR was circulated and discussed for further input among HoA countries during 1st Regional Forum for HoA at KEFRI in Nairobi, Kenya. The TOR for HoA was referred to in developing the draft TORs for the Sahel region.

5.2. Hold regional cooperation meetings and fora

5.2.1. Hold policy level fora

The Project held six (6) regional fora for Horn of Africa. The purpose of holding the regional fora was to share knowledge and experiences within and among Horn of Africa countries on priority areas on combating desertification to address similar environmental challenges. By utilizing knowledge and experiences shared during the fora, AI-CD therefore supported the process for each member country to address its own challenges. The fora emphasized on the need to address our challenges using our local solutions which can be found within each country.

Promotion of AI-CD at political level was critical, therefore the 2nd Regional Forum had participation by the senior policy makers level including the Minister of Environment of Sudan. During the forum, the participating countries deepened their views on AI-CD, shared their policies on combating desertification to facilitate actions taken on the ground, and highlighted the importance of political commitments in light of the urgency of fight against desertification. As a result of forum, it adopted Nairobi declaration which emphasises on more political commitment for the future and promised to achieve the goals of AI-CD.

The 3rd Regional Forum created opportunities between the international development partners and the HoA member countries to have linkage to improve access to finance based on the project concept notes prepared by member countries. The forum contributed to

strengthen the harmonisation among them and the member countries as well.

The main participants from HoA during the regional fora were the AI-CD Focal Point who are also UNCCD Focal Points. The various fora's theme, date and the venue and number of participants are as outlined in below Table OP 5-1.

Table OP 5-1: Regional Forum for HoA

Event	Theme	Date	Venue	Participants
Preparatory meeting on AI-CD	To shape up and verify the initiative having opinions with wider stakeholders before launching at the TICAD-VI side event	11th-13th July ,2016	KEFRI, Nairobi, Kenya	60
1st Regional Forum for HoA	To build consensus on TOR, create common understanding of AI-CD and tools Good Practices documentation	1st - 3rd February, 2017	KEFRI, Nairobi, Kenya	69
2nd Regional Forum (Ministerial Forum) for HoA * Figure OP 5-2	Promotion of AI-CD at political level in order to mainstream AI-CD at the policy level	29th June, 2017	Crown plaza Hotel, Nairobi, Kenya	14
3rd Regional Forum for HoA* Figure OP 5-3	To improve access to finance, donor's clinic planned	14th-16th May, 2019	KEFRI, Nairobi, Kenya	57
4th Regional Forum for HoA	Opportunities in networking and knowledge sharing which contribute to enhancing access to finance	9th December, 2020	Virtual, Web based	43
5th Regional Forum	Impact of networking, knowledge sharing and	25th August, 2021	Virtual, Web based	65

(Conference) for HoA)	improving access to finance as approaches for strengthening resilience to climate change and combating desertification in Africa			

Figure OP 5-2: 2rd Regional (Ministerial) Forum for HoA

Figure OP 5-3: 3rd Regional Forum for HoA at KEFRI

The project utilised the opportunity to evaluate the usefulness of the Regional Forum by HoA participants. About 89% of participant ranked the forum as very useful while 11% ranked it as useful. Some of the comments by the participants include as below.

[The comments by the participants as "Very useful"]
- We had a better understanding of what the different countries experience.
- In my experience, it is the first time to participate in such a forum, I learnt a lot from the experience about the member countries on methods on combating desertification and learnt how to change my attitude in my country and region to give attention to combating desertification.
- The usefulness of the forum is we evaluate where we are and clearly comment on the way forward and share the experience of each member country knowing also their conditions.
- It was useful because I had the opportunity to exchange ideas and experience with colleagues from other countries.

[The Comments by the participants as Useful answered"]

- I was able to get some updates on progress of AI-CD and sharing good practices.

According to the very positive response from the participants from HoA, the project recognized the indicator 5-2 (70% of participating countries evaluate the regional cooperation useful.) was achieved.

Other than holding the regional fora, The Project also had opportunity to participate in international events such as AI-CD Sahel regional fora and UNCCD COPs. During these events, the Project reported on the progress and achievements for HoA. The various international events where the project participated included below Table OP 5-2 and 5-3:

Table 5-2: Sahel Regional Fora

Event	Theme	Date	City and Country
1st Regional Forum for the Sahel (refer to Figure OP 5-4)	Awareness and common understanding of AI-CD	1st – 3rd March, 2017	Dakar, Senegal
3rd Regional Forum for the Sahel	Presenting progress & achievement and project concept notes	16th – 18th July, 2018	Dakar, Senegal
4th Regional Forum for the Sahel	To strengthen access to finance through building network and access to finance	27th January, 2020	Virtual forum

Table OP 5-3: UNCCD COPs

Event	Activity	Date	City & Country
UNCCD COP 13 (refer to Figure OP 5-5)	Side event and follow up meeting with the focal points	5th – 11th September, 2017	Ordos, China
UNCCD COP 14	Side event and follow up meeting with the focal points	1st – 7th September, 2019	New Delhi, India

Figure OP 5-4: 1ˢᵗ Regional Forum for the Sahel

Figure OP 5-5: UNCCD COP 13, AI-CD side event

5.2.2. Hold Technical meetings for national in Kenya and regional for HoA

The Project mandated to build capacity of partner institutions within the participating Horn of Africa countries, engaged in environment and natural resources management activities including; forestry, water, soil, agriculture and range/pasture management to approach cross-cutting issues.

The purpose of holding technical training workshops is to build capacity of participants in collecting, documenting and sharing good practices in Natural Resources Management (NRM) for combating desertification and land degradation using CADEP tools. The training also would provide an opportunity for participants to accelerate knowledge sharing, transfer and adoption of existing good practices. The two (2) technical regional workshops for HoA and four (4) National workshops are detailed in Table OP 5-4.

Table OP 5-4: Regional Technical meetings

Event	Theme	Date	Venue	No. of Participants
1ˢᵗ Regional Technical Workshop training for HoA	Collection, documentation and sharing Good Practices	29ᵗʰ September - 6ᵗʰ October, 2017	KEFRI, Nairobi, Kenya	20
2ⁿᵈ Regional Technical Workshop training for HoA (Refer to Figure OP	Repackaging Good Practices into various extension materials, such as Brochures and Posters.	1ˢᵗ - 12ᵗʰ October, 2018	KEFRI, Nairobi, Kenya	11

60

5-6)				

Table OP 5-3: National Technical meetings

Event	Theme	Date	Venue	No. of Participants
1st National Technical Workshop training	Collection, documentation and sharing Good Practices	29th September - 6th October, 2017	KEFRI Kitui Centre Kenya	20
2nd National Technical Workshop training	Repackaging Good Practices into various extension materials, such as Brochures and Posters.	1st - 12th October, 2018	KEFRI Marigat Centre Kenya	11
3rd National Technical Workshop training*	Documentation of Good Practices	25th to 30th October 2020	KEFRI Marigat Centre Kenya	6
3rd National Technical Workshop training (refer to Figure OP 5-7)	Documentation of Good Practices	9th - 12th March, 2020	KALRO Machakos Kenya	6

*3rd National Technical Workshop trainings were held in two different venues due to COVID-19.

Figure OP 5-6: 2nd Regional Technical Workshop

Figure OP 5-7: 3rd National Technical Workshop

5.2.3. Undertake follow up visit

The Project planned a follow up visit to selected HoA countries to monitor progress as well as accelerate the activities in the visited countries. However, the Project decided not to hold this activity due to COVID-19.

5.2.4. Hold 5th Regional Forum for Horn of Africa (Conference)

Towards end of the project, a Conference was planned and held virtually on Wednesday 25 August 2021. The main goal of the Conference was sharing the impact of AI-CD in combating desertification and making communities resilient to climate change in Horn of Africa as well as propose a way forward. This goal was achieved through sharing experiences, progress and achievements made, as well challenges experienced and opportunities presented by AI-CD in HoA countries from 2016 to 2021.

5.3. Collect good practices information for strengthening the resilience to climate change and drought in Sub-Saharan Africa from Kenya and surrounding countries

5.3,1. Develop and test tools for collecting good practices

The Project developed tools to collect good practices in integrated manners utilising the standardised formats in Kenya and HoA.

The tools include how to identify the good practice, questionnaire for collecting information on good practice and the documentation guidance on how to write good practices. The good practices documented are then disseminated through the web for wide scale sharing (refer to CADEP Good Practice website - URL: https://www.kefri.org/cadep/index.html) .

5.3.2. Collect good practices in Kenya

KEFRI has six (6) regional offices and each office has dissemination officers who are charged with extension activities within each region and are familiar with communities and environment of the area. The Project, thus involved KEFRI in collecting and documentation of good practices. The National technical workshops were held to build the capacity of the officers to undertake the project activities including documentation and editing, consequently accelerate the process of good practice collection.

5.3.3. Collect good practices in HoA

The Project utilized the opportunities offered during the regional fora to collect good practices from HoA countries. Due to financial challenges, the Project focused on repackaging existing good practices in the HoA countries.

5.4 Accumulate the collected information and establish the database on KEFRI's website

5.4.1. Design and develop web and search tools within KEFRI knowledge management system
For the purpose of wider dissemination of good practices, the web was created under the KEFRI official web site (refer to Figure OP 5-8 and 9). To expand the capacity of KEFRI's database to accumulate the collected information, a server equipment was purchased and installed at KEFRI.

Figure OP 5-8: CADEP website
https://www.kefri.org/cadep/index.html

Figure OP 5-9: Introducing Good
Practices uploaded in the website

5.4.2. Repackaging and uploading collected good practices
Repackaging and uploading collected good practice information material was continuously undertaken throughout the project duration with strong ownership and commitment by KEFRI. Good practices collected and documented at KEFRI regional centres were sent to KEFRI headquarters for editing before uploading on the web site. The National Technical Workshops became a drive to strengthen capacity for documenting by the dissemination officers to support editing work within KEFRI.

Through collaboration of AI-CD and discussion with JICA Headquarters, the Project developed the AI-CD Guideline on Measure for Combating Desertification for Horn of Africa and AI-CD Book (refer to Figure OP 5-10) which complied good practices contributed by all seven AI-CD HoA member countries. The two publications were edited and published by the Project.

The two publications were officially launched during UNCCD COP 14, side event (refer to Figure OP 5-11) and distributed to the member countries and participants. The Guideline and Book will be key products to disseminate at all levels from policy level to people at the local level in Kenya as well.
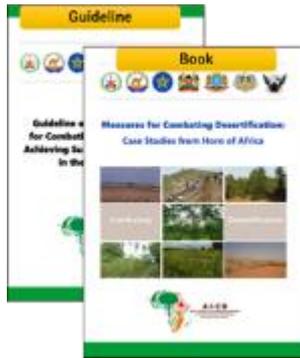
Figure OP 5-10: Published the AI-CD Guideline and Book

Figure OP 5-11: Guideline and Book were launched during Side event of UNCCD COP

For the purpose of reaching to the end users of the technologies on good practices, the project repackaged from good practices collected and documented into leaflets. The repackaging methods were introduced during 2nd National and Regional Technical Training Workshops, where the capacity of participants from Kenya and Horn of Africa was built on repackaging information into different formats that included leaflets.

In regards to development of the web site for uploading the good practices, the project faced challenges to access uploaded good practices stably due to fluctuation of network. However, the challenge was addressed, now ensuring stable access of the web site.

5.5. Share the collected knowledge and technologies with other countries in Sub-Sahara Africa

5.5.1. Use internet-based methods

The Project planned to use the internet to share knowledge with a wider pool of end users. Adoption and utilization of the good practices was envisaged to contribute to addressing environmental problems in HoA and as well as Kenya, areas that have similar challenges. The developed CADEP web portal under the KEFRI website is supporting as one stop shop to provide information to be an entry point of combating desertification.

5.5.2. Use non-internet-based methods

Many countries in the HoA under AI-CD framework, have challenges of stable internet access, to overcome the challenges, the Project has produced leaflets on good practices for wider circulation for information to reach users. However, many of the end users are not able to access internet. Leaflet produced at the beginning of the Project were distributed as hard copies during 2nd National/Regional Technical Workshop Trainings.

One of the activities that was scheduled by the project in year 2019 and 2020, was to build capacity of farmers through a Farmer Exchange Visit. The exchange visit was proposed to be undertaken in Embu, Kitui, Makueni and Taita Taveta counties. A Pre-field visit to select farmers to be visited during the Farmer Exchange Visit was undertaken in Embu, Kitui, Kibwezi and Taita Taveta from 8th -13th March 2020. During the pre-field visit, 2-3 farmers in each region were identified and selected from a pool of farmers that had been pre-selected by KEFRI Dissemination Officers (DOs) and KFS CADEP Output 2 officers. The farmer exchange visit was scheduled to be undertaken in the third week of March 2020, in collaboration with Output 2. However due COVID-19 pandemic in Kenya, the farmer training was cancelled.

On the Project utilizing non-internet-based methods, distributed materials during activities such as World Day for Combating Desertification in Kenya (refer to Figure OP 5-12 and 13). The World Day to Combat Desertification has been observed annually on every 17th day of June since 1995 to raise awareness to public in relation to International Cooperation to Combat Desertification, Land Degradation and Drought (DLDD). The project has been able to contribute technical aspects to the communities and government officers through the brochures and booklets for the purpose of knowledge sharing.

Figure OP 5-12: WDCD-2018: Cabinet Secretary, MoEF visited KEFRI booth where CADEP outputs were presented

Figure OP 5-13: WDCD-2019: Good practices were distributed wider range of participants

5.5   Improve access to finance through proposal writing

Improved access to finance is one of the major pillars of AI-CD. To contribute to this pillar after a series of discussions, the project identified the need to facilitating to strengthen capacity of AI-CD HoA member countries to develop fundable proposals to the international development partners in order to accelerate the activities on the ground.

The occasions of the regional fora and technical workshops for HoA, the project has been facilitated to invite particular partners to share the critical points for access to finance. Finally, the Project addressed this matter to hold a donor's clinic with project concept notes prepared by the member countries during 3rd Regional Forum for HoA.

1-4. Activities other than five Outputs

1. Interaction WS

CADEP consists of five components quite different one another. So, it is not easy for C/Ps of each component to know about other component activities. In this regard, the Project conducted two times Interaction Workshop (WS) in June 2018 and July 2019. The second WS was realised through the strong intention and initiative by the GoK side, and field visit was included in the programme.

Four short term experts (two from Comp.3 and two from Comp.4) also attend the WS. The WS contributed to bring synergy for the whole project.

Figure II-1: 2nd Interaction Workshop

2. TICAD7

Dr. Ibrahim Mohamed, Principal Secretary (PS) of MoEF was invited to TICAD7 (Aug. 2019, Yokohama-city, Japan) by JICA HQs. PS made speeches in the two events *"Forests can Change the World and Innovative Technologies and Approaches, Key Elements for Better Forest Governance in Africa"* and "Integrated Approach For Climate Change In Sub Sahara Africa" respectively.

Chief Advisor supported to prepare the two speeches, and attended for the trip. Through the two events, PS explained about the effort and commitment in Kenya, with a gratitude for JICA contribution including AI-CD activity.

Figure II-2: Dr. Ibrahim addressed during the side event of TICAD 7

Mr. Kumahira of Komaza, important partner in CADEP Comp.2 was also invited to the same two events. He explained about the recent situation and activity of Komaza.

3. Publicity of the Project

The project made efforts to disseminate the activities to be highly profiled in Kenya. In regard to the public relation, there two dimensions such as "Technical information" (refer to Table II- 6) and "Project activities" (refer to Table II-7) and technical information and Project activities have been shared in ways of presentation, through internet, brochures, calendars,

and so on to be highly profiled.

（1）Technical information

Technical information regarding to tree breeding was widely disseminated through the academia and internet based. The details show in Table II-8.

Table II-8: List of Technical information			
Day/Month/Year	Occasion	Title	Contributor
30th October 2017	Workshop on technical development held by Hokkaido National Forest Regional Office in 2017	Introduction of Tree Breeding for *Melia volkensii* in Kenya	Dr. So Hanaoka
Jan.2018	Information Magazine of Tree Breeding	For scaling up" Tree breeding project in Kenya"	FTBC HP
13th Feb. 2019	Poster presentation： Hokkaido Regional Workshop on research results held by FFPRI	Effort of tree breeding in Kenya	Dr. So Hanaoka
Sep. 2019	IUFRO research meeting 「 21st International Nondestructive Testing and Evaluation of Wood Symposium」	Improvement of Seed Orchard according to the Progeny Test through Nondestructive Wood Property Testing on Tree Breeding Project in Kenya	Dr. Hisaya Miyashita
Oct. 2019	IUFRO research meeting "The 4th IUFRO Seed Orchard Conference 2019"	Breeding for Drought Tolerance and Establishment of Clonal Seed Orchards of *Melia volkensii* in Drylands of Kenya	Dr. Hisaya Miyashita
Nov. 2019	Information Magazine of Tree Breeding	Progress on Tree breeding project	FTBC HP
April 2020	Forest Genetics and Tree Breeding	International conference presentation "21st	Dr. Hisaya Miyashita

		International Nondestructive Testing and Evaluation of Wood Symposium"	
April 2020	Forest Genetics and Tree Breeding	Report on International Academic Assembly "IUFRO Seed orchard Conference"	Dr. Hisaya Miyashita
April 2020	Information Magazine of Forestry Agency "Rinya"	Tree breeding project in Kenya	Forestry Agency HP
July 2020	Report for activities on the Tree Breeding Field	Root cutting propagation trial for *Melia volkensii*	FTBC HP
Aug. 2020 （Japanese and English）	Brochures	FTBC Introduction Brochures	FTBC HP

（Information contributed by FTBC）

(2) Project activities

Three (3) web sites have been developed during the project period as shown in Table II-10.

Table II-10: List of Project activities disseminated internet-based

Website	URL
National Forest Information Platform	http://arcg.is/140OXv (under construction)
CADEP Good Practices under KEFRI Official Homepage	https://www.kefri.org/cadep/
CADEP website (Japanese language) under JICA's Technical Cooperation Official Homepage	https://www.jica.go.jp/project/kenya/014/index.html

In addition, the project produced below products for dissemination purposes;

- The Project logo was set in the purpose of familiarisation for the stakeholders and raising awareness to the public, and agreed the project abbreviation as "CADEP-SFM" among

the entire team during the 4th Project Management Unit (PMU) meeting held on 4th July 2017.

- Roll-up banners

Signage

CADEP

Policy Support (Component 1)

Tree Growing in ASALs (Component 2)

REDD+ Readiness (Component 3)

Tree Breeding (Component 4)

Regional Cooperation (Component 5)

- CADEP Calendar: Year 2018,2019,2020,2021

CADEP Calendar 2019

CADEP Calendar 2020

CADEP Calendar 2021

2. Achievements of the Project

2-1. Outputs and indicators (Target values and actual values achieved at completion)

Indicator 1-1; (Monitoring and evaluation process of the National Forest Programme is established.)

\<Achieved\>

Through the activity 1-3-2 and taking into account the latest forest policy considerations (especially the new strategy for 10% tree cover by 2022), Comp.1 team had reviewed NFP monitoring and evaluation process made in 2016, and prepared a road map, which was presented to MoEF in Jan. 2020. This indicator has been achieved.

Indicator 1-2; (70% of stakeholders recognize the recommendation prepared by the Project as applicable and effective.)

\<Achieved\>

The recommendation report (Activity 1-4) was prepared by all component members in Sep. 2021. Also, Japanese experts met with

> ➢ Mr. Chris Kiptoo, CBS, Principal Secretary of MoEF
> ➢ Mr. Julius Kamau, Chief Conservator of Forests, KFS
> ➢ Dr. Joshua K. Cheboiwo, Director, KEFRI

and explained about it at the end of the Project. The report was highly appreciated.

Indicator 2-1 Participatory Forest Management Plan (PFMP), Farmer Field School (FFS) and other forestry extension approaches are applied in a strategic and coordinated manner in the Pilot Counties.

\<Almost achieved\>

This indicator has been almost achieved. Various approaches of forestry extension are applied, i.e., PFMP, FFS, extension through individuals, schools, private companies, etc. As mentioned in the report on 2.3., the third round FFS groups were selected from the adjacent areas of the forests where PFMP was formulated (2019-2020), so that the synergy between PFMP and FFS would be produced and enhanced. FFS participants were taught about the linkage between tree growing and conservation of trees in the forests. Many participants became aware of the relations between growing trees and protecting forests while long-term effect should be carefully observed. At the same time, strategic coordination among PFMP, FFS and other extension approaches should be further explored in order for the counties to identify the best combination of extension methods that will fit to local environment and conditions.

Indicator 2-2 Collaboration among private and public sectors, and NGOs/CBOs is enhanced to promote tree growing in ASALs
<Achieved>
As shown in the report on the Activity 2.4, the Project organised the collaboration workshop inviting private sector and NGOs in May 2019 and discussed tree growing in ASALs. The Project also coordinated and mediated the signing of MOU between KEFRI and Komaza on collaboration in research and development. Through these activities and interventions, collaboration among the stakeholders was enhanced.

Indicator 2-3 More than 10 times of seminars/trainings for related stakeholders are held to promote improved *Melia volkensii* growing.
<Achieved>
As shown in the report on Activity 2.5.2., a total of 14 seminars/workshops/trainings with 1,284 participants were conducted and the indicator was achieved.

Indicator 3-1 The methodology of forest monitoring under the NFMS is established and documented.
<Achieved>
The methodologies of forest monitoring such as forest cover and forest cover change for Activity Data and forest carbon stock for Emission Factor have been developed and the NFMS document (draft) was developed including structure of data management function, institutional arrangement and calendar of NFMS operation etc. as well as the monitoring methodologies under the NFMS.

Indicator 3-2 Forest Information Platform as data management function of the NFMS is developed.
<Achieved>
The Forest Information Platform (FIP) has been installed on a newly procured server. The base software had been updated. In addition, the process of designing and uploading content such as map data has been improved. Moreover, the knowledge and capacity for the operation of FIP, GIS and field survey tool have been enhanced. The institutional arrangement for operation and maintenance of FIP has been developed. FIP management team has been established inside of the KFS. The upper level commission that is responsible for policy aspect and quality assurance of the content of the FIP will be established in the future.

Indicator 3-3 FRL is established in consultation with other stakeholders for submission to the

UNFCCC by the Kenyan Government.

<Achieved>

The FRL report was submitted to UNFCCC in January 2020. The modified FRL report based on the results of Technical Assessment (TA) by UNFCCC was then submitted to UNFCCC in August 2020. The TA report was finalized and published through the UNFCCC website.

Indicator 3-4 Creation of Land Cover/Land Use Map of 2020 is undertaken.

<Achieved>

The creation of Land Cover/Land Use Map 2020 was planned and started. The selected LANDSAT8 satellite image data was downloaded and pre-processed and the image classification has also commenced. The progress of creation of the map is 75% as of October, 2021.

Indicator 4-1 Plus trees of *Melia volkensii* and *Acacia tortilis* are selected in the seed orchards and stands in Tiva and Kibwezi.

<Almost Achieved>

FTBC and KEFRI researchers analysed growth and other traits, and developed a draft of plus tree traits tables for 1st generation plus trees of *Melia*. Subsequently, FTBC proposed KEFRI rogueing inferior *Melia* trees based on the plus tree traits tables. For Acacia, thinning were implemented for improvement, while selecting of plus trees by evaluating Acacia trees using growth/flowering data has been partly implemented as due flowering was not observed. Therefore, indicator 4-1 was almost achieved.

In addition, FTBC and KEFRI researchers took a further step toward future tree breeding cycles in Kenya, and implemented the on-site selection of 400 individuals of 2nd generation *Melia* in entire Kenia (100 in each region).

Indicator 4-2 Researchers of KEFRI acquire the skills of artificial crossing technique

<Achieved>

Through technology transfer by short-term experts, the capacity of pollen collection and artificial crossing technique have been strengthened to a practical level for the mating experiment. In addition, genetic experiments such as DNA extraction and SSR genetic analysis were conducted by C/P for a study of mating system.

Therefore, acquiring the skills of artificial crossing technique for KEFRI researchers, indicator 4-2 was achieved.

Indicator 5-1 Database on good practices to strengthen the resilience to climate change and

drought in Sub-Sahara Africa is established to be referred by Kenya and other neighbouring countries.

<Achieved>

A database on good practices was established and made it accessible to neighbouring countries through the following steps;

(a)Collection: Templates(questionnaires)were developed,

(b)Accumulation: KEFRI's database was set, and

(c)Sharing: CADEP Good Practices website was designed, opened under the KEFRI website, and encouraged its use for AI-CD Horn of Africa countries.

Indicator 5-2 70% of participating countries evaluate the regional cooperation useful.

<Achieved>

The project implemented the evaluation during 3rd Regional Forum and 5th Regional Forum (Conference) for HoA for asking the usefulness among participants from HoA. As a result, 89% participant recognized as very useful and 11% of participants recognized as useful.

2-2 Project Purpose and indicators (Target values and actual values achieved at completion)

To evaluate the Project Purpose "Capacity at the national and county level for sustainable forest management is strengthened", the Project has five indicators. As a result, four indicators out of five were judged "achieved". Indicator no.5 "Distribution system of seeds and seedlings of improved *Melia volkensii* is improved" was judged "not achieved" due to challenges of resources allocation and impact by the COVID-19.

Indicator no.1: 70% of direct beneficiaries recognize the improvement of policy implementation (Output 1)

<Achieved>

The developed "Draft Forest products export/import rules, 2021" under the project is expected to make forest products export and import more efficient and transparent after this rules is gazetted. Report on "Gaps in the formulation and implementation of county governments forest policies/laws" also developed under the project is expected to contribute to GoK process of supporting each CGs own forest policy. They are likely to contribute to the improvement of policy implementation.

Indicator no.2: At least 3 entities (government, private, NGO/CBO) and individuals newly start growing of improved *Melia volkensii* in the ASALs. (Output 2)

<Achieved>

This indicator was achieved. At least 17 schools, 1 private company and 27 individual farmers

newly started growing improved *Melia volkensii* in the ASALs as shown in the report on Activities 2.3.5. and 2.5.3.

Indicator no.3: REDD+ readiness process is advanced by the establishment of NFMS and FRL (Output 3)
<Achieved>
Establishment of FRL was completed and establishment of NFMS is almost done. Through the process of the establishment, REDD+ readiness process in Kenya has been advanced.

Indicator no.4: KEFRI as AI-CD Regional Hub holds at least 5 Regional/National meetings, workshops and trainings for knowledge sharing. (Output 5)
<Achieved>
The project held four (4) Regional fora, two (2) Regional technical workshops for HoA and four National technical workshops. Total ten Regional/National meetings/workshops were implemented.

Indicator no.5: Distribution system of seeds and seedlings of improved *Melia volkensii* is improved. (Output 2)
<Not Achieved>
At least 7 candidate nurseries were inspected as possible distribution points of improved *Melia volkensii* seedlings. However, none of them satisfied the requirements, such as staffing, management including funding, technical skills, security and others. Further survey for other candidate nurseries was disturbed by the COVID-19 situation.

3. History of PDM Modification

○Comprehensive PDM modification
The PMU member was changed from Director level to Component Manager level from the aspect of the Project management efficiency through the 2nd JCC.
Several PDM modification ideas were recommended through the Consultation mission (July 2018) and Mid-term review (Feb. 2019), and its changes in PDM were authorized by the JCC and then approved by both the GoK side and JICA. One of the major changes according to the Mid-term review is the contents of the Output2 and 3.

Output	Name of the Output in PDM ver.2	Name of the Output in PDM ver.3	reason of the change
2	Capacities of selected County governments, private sector, NGO and CBO are enhanced through implementing pilot forest management activities.	Capacities of public and private sectors, and NGOs/CBOs to promote tree growing in ASALs are enhanced through pilot forest management activities.	Since capacity development of pilot Counties was regarded as impossible due to absence of forestry officers, "selected County" was deleted as the obvective of capacity enhancement from the original output. Purpose of capacity enhancement was specified as to promote tree growing in ASALs.
3	Technical capacities for REDD+ readiness activities in KFS are strengthened.	Technical capacities for REDD+ readiness activities and forest monitoring for sustainable forest management in KFS are strengthened.	Technical capacity to be strengthened is not only REDD+ readiness capacity but also monitoring capacity for sustainable forest management.

The Project was initially supposed to come to an end in June 2021, but it was extended four months (until Oct. 2021) on Apr. 2021 because of the activity delay by the pandemic. The other PDM changes regarding indicators and activities are included in Annex3.

4. Others

4-1 Results of Environmental and Social Considerations; Nothing in particular

4-2 Results of Considerations on Gender/Peace Building/Poverty Reduction
(Output 2)

For the field extension activities under Component 2, women's participation and leadership were encouraged. Particularly at FFS, female participants were encouraged to join the discussions freely and play equal roles with their male counterparts. FFS facilitation tool such as "Talk Ball" helped female participants as well as those who are shy to speak out to have equal opportunities to express their views during the FFS sessions. As a result, many female participants became confident to speak in the public and to play important roles in the FFS groups and in the community.

The following table shows the gender balance of FFS participants, where 70% are female.

Round	Period	Participants (Male)	Participants (Female)	Total
1st Round	2017-2018	124	199	323
2nd Round	2018-2019	70	224	294
3rd Round	2019-2020	62	172	234
Total		256	595	851
		30%	70%	100%

III. Result of Joint Review

1.Results of Review based on DAC Evaluation Criteria

1-1. Relevance of the Project is considered "high" as evidence by the following facts;

Kenya has unique provision in the Constitution which stipulates a target figure "achieving ten percent tree cover". It means that the forest sector is a significant and essential sector for this country.

When the project started, the 10% forest cover target year was 2030 (stipulated in Vision 2030), but in Feb. 2018, the Presidential Directive to increase tree cover to 10% by 2022 came into force. The new target made forestry more pressing issue, and this situation enhanced the Project Relevance of the Project. It is obvious that the Project objectives and approach have closely corresponded to the Kenyan development policy and needs.

From the aspect of the Project Relevance for "Japan's country assistance policy for Kenya" (Apr. 2012) which has five target areas, the Relevance is also high because the Project aligns with one of the five areas; "Environmental Protection".

1-2. Effectiveness of the Project is considered "high" as evidence by the following facts;

The Project consists of activities such as policy planning and implementation, tree breeding which enables this country to produce improved seedlings, and REDD+ readiness as for combating climate change. Such activities fully contained methodology and approach which contribute to the project purpose "Capacity at the national and county level for sustainable forest management is strengthened." In addition, Regional Cooperation (Output 5) which focuses on combatting desertification and deforestation in Horn of Africa played an important role to support wider national agenda because forest sector is a cross-border issue.

Although some activities were delayed or suspended due to the Pandemic, it did not hamper project output very much thanks to all effort made by those engaged in the project. Among five project purpose indicators, no.5 "Distribution system of seeds and seedlings of improved *Melia volkensii* is improved" was not achieved due to absence of appropriate nursery that meets the requirements for Melia seedling distribution point, but other four indicators were achieved. So, the Effectiveness of the Project is considered "high".

1-3. Efficiency of the Project is considered "fair" as evidence by the following facts;

The most important factor to judge Efficiency is project cost. The input of JICA side reached about seven hundred sixty (760) million yen, about 27% more than the original budget. The reason of cost increasing is

➢ Four months Project extension due to the Pandemic, and
➢ Additional work in Comp.3 (REDD+ readiness), which are national forest monitoring system (NFMS) and FRL establishment, due to the delay of submission of FRL to UNFCCC and additional activities to make the NFMS technically robust enough.

Necessary procedure for additional inputs was done properly in both GoK side and JICA side. Although JICA side inputs (experts, training, procurement and project activity cost) were properly dispensed other than COVID-related matters, there were some challenges for GoK side. The delay of hiring Pilot County forest officers decreased the efficiency of Comp.2 activities, and insufficient national budget allocation for the orchard management caused some challenges for Component 4 activities.

1-4. Impact of the Project is considered "high" as evidence by the following facts;

Impact is mainly evaluated according to the Project contribution to the overall goal "Sustainable forest management (SFM) is promoted in Kenya towards the national forest cover target of 10%".

Ten (10) percent forest cover target is significant target which is stipulated in Vision2030 covering the period from 2008 to 2023. "SFM is promoted" is a key to Kenya's social and

economic wellbeing as most of the country's economic sectors rely on nature-based resources for their sustenance. Forests are also known to be among the most effective sinks of greenhouse gases.

Comp.1 has supported in the creation of an enabling environment for SFM in the country through policy-making and implementation. NFMS which was developed through Comp.3 enables GoK to analyse many aspects necessary to promote SFM (e.g., areas of deforestation) all over the country. Improved seeds and seedlings (Comp.4) and forestry extension activities including *Melia volkensii* promotion (Comp.2) can contribute to SFM directly at the ground level and the "ripple effect" can be expected in other places.

In addition, knowledge sharing through the whole Horn of Africa area (Comp.5) was able to realize better and more efficient SFM promotion by sharing good practices and lesson learned of each country. It is also a ripple effect.

1-5. Sustainability of the Project is considered "high" as evidence by the following facts;

CADEP activities fully correspond to the 10% tree/forest cover target which is stipulated in the Constitution and Vision 2030. The Project agenda is reflected in the important national commitments/policies such as NDC and Draft National Forest Policy, 2020.

One feature of CADEP is that the majority of activities are focusing on capacity building to ensure sustainability. Comp.2 conducted training for facilitators and CGs staff in consideration of devolution of the forest administration. Other Components also conducted trainings including access to finance training for Horn of Africa country officers. In addition, C/P staff who organised trainings with Japanese experts also acquired skills and knowledge, and their experience will be quite useful for Kenyan forest sector in the future. So, it is very likely that outcomes from the Project can continue even after the completion of the Project.

On the other hand, some challenges were experienced from GoK side during the Project such as staffing (especially younger generation) and securing ordinary budget (not counterpart fund). However, capacity to access to finance (green fund, private fund etc.) was built through Comp.3 and 5 activities. GoK side is expected to make use of such funds to achieve the Overall Goal.

2. Key Factors Affecting Implementation and Outcomes, Evaluation on the results of the Project Risk Management, and Lessons learnt

COVID-19 brought delays throughout all outputs. Some delays could not be recovered by the end of the Project period within four (4) months extension of the project. Other key factors affecting implementation and outcomes, evaluation on the results of the project risk management and lessons learnt at each Output level are as follows.

Output 2

1) Delay of employment of forest officers by the pilot county governments.

The pilot county governments employed forest officers only in the last year (2020/21) of the Project period, which made it impossible to develop capacity of the county governments during the first four years of the Project. However, the Project conducted Induction Training for the newly recruited forestry and environment officers to equip them with the basic knowledge and skills on sustainable forest management (March 2021). In addition, the Project tried to involve county officers in the Project activities in the field so that they could accumulate knowledge and experiences on forest management and administration.

2) Insufficient allocation of counterpart personnel during November 2020 and June 2021.

As a part of the large-scale personnel reshuffle at KFS across the board, all 4 KFS counterparts in component 2 were transferred to other stations of KFS. However, two counterparts were finally recalled to the Project by the KFS based on consultations between KFS and JICA for effective project implementation.

（Lessons learnt）

1) Delay of employment of forest officers by the pilot county governments.

Though one of the criteria for selecting pilot counties was "adequate number of foresters", Embu and Taita Taveta Counties were selected without meeting the criteria. Allocation of counterpart personnel is the most important prerequisite for implementing a technical cooperation project and should be strictly observed by the implementing organisations.

2) Insufficient allocation of counterpart personnel during November 2020 and June 2021.

Again, allocation of counterpart personnel is the most important prerequisite for implementing a technical cooperation project. It is strongly requested that implementing organisation should assign and maintain adequate number of qualified counterpart personnel for project implementation.

Output 3

1) Maintenance contracts for ESRI product

It is KFS's responsibility to secure a budget and renew the maintenance contract for ESRI products, but there was a delay in securing budget during the project. If the maintenance contract is not renewed, the operation of the field survey system using FIP and Survey123 would be disrupted disturbed, or even worse, the system itself may become inoperable.

2) Establishment of management and operation team and upper level commission for FIP

The Project has been discussing the necessity and the structure and the role of an upper level commission to manage and operate the FIP. The management team of KFS has been established. However, due to the wide range of agencies involved in the FIP, the establishment of the upper level commission has been delayed. If the upper level commission is not up and running soon after the project completion, there could be problems with collecting/updating information and its reliability in FIP operation. This team will totally manage the FIP temporally until the upper level commission is established.

(Lessons learnt)

1) Maintenance contracts for ESRI product

Securing a maintenance budget is essential for the continuous operation of the FIP as it is constructed with commercial products. The importance of budgeting to maintain and operate a system should be well understood by an implementing agency and necessary actions to secure a budget should be made for the sustainable use of the system.

2) Establishment of management and operation team and upper level commission for FIP

Establishing a new structure within a government agency requires a certain time and close coordination among relevant stakeholders. Therefore, enough time should be secured and necessary coordination is made in accordance with the circumstances of a country before its establishment.

Output 4

1) Shortage of the budget for monitoring and management of the sites, Melia seed orchards, Acacia seed stands and all progeny test sites.

The budget for the cost of appropriate maintenance of the sites should have been provided by the Kenya government as it was not enough. Therefore, the project tried to reduce the maintenance cost and asked KEFRI clarify the cost and more efforts on effective management of project sites.

2) Difficulty in implementation of activities under COVID-19 pandemic, in both FTBC side and C/P side.

Due to the COVID-19, short time experts could not be dispatched to Kenya. FTBC organized several online meetings with C/Ps and supported C/Ps in implementing several activities such as assessment of PTS, DNA analysis for mating system based on techniques and measures already transferred by training in the current and previous project.

(Lessons learnt)

Despite several challenges due to the COVID-19, the objectives and indicators were met due to close communication between FTBC and KEFRI and efforts made by C/Ps based on their developed capacities through past lectures and trainings and also technical supports provided by virtual meetings with FTBC.

However some activities were delayed and forwarded to the following year because the activities needed onsite advices from short term expert. It is advised that onsite observation and discussion are critical for some key activities, particularly rogueing for improving seed orchards and analysis for mating system.

IV. For the Achievement of Overall Goals after the Project Completion

Overall Goals are expected to be achieved after the Project Completion. The followings describe prospects of achievements of Overall Goals' indicators, required plan of operation and implementation structure to achieve Overall Goal, and recommendations.

<u>Indicator 1 "Monitoring by methodologies set in the NFMS (National Forest Monitoring System) and the Forest Information Platform as data management function of the NFMS is sustainably implemented and utilized respectively."</u>
Regarding implementation of monitoring by methodologies set in the NFMS, Kenya including KFS has the ability of creation of land cover/land use map and implementation of National Forest Inventory (NFI) which are the main components of the monitoring in the NFMS. In addition, data input format by use of Survey 123 for NFI were prepared and practiced to master how to use the format. Moreover, in order to ensure the sustainable utilization of Forest Information Platform (FIP) operation, ways to update data on FIP etc. were clarified. Furthermore, as for the FIP, which was developed based on ESRI ArcGIS server, KFS has continued the maintenance contract with ESRI Inc. since December, 2020. Therefore, sustainable FIP operation has been guaranteed. However, monitoring of PaMs is an exercise that Kenya has not undertaken before and will require further development of specific methods for each item of monitoring.

The data and information stored in the FIP can be well utilized for REDD+ implementation and sustainable forest management in Kenya when the FIP is fully operationalized. However, for this, maintenance contracts for ESRI product should be continuously secured, and a management and operation organization for the FIP should be fully established including its upper level commission as mentioned in the above Section III.

－Plan of Operation and Implementation Structure of the GoK side to achieve Overall Goal
SLEEK can function to coordinate creation of land cover/land use map in collaboration with other related organizations including KFS which have the technical capability for the creation. In addition, KFS has the ability to coordinate and implement the national forest inventory. Therefore, Kenya has been able to implement monitoring activities in terms of technical capability and institutional arrangement. However, budget plan to implement the monitoring has not yet been prepared.

－Recommendations for the Kenyan side
The Government of Kenya should ensure necessary budget is allocated to continue to implement the monitoring as described in the NFMS document and to manage and operate

the FIP properly.

Indicator 2 "50% of ASAL counties introduce the activities promoted by the Project."
Great efforts by the GoK would be required to achieve this indicator in three years after completion of the Project. During the Project, due to the delay of employment of forest officers by the pilot counties, limited planned activities were conducted by the pilot county governments by themselves and thus, forestry extension models that could be replicated by other counties was not fully established.

However, Activity 2.5.3. (Support selected farmers in growing improved *Melia volkensii*) was conducted in 7 counties, namely Embu, Tharaka Nithi, Kitui, Makueni, Taita Taveta, Kwale and Kilifi, which consist 24% of 29 ASAL counties. If this activity shall be continued and expanded to other ASAL counties by the Kenyan side, the indicator shall be achieved.

-Plan of Operation and Implementation Structure of GoK side to achieve Overall Goal
The first prerequisite for extension of the Project activities in the counties after the Project is assignment of sufficient number of qualified forestry officers in the county governments. Besides, a systematic structure for capacity development of county governments should be established in the KFS.

－Recommendations for the GoK side
For county governments: To employ and assign sufficient number of qualified forestry officers.
For KFS: To establish a systematic structure for capacity development of county governments.

Indicator 3 "National Forest Programme is updated"
According to the page 152 of the NFP, NFP is supposed to be revised in 2021. As one of the activity 1-3, Comp.1 team had prepared a paper to conclude that revision in 2023 would be more appropriate than in 2021 from the aspect of the importance of reviewing the result of 10% tree cover target in 2022.
Revision of NFP by three years after the completion of CADEP is quite reasonable. But not certain whether it is possible as NFP Board (overall advisory and decision-making organ････ page 133 of the NFP) is yet to be established, which should be a necessary organ for the NFP revision.

－Plan of Operation and Implementation Structure of GoK side to achieve Overall Goal
The most important thing for GoK in 2023 is to review whether 10% target is achieved or not, and to reflect on lessons learnt of the process. After that, make a decision whether the revision of NFP is necessary. At the same time, to discuss establishing NFP Board and other related

organ (page 134-135 of NFP) is also important.

－Recommendations for the GoK side
Policy, law, strategies and plans regarding forestry are well prepared and established in Kenya. But there are some challenges for finalizing and implementation process. Task force report presented a lot of recommendations especially in the governance of Kenyan forest sector but no news about following up is yet to be released. National Bamboo Policy was launched in 2019 but still not formally gazetted. National Forest Programme was launched in 2017 but NFP Board is yet to be established. As for the revision of NFP also, it is important to make a decision considering the priority and latest situation of Kenyan forest sector.

4.Monitoring Plan from the end of the Project to Ex-post Evaluation
One of the main activities of Output 2 is that three PFMPs were established in pilot counties. Each PFMP contains "management programme" such as tree planting and forest boundary cleaning for coming five years. It is important to monitor whether CFA will follow "management programmes". In each PFMP, M&E plan to be conducted by KFS and CGs are stipulated. KFS should monitor whether the M&E will be conducted.
National Forest Monitoring System (NFMS) was established through Output 3. Although the "system" was established, conducting the Monitoring making use of the "system" requires resource of GoK side. That point of view is closely related with one of the overall indicators regarding NFMS.
As for Output 4, the overall goal is that a large number of improved seedlings are used in Kenya. The number of improved seedlings should be monitored periodically (e.g., annually).

ANNEXES:
ANNEX 1: Results of the Project
(List of Dispatched Experts, List of Counterparts, List of Trainings, etc.)
ANNEX 2: List of Products (Report, Manuals, Handbooks, etc.)
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Separate Volume: Copy of Products Produced by the Project

ANNEXES

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ANNEX 1: Results of the Project (List of Dispatched Experts, List of Counterparts, List of Trainings, etc.)

(List of Dispatched Experts, List of Counterparts, List of Trainings, etc.)

1) List for long-term experts

Name	Designation	Duration
Mr. Kenichi Takano	Chief Advisor/ Forest Policy	10th June 2016-31st July 2018
Mr. Keiichi Takahata	Chief Advisor/ Forest Policy	11th July 2018 –13th September 2021
Ms. Naomi Matsue	Forestry Extension	29th July 2016 – 28th July 2018
Mr. Katsuro Saito	Deputy Chief Advisor/ Forestry Extension	2nd July 2018 – 11th October 2021
Ms. Yuki Honjo	Regional Cooperation/ Project Coordination	8th July 2016 – 11th October 2021

2) List for short-term experts for Output 2,3 and 4

Output 2 (Tree Growing in ASAL s)	
Name	Designation
Mr. Shinji Ogawa	Farm Forestry Extension
Output 3 (REDD+ Readiness)	
Name (From Company)	Designation
Mr. Kazuhisa Kato (Asia Air Survey)	Leader / National forest monitoring system (NFMS) / Measurement Reporting & Verification (MRV)/FRL (June 2016 - Oct. 2021)
Mr. Kei Sato (PASCO)	Forest remote sensing / GIS (June 2016 - October 2021)
Mr. Kazuhiro Yamashita (JOFCA)	FRL / Forest inventory (January 2017 – September 2018)
Mr. Kohei Yamamoto (PASCO)	Data base (June 2016 – July 2017)
Mr. Shintaro Ishizuka (PASCO)	Date base (June 2017 - July 2020)
Mr. Kenji Shindo (PASCO)	Data base (2) (June 2018 – July 2018)

Mr. Akinobu Sembo (PASCO)	Data base (3) (September 2019 - September 2021)
Ms. Sahori Fujimura (Asia Air Survey)	Forest remote sensing / GIS assistant (September 2016 -December 2017)
Mr. Yoshihiko Sato (Asia Air Survey)	NFMS (2) / FRL (2) / Forest remote sensing / GIS assistant (June 2017 – October 2021)
Ms. Sachiko Takinaga (Asia Air Survey)	Coordinator (June 2016 – July 2016)
Output 4 (Tree Breeding)	
Name (Organization)	**Designation (mainly dispatched with a short term)**
Dr. Masatoshi Ubukata (FTBC)	Team leader (September 2017～March 2021)
Dr. Hiroo Yamada (FTBC)	Team leader (April 2021～October 2021)
Dr. Koichiro Gyokusen (Kyushu University)	Drought tolerance (September 2017～October 2021)
Dr. Eiji Goto (Kyushu University)	Drought tolerance (September 2017～March 2019)
Dr. Hisaya Miyashita (FTBC)	Tree breeding (September 2017～October 2021)
Dr. So Hanaoka (FTBC)	Artificial crossing (September 2017～October 2021)
Dr. Michinari Matsushita (FTBC)	Artificial crossing (September 2017～October 2021)
Dr. Eitaro Fukatsu (FTBC)	Tree breeding (April 2020～October 2021)
Mr. Koji Hashimoto (FTBC)	Tree breeding (September 2017～March 2019)
Mr. Taiki Kobayashi (FTBC)	Tree breeding (April 2019～October 2021)
Mr. Yoshinori Takakura (FTBC)	Tree breeding (September 2017～March 2020)
Mr. Ryo Furumoto (FTBC)	Tree breeding (April 2019～October 2021)
Mr. Hideki Kawato (FTBC)	Project Management (September 2017～March 2018)
Mr. Yutaka Kawashima (FTBC)	Project Management (April 2018～March 2020)
Mr. Tatsuo Inamoto (FTBC)	Project Management (April 2020～October 2021)
Mr. Shizuo Kamizore (FTBC)	Project Management (September 2017～May 2019)
Mr. Hidetaka Ichikawa (FTBC)	Project Management (April 2019～March 2021)
Mr. Yoshiki Takahama (FTBC)	Project Management (April 2021～October 2021)

3) List of Counterparts

No.	Component	Title	First Name	Family Name	Designation/Position	Institute

2

1	Component 1 (Forest Policy)	Mr.	Gideon	Gathaara	Conservation Secretary CADEP Project Director,(2016-2019)	MoEF
2		Mr.	Hewson	Kabugi	Director of Forest, CADEP Project Manager(2016-2018)	
3		Mr.	Alfred	Gichu	Conservation Secretary, CADEP Project Director(2019-2021)	
4		Mr.	Steven	King'oo	Assistant Director, CADEP Project Manager (2020-2021)	
5		Mr.	Gordon	Sigu	Comp.1 focal point (2016-2020)	
6		Ms.	Beatrice	Atemo	Comp.1 focal point (2020-2021)	
7	Component 2 (Tree Growing in ASALs)	Mr.	Emilio	Mugo	Chief Conservator of Forests (2016-2019)	KFS
8		Mr.	Julius	Kamau	Chief Conservator of Forests (2019-2021)	
9		Mr.	Peter	Nduati	Component 2 & 3 Component Manager	
10		Ms.	Diana	Kishiki	Assistant Conservator of Forests	
11		Ms.	Amina	Osman	Assistant Conservator of Forests	
12		Mr.	Isaac O	Omoding	Assistant Conservator of Forests	
13		Dr.	Elizabeth	Wambugu	Head, Forest Management Plans	
14		Mr.	Dzimuji	Kambarage	ACF, Forest Management Plans	
15		Ms.	Nancy	Karugi	Assistant Management Plans Officer	
16		Ms.	Bettina	Adhiambo	Assistant Management Plans Officer	
17		Mr.	Jane	Ndeti	Technical Team Member	
18		Mr.	Clement	Ng'oriareng	Technical Team Member	

19		Mr.	Joseph	Njigoya	Technical Team Member	
20		Mr.	Mathenge	Gitonga	Assistant Chief Conservator of Forests /Project Development & Resource Mobilising (PD&RM) Branch	
21		Ms.	Monica	Ndirangu	EC, KFS Embu	Embu County
22		Mr.	Wellington	Ndaka	FFS Coordinator, KFS Embu	KFS
23		Ms.	Lydiah	Ndwiga	Sub County Forester/FFS Facilitator, KFS Embu	
24		Mr.	Ezekiel	Maganda	Sub County Forester/FFS Facilitator, KFS Embu	
25		Ms.	Miriam	Kamau	Sub County Forester/Former FFS Facilitator, KFS Embu	
26		Mr.	Daniel	Kagai	Agric. Officer/FFS Facilitator, Embu County	Embu County
27		Ms.	Joan	Kabubu	Agric. Officer/FFS Facilitator, Embu County	
28		Mr.	Nicholas	Ngece	CCO Environment, Embu CG	
29		Mr.	Felvin	Otieno	FFS Coordinator, KFS TT	KFS
30		Mr.	Mwamutsi	Ali	Forester, KFS TT	
31		Mr.	Ruwa	Masha	Sub County Forester, KFS TT	
32		Mr.	Pitron	Mwakio	Agric. Officer/ FFS Facilitator, TT County	Taita Taveta County
33		Ms.	Joan	Lavoga	Environment Officer (Conservation), TT CG	
34		Mr.	Peter	Nduati	Component 2 & 3 Component Manager	KFS
35	Component 3 (REDD+ Readiness)	Mr.	Geroge	Tarus	Conservator of Forests	
		Mr.	Peter	Sirayo	Assistant Conservator of Forests	
		Ms.	Faith	Muturi	Chief GIS and Remote Sensing Officer	

36		Mr.	Richard	Mwangi	GIS and Remote Sensing Officer	
37		Ms.	Divinah	Nyasaka	ICT officer	
38	Component 4 (Tree Breeding)	Dr.	Ben	Chikamai	Director (2016-2019)	KEFRI
39		Dr.	Joshua	Cheboiwo	Director (2019-2021)	
40		Dr.	Gabriel	Muturi	Deputy Director (FBEM)/Component 4 Project Manager	
41		Dr.	James	Ndufa	Successor of Dr. Muturi	
42		Mr.	Jason	Kariuki	PRO	
43		Mr.	Bernard	Kamondo	PRO	
44		Mr.	Albert	Luvanda	Regional Director-DERP	
45		Ms.	Josephine	Musyoki	Deputy Director, DERP	
46		Mr.	Samuel	Auka	Forester/data	
47		Ms.	Damaris	Mwende	Technical staff/Data	
48		Mr.	Paul	Onganda	Forester	
49		Mr.	Ezekiel	Kyalo	Technical staff	
50		Ms.	Mary	Mwangi	Technical staff	
51		Ms.	Frouza	Maingi	Technical staff	
52		Mr.	James	Mwanzia	Nursery staff	
53		Mr.	Mutwii	Munyao	Field Supervisor	
54		Mr.	David	Muchiri	RO	
55		Ms.	Eunice	Mose	Forester	
56		Mr.	Zaverio	Mwangi	SS/data	
57		Ms.	Grace	Mwandege	Feld Staff	
58		Mr.	Zablon	Musumba	Project staff	
59		Ms.	Mary	Onganda	Project staff	
60	Component 5 (Regional Cooperation)	Dr.	Ebby	Chagala-Odera	Deputy Director Forest Research Support Services/Component 5 Project Manager (2016-2020)	KEFRI
61		Dr.	Musingo	Mbuvi	Deputy Director Forest Research Support Services/Component 5 Project Manager (2020-2021)	
62		Ms.	Josephine	Wanjiku	Senior Research Scientist	

| 63 | | Dr. | Michael | Mukolwe | Chief Research Scientist | |
| 64 | | Mr. | Paul | Tuwei | Principal Research Scientist | |

4) List of Training in Japan (Knowledge Co-Creation Programme)

4)-1. List Knowledge Co-Creation Programme Training in Japan

No.	Title of training	Year	Duration	Name	Designation	Institute
1	Policy planning skills for implementation of REDD+ (for Government executives)	2017	28th May to 6th June	Mr. Peter Nduati	Component 2 & 3 manager, CADEP-SFM	KFS
2	GIS and Remote Sensing Utilised for Biodiversity information	2017	21st May to 29th July	Mr. George Tarus	Forest officer 2 - Climate Change Response	KFS
3	Combating Desertification to strengthen resilience to Climate Change in Sub-Saharan Africa	2017	19th November to 2nd December	Mr. Richard Mwendandu	Director, Multilateral Environmental Agreements	MENR
				Dr. Ebby Chagala	Deputy Director, Training Support Service	KEFRI
				Ms. Josehine Wanjiku	Senior Research Scientist	KEFRI
				Dr. James Ndufa	Director, the Drylands Eco-Region Research Programme, Kitui	KEFRI
				Mr. Paul Tuwei	Principle Research Scientist	KEFRI

4	Remote sensing of Forest resources	2018	19th August to 6th October	Mr. Peter Sirayo	Assistant Conservator of Forests	KFS
5	Proceeding ability of policy making for sustainable forest management	2018	21st Aug to 20th Sep	Ms. Rose Adhiambo AKOMBO	Conservator of Forests, Climate Change Response Programme	KFS
6	Combating Desertification to strengthen resilience to Climate Change in Sub-Saharan Africa	2018	25th November to 8th Dcember	Ms. Sylvia Mwalewa	Assistant Research Officer, Drylands Eco-Region Research Programme, Kitui	KEFRI
7	Remote sensing of Forest resources	2019	13th May to 28th June	Mr. Richard Mwangi	Senior GIS and Remote Sensing Officer, Forest Planning and Information Systems	KFS
8	Combating Desertification to strengthen resilience to Climate Change in Sub-Saharan Africa	2019	27th October to 15th November	Dr. Lucy Ng'ang'a	Deputy Director, Multilateral Environmental Agreements	MoEF
9	Sustainable forest management with comminity participation	2019	16th Sep. to 15th Nov.	Mr. Issac Omoding	Assistant Conservator of Forests III	KFS
				Mr. Felvin Otieno	Assitant Forest Station Manager, Taita Taveta	KFS

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| 10 | Online training: Tropical forest management using the JJ-Fast, AN ALOS-2 based forest monitoring system and other satellite technologies | 2021 | 1st to 16th Februrary | Mr. Frank Juma | Land Survey Technician | KFS |

4)-2. Counterpart Training in Japan

No.	Title of training	Year	Duration	Name	Designation	Institute
1	Capacity Development Project for Sustainable Forest Mangement in Kenya	2017	6th to 17h November	Mr. Hewson Kabugi	Director of Forest	MoEF
				Mr. Gordon Sigu	Principal Research Scientist CADEP, Component 1 Focal Point)	MoEF
				Mr. Ng'oriareng	Head Dryland Forest	KFS
2	Capacity Development Project for Sustainable Forest Mangement in Kenya (The training was fully organised for the departures for the trainees, but the decision made as cancelled due to COVID-19)	2020	2nd to 13th March	Mr. Julius Kamau	Chief Conservator of Forests	KFS
				Ms. Beatrice Mbula	Head of Conservancy, KFS Eastern Conservancy	KFS
				Ms. Monicah Ndirangu	Ecosystem Conservator, KFS Embu	KFS

				Mr. Wellington Ndaka	Senior Forester, KFS Embu	KFS
				Ms. Amina Guyo	Assistant Conservator of Forests, KFS Headquarters	KFS
				Ms. Lydia Ndwiga	Sub-County Forester, KFS Embu	KFS
				Mr. Ezekiel Ndaru	Sub-County Forester, KFS Embu	KFS
				Mr. Ruwa Masha	Sub-County Forester, KFS Taita Taveta	KFS
				Mr. Diang'a Obara	Wundanyi Forest Station Manager, KFS Taita Taveta	KFS
				Mr. Nicholas Ngece	Chief Officer, Environment, Natural Resources & Climate Change, Embu County	Embu County
				Mr. Patrick Ndwiga	Director, Environment, Embu County	Embu County

				Ms. Joan Kabubu	Agriculture Officer, Embu County	Embu County
				Mr. Pitron Mwakio	Agriculture Officer, Taita Taveta County	Taita Taveta County

5） List of Equipment

No.	Items	Specifications
1	Printing machine	Kyocera Taskalfa 3252ci
2	Kyocera black & white printing machine	Kyocera
3	Project Vehicle KCH047H	TOYOTA LC PRADO KDJ150R
4	Project Vehicle KCJ103T	TOYOTA Land Cruiser VDJ200R
5	Kyocera Copier Machine	Taskalfa 5551ci
6	Projector	Epson
7	Lenovo Laptop	Ideapad100-iBD i3-5005U
8	Project Vehicle KCK347G	TOYOTA LC PRADO KDJ150R
9	Desktop	HP Prodesk 400
10	Laptop	ASUS C17
11	Projector (1)	Epson S005
12	Projector (2)	Epson S005
13	Desktop (1)	Lenovo V520-151IKL
14	Desktop (2)	Lenovo V520-151IKL
15	Desktop (3)	Lenovo V520-151IKL
16	Desktop (4)	Lenovo
17	Multifunctional Printer (1)	HP M426 fdn
18	Multifunctional Printer (3)	HP M426 fdn
19	Multifunctional Printer (4)	HP M426 fdn
20	Multifunctional Printer (2)	HP M426 fdn
21	Motor bike (1) KMEJ722X	HONDA XL125LEK, eg#JD21E-2314026
22	Motor bike (2) KMEJ723X	HONDA XL125LEK, eg#JD21E-2314024
23	Motor bike (3) KMEJ724X	HONDA XL125LEK, eg#JD21E-2314028
24	Motor bike (4) KMEJ725X	HONDA XL125LEK, eg#JD21E-2314011
25	Motor bike (5) KMEJ726X	HONDA XL125LEK, eg#JD21E-2314032
26	Server blade	Power Edge R730
27	Lenovo Laptop	G50
28	HP 15 C15 Laptop PC	S/N CN05W23QC4 500GB、 5400RPM、 4GB
29	HP LASERJET M552DN PRINTER	S/N CNBXH931C6

30	GIS software for desktop ArcGIS desktop standard	Concurrent use license
31	GIS software for desktop ArcGIS 3D Analyst	Concurrent use license
32	GIS software for desktop Geostatistical Analyst	Concurrent use license
33	GIS software for desktop Spatial Analyst	Concurrent use license
34	GIS software for desktop Publisher	Concurrent use license
35	GIS cloud server software ArcGIS Online Organization Plan Level 2 + additional 14 named user-3years	ArcGIS Online Organization Plan Level 2
36	Geo-information data base software with spatial data management ArcGIS Enterprise Standard (Windows)	Up to Four Core license
37	Image server software ArcGIS Image Server (Windows)	Up to Four Cores License
38	Database server software Microsoft SQL Server Standard 2017 + 5User CALS	Microsoft SQL Server Standard 2017
39	Geo-information data base server	Hewlett Packard DL380
40	Data storage server	Hewlett Packard DL380
41	Rack for servers & Customized accessories	HPE 42U
42	Windows server 2012 r2 software license	2012 r2 software license
43	UPS	APC 3000XLI
44	L3 Switching Hub	CISCO WS-C3650-24TS-L
45	Anti-virus software	KASPERSKY SERVER 10
46	Back-up Device	Hewlett Packard LTO-5 ULTRIUM S
47	Laptop PC	Dell alienware 17R5
48	Large format printer	HP-T2600
49	Business printer	HP-577DN
50	Laminating machine	SIGO SG-1100S
51	Remote sensing software No.1 for desktop	ERDAS IMAGINE 2016 version

52	Maintenance for Remote sensing software No.1	1-year maintenance
53	Media Kit with Shipping and handling	Media Kit for install software, and shipping with handling
54	Remote sensing software No.1 for desktop	ERDAS IMAGINE 2016 version
55	Maintenance for Remote sensing software No.1	1-year maintenance
56	Media Kit with Shipping and handling	Media Kit for install software, and shipping with handling
57	Maintenance for Remote sensing software No.1	1-year maintenance
58	Remote sensing software No.2 for desktop	eCognition 9.2 Developer Included 1-year maintenance
59	Workstation	OS: Windows 10 Pro Edition 64 bit (English)CPU: Intel® Xeon® Processer ES-1620, 3.7GHz Turbo or higher, 12M L3, 5.86GT/s or higher Memory: 16 GB or moreHardDisk: at least 2TB totally, SATA (No RAID) or moreDVD Super Multi DriveGraphic Card: 1G NVIDIA Quadro K600 (1DP and 1DVI) (1DP-DVI and 1DVI-VGA adapter) or higherWireless network USB adopter (support 11n/11a/11g/11b)29inch Wide MonitorMicrosoft Office 2016 (Home & Business)Security software (24 months)System Recovery mediaAuto Ranging (100V- 240V)UPS 650 (650VA - 400 Watts), Input 230V / Output 230Vat least one year warranty

60	Workstation	OS: Windows 10 Pro Edition 64 bit (English) CPU: Intel® Xeon® Processer ES-1620, 3.7GHz Turbo or higher, 12M L3, 5.86GT/s or higher Memory: 16 GB or more HardDisk: at least 2TB totally, SATA (No RAID) or more DVD Super Multi Drive Graphic Card: 1G NVIDIA Quadro K600 (1DP and 1DVI) (1DP-DVI and 1DVI-VGA adapter) or higher Wireless network USB adopter (support 11n/11a/11g/11b) 29inch Wide Monitor Microsoft Office 2016 (Home & Business) Security software (24 months) System Recovery media Auto Ranging (100V- 240V) UPS 650 (650VA - 400 Watts), Input 230V / Output 230V at least one year warranty
61	Handy GPS	- Capture more positions and increased accuracy in tough GNSS environments - Compatible with existing and planned GNSS constellations to maximize - GNSS Systems: GPS, GLONASS, Galileo, BeiDou, QZSS - SBAS: WAAS, EGNOS, MASAS, GAGAN, SBAS+ - DGNSS accuracy: Horizontal 1cm to 100cm, Vertical 1.5cm to 100cm
62	survey 123 for mobile mapping	subscription for 5 years
63	Mobile mapping devices	7inch tablet with WiFI and socket for SIM card

64	GPS Camera	16 mega pixcel Optical 4 x zoom, Digital 7.2 x zoom (Combine 28.8 x zoom) Still image:JPEG(Exif Ver.2.3,DCF2.0,DPOF) Movie:MOV form(H.264/AVC,IMA-ADPCM sound(monaural) media:SD memory card,SDHC memorycard,SDXC memory card GPS English Instruction Manual Universal Power Supply at least one year warranty
65	Integration and configuration for servers & workstation, etc.	Integration of H/W and configuration for software

ANNEX 2: List of Product (Report, Manuals, Handbooks, etc.) by the Project

PO no.	Name of the documents	Author	Background, contents of the documents and target audience	Completion date
1-2-2	Gap in the formulation and implementation of the County Government Forestry policies and laws	Grace Kemunto (CADEP local staff)	Result of the survey of 6 CGs' (Taita Taveta, Kilifi, Makueni, Elgeyo Marakwet, Vihiga and Embu) County Forest Policy/Law mainly from the aspect of the contents and formulation process.	Mar. 2021
1-3-2	Review monitoring and evaluation process of the National Forest Programme	CADEP Component 1	To express opinion from CADEP Comp.1 team regarding monitoring process and updating of NFP, taking into account forestry policy circumstances after the NFP was launched.	June. 2019
1-3-3	Report on export/import of forest products	Intergrated forestry consultancy and management services LTD	Report on the export/import of forest product mainly about the statistic information, procedure and fees. The survey was conducted in Mombasa, Lunga Lunga, Namanga, Busia and institutions in Nairobi.	Mar. 2021
1-3-3	Draft forest products export and import rules	Mr. Gad Awuonda, Advocate, Legis Policy Associates	Section 60 (1) of the Forest Conservation and Management Act, 2016 requires that, "the Cabinet Secretary shall by notice in the Gazette, publish rules regulating the export and import of forest products.". This is the draft rules.	Sep. 2021

1-4-2	Lessons learnt from CADEP activities	CADEP (all components)	To enable GoK to share outcomes and lessons from the project implementation to wider stakeholders in Kenya, Africa and even further. It may include Japan's knowledge and experiences.	Sep. 2021
2.5.1	Guidelines to On-Farm *Melia volkensii* Growing in the Dryland Areas of Kenya	CADEP-SFM /KFS	A technical manual to introduce growing *of Melia volkensii* including seed collection, raising seedlings, plantation management, pest and disease control and cost and benefit analysis.	Mar. 2018
2.5.1	Cost & benefit analysis of *Melia volkensii* growing project (tentative title)	CADEP-SFM	Revised version of chapter 6 of "Guidelines to On-Farm *Melia volkensii* Growing in the Dryland Areas of Kenya", It is a step-by-step guide on the methodology of cost and benefit analysis of *Melia volkensii* growing project.	Aug. 2021
2.3.4	Survey on Learning Result/Impact of the Farmer Field School (FFS)	CADEP-SFM	Report on survey results on learning impact of the 1st round FFS.	Oct. 2019
2.5.4	Survey report on market analysis of *Melia volkensii* products	CADEP-SFM	Report on market analysis of *Melia volkensii* products.	Sep. 2021
2.5.5	A Note/guidelines on promotion of *Melia volkensii* plantation in ASALs	CADEP-SFM	A Note/guidelines that shows principles and directions of promotion of *Melia volkensii* plantation in ASALs, this will be a basis for preparation of a strategy for promotion of Melia growing.	Sep. 2021

3	Work Plan of REDD+ Readubess Component in CADEP-SFM	Japan Overseas Forestry Consultants Association and PASCO CORPORATION	The overall activity plan and modalities for the REDD component of the CADEP-SFM are described with the implementation policy. It is useful for those who are interested in CADEP-SFM effort in REDD+ activity in Kenya.	Jul. 2016
3	Progress Report of REDD+ Readiness Component in CADEP-SFM (1st - 4th year)	Japan Overseas Forestry Consultants Association and PASCO CORPORATION	The progress report explains the implementation methods and outputs of cooperation, activity concept for the next year, etc. based on the implementation of the REDD+ Readiness Component in each year. It is useful for those who are interested in CADEP-SFM effort in REDD+ activity in Kenya.	1st: Jul. 2017 2nd: Jul. 2018 3th: Jul. 2019 4th: Jul. 2020
3	Final Report of REDD+ Readiness Component in CADEP-SFM	ASIA AIR SURVEY CO., LTD. and PASCO CORPORATION	The final report explains the overall implementation methods and outputs of cooperation, etc. based on the implementation of the REDD+ Readiness Component in CADEP-SFM. It is useful for those who are interested in CADEP-SFM effort in REDD+ activity in Kenya.	Oct. 2021
3-1	THE NATIONAL FOREST MONITORING SYSTEM (NFMS)	KFS	NFMS document shows what is NFMS in Kenya consisting of the monitoring function and data management function of the Green House Gas Inventory process. It is useful for those who are interested in NFMS in Kenya and for KFS staff who are actually involved in NFMS.	Jul. 2021

3-7-2	The National Forest Reference Level (FRL) for REDD+ Implementation	KFS	This report describes the methods and the final results of the FRL value with development of Activity Data and Emission Factor used in the construction of FRL. It is useful for those who aims to receives the results payment and to calculate the emission factor.	Aug. 2020
3-8-2	Manual for creation of land cover/land use map and land cover/land use change map	KFS and CADEP-SFM	This manual describes the methodology to create the land cover/land use map and land cover/land use change map in Kenya, including remote sensing analysis, forest type classification, and ground-truth methods. It is useful for those who is incharge of creating the maps.	Sep. 2021
3-2-2	Manual and Specification for usage and management of Forest Information Platform (FIP)	KFS and CADEP-SFM	This manual describes the method and specification for usage and management of FIP. This document is useful for FIP operators and users.	Sep. 2021

4-1-2	Plus tree traits table on *Melia volkensii* in the drylands of Kenya （プラスツリー特性表）	Jason Kariuki Eitaro Fukatsu Michinari Matsushita	The plus tree table on *Melia volkensii* is a list of breeding values of important traits of Melia for forestry context, such as height and diameter growth, wood properties and seed productivity. The table will help researchers plan the breeding process of Melia including thinning and improvement of seed orchards, etc. It will make the Melia users (farmers and orchard manager) know more about the traits and properties of the strains they use and promote expectations for improved seeds of Melia.	Oct. 2021
4-1-4	Manual for managing Melia seed orchards （採種園維持管理マニュアル）	James Ndufa Jason Kariuki Bernard Kamondo Hisaya Miyashita	Manual for managing Melia seed orchards is to guide how to manage the seed orchards. The contents are selection of candidate plus trees, establishment of clonal seed orchards, reducing pests and diseases, monitoring, weeding and seed production. It will make the orchard manager know more about effective management of the seed orchards.	Oct. 2021

4-1-5	Guideline for Clone Propagation of Melia volkensii （クローン増殖指針）	Jason Kariuki Taiki Kobayashi Hisaya Miyashita	Guideline for clone propagation of *Melia volkensii* is to guide how to make clones. The contents are Grafting and other clonal propagation Technique. It will make the researchers and orchard manager know more about clone propagation required in establishing seed orchards and foundation stock.	Oct. 2021
4-2-2	How to Promote Breeding Population Forward?: Studies for Next Generation of *Melia volkensii* （人工交配指針）	Jason Kariuki Stephen Omondi Michinari Matsushita So Hanaoka	Guideline for promoting breeding population forward of *Melia volkensii* is to guide how to conduct mating study. The contents of the guideline are mating system, types of pollination and genetic analysis of artificial pollination. It will make the researchers and orchard manager know more about mating system and artificial pollination for the next generation seed.	Oct. 2021

4-3	Managements of Acacia seed stands in Kenya （採種林施業指針）	Jason Kariuki Ryo Inanaga	Managements of Acacia seed stands in Kenya is to guide how to manage the seed stands. The contents are selection of candidate plus trees, planning and establishment of seedling seed stands (progeny test), rougueing and improvement of seed stands, seed production. It will make the orchard manager know more about effective management of the seed stands.	Oct. 2021
5.1.2	Terms of Reference on AI-CD	KEFRI/CADEP-SFM	A document to facilitate common understanding of A-CD to enable several countries together with under the same goal.	Feb. 2016
5.2	Nairobi Declaration for the Horn of Africa on AI-CD	MoEF (Technical support by CADEP-SFM for the forum)	The document was signed during 2nd Regional Forum (Ministerial Forum) for Horn of Africa Held in Nairobi, Kenya. High level ranking officers from Horn of Africa namely; Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan and Sudan attended the forum. Objective was to raise awareness of AI-CD and mainstream the Initiative at high level, who would become a drive to facilitate the activities on the ground.	Jun. 2017
5.2.3	Proceedings of Regional fora for Horn of Africa	KEFRI/CADEP-SFM	The documents cover contents of a series of fora held at KEFRI. The proceedings are: (1) 1st Regional Forum for Horn of Africa (compiled in Feb. 2017) (2) 3rd Regional Forum for Horn of Africa	Compiled in various dates; 2017,2019, 2020 and 2021

			(compiled in May 2019) (3) 4th Regional Forum for Horn Africa (compiled in Dec. 2020) (4) Conference (Final Regional Forum) (will be compiled in Oct. 2021)	
5.2.4	Proceedings of Regional Technical Workshop for Horn of Africa	KEFRI/CADEP-SFM	The documents cover 1st and 2nd Regional Technical Workshop Trainings for Horn of Africa held at KEFRI. (1) 1st Regional Technical Training Workshop for Horn of Africa (compiled in Oct. 2017) (2) 2nd Regional Technical Training Workshop for Horn of Africa (compiled in Oct. 2018)	Complied in 2017 and 2018
5.3.1	Tools for identifying, collection and documentation of good practices	KEFRI/CADEP-SFM	Tools consist of questionnaires, guide on good practices identification and a document for compilation of the good practices	Dec. 2016
5.4.1	CADEP Good Practice Home Page	KEFRI/CADEP-SFM	The home page developed under KEFRI's home page to disseminate good practices widely Kenya and beyond **URL: https://www.kefri.org/cadep/**	Apr. 2018

5.4.4	AI-CD Guideline on Effective Measures for Combating Desertification for Achieving Sustainable Development in the Horn of Africa	JICA HQs/ AI-CD Secretariat/KEFRI/CADEP-SFM	Proposed audience are offices at the policy level. The guideline consists on the three major pillars namely; Policies and Strategies, Institutional Building and Implementation at local level. The guide provides advice on how to take measures on Combating Desertification. All seven Horn of Africa countries provided information on policies, strategies, approaches and good practices towards combating desertification.	Aug. 2019
5.4.4	AI-CD Book on Measures for Combating Desertification: Case study from Horn of Africa	Horn of Africa Countries/KEFRI/CADEP-SFM	Proposed audience include those at the policy level and the extension officers. The book is linked to the AI-CD Guideline on implementation at local level. The publication gives examples of good practices from Horn of Africa countries.	Aug. 2019

| 5.4.4 | CADEP-SFM Good Practices (Repackaged as brochures) | KEFRI/CADEP-SFM | The good practices information collected, documented and repackaged for use by the extension officers and farmers on the ground.
Eight brochures were developed namely:
No.1 - Production of Aloe Bitter Gum from *Aloe secundiflora*
No.2 - Making soap using *Aloe vera*
No.3 - Charcoal Production from Prosopis using Improved Earth Klin
No.4 - Production of Livestock Feed from *Prosopis juliflora* Pods
No.5 - Reclaiming Land Invaded by Prosopis for Agricultural Production in Marigat, Kenya
No.6 - Making Briquettes using Charcoal Fines
No.7 - Growing *Melia volkensii* for Improved Livelihood and Environmental Conservation in Makueni County, Kenya
No.8 - Natural Pastures Improvement for Enhanced Livestock Productivity in Makueni County, Kenya | Jan. 2021 |

ANNEX 3: PDM (all versions of PDM)

1) PDM-Version 0 (February 2016)

Annex1 Project Design Matrix

Project Title: Capacity Development Project for Sustainable Forest Management in the Republic of Kenya

Implementing Agency: MENRRDA (Ministry of Environment, Natural Resources and Regional Development Authorities), KFS (Kenya Forest Service), KEFRI (Kenya Forestry Research Institute) and County Governments

Target Group: Direct Beneficiaries: Staff of implementing agencies and collaborating organizations

Indirect Beneficiaries: Population of pilot counties and activity areas of NGO/CBO/private entities in Output 2

Period of Project: May, 2016 – May, 2021 (5 years)

Project Site: Nationwide, and ASALs (Arid and Semi-arid Lands) for Output 2 and Output 4.   Model Site: Pilot counties for Output 2 will be selected in project activities.

Version 0

Dated February 2016

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Sustainable forest management is promoted in Kenya towards the national forest cover target of 10%.	1 Result-based payment for REDD+ from international community is provided for Kenya. 2 50% of ASAL counties introduce the activities promoted by the Project.	· Citation in public documents · Observation of activities			
Project Purpose National capacity at the national and county level for sustainable forest management is strengthened.	1 70% of direct beneficiaries recognize the improvement of policy implementation. 2 At least 2 other counties refer to the forest management & implementation plan as a good example to emulate for forest management. 3 The developed National Forest Monitoring System is utilized in Kenya. 4 At least 2 countries adopt the technologies transferred by the regional cooperation. 5 Two areas of REDD+ readiness stage, namely the establishment of NFMS (National Forest Monitoring System) and FRL (Forest Reference Level), are completed. 6 Improved seedlings are provided to at least 3 other counties and 5 entities of NGO, CBO (Community-based Organization) or private sector.	· Project reports · Citation in public documents · Interview · Operation of NFMS · Report to UNFCCC (United Nations Framework Convention on Climate Change)	· There is no major changes of government institutional arrangement on forest and climate change policy.		
Outputs Output 1 (Policy Support) Implementing and monitoring capacities of forest-related policies/strategies at the national level are enhanced.	1-2 The proposed monitoring mechanism is acknowledged useful for managing policy/strategy implementation. 1-2 70% of stakeholders recognize the recommendation prepared by the Project applicable and effective. 1-3 50% of development partners recognize the improvement of donor coordination.	· Remarks and interview · Project reports · Interview	· Relevant policies currently under deliberation (National Forest Policy, Forest Conservation & Management Bill, National Climate Change Framework Policy, etc.) are finalized.		
Output 2 (Pilot Implementation through County Governments and Private Sector) Capacities of selected county governments, private sector, NGO and CBO are enhanced through implementing pilot forest management activities.	2-1 At least 2 counties develop forest management & implementation plans including the establishment of the clonal seed orchards. 2-2 Possible collaboration with private sectors for forest management activities is proposed. 2-3 A report on possible REDD+ activities at a project level is prepared based on the pilot implementation.	· Observation of activities at field based on the plan. · Project reports · Proposal/report submitted			
Output 3 (REDD+ Readiness) Technical capacities for REDD+ readiness activities in KFS are strengthened.	3-1 NFMS is established. 3-2 FRL is established in consultation with other stakeholders. 3-3 Land Use Map of 2020 is created. 3-4 Annual forest cover monitoring is conducted until the end of project.	· Public document · Creation of the map · Project reports.			
Output 4 (Tree Breeding) The capacity of breeding techniques for drought tolerant trees in KEFRI is improved.	4-1 Plus trees of Melia volkensii and Acacia tortilis are selected in the seed orchards and stands in Tiva and Kibwezi. 4-2 Researchers of KEFRI acquire the skills of artificial crossing technique. 4-3 Tree seed orchards of Melia volkensii are established in the pilot counties.	· Project reports · Visit/observation of the tree · Interview of researchers · Demonstration of the techniques			
Output 5 (Regional Cooperation) Capacity of regional cooperation in KEFRI is intensified by promoting knowledge sharing and transfer of technologies for strengthening the resilience to climate change and drought in Sub-Sahara Africa.	5-1 Database on strengthening the resilience to climate change and drought in Sub-Saharan Africa is referred to by neighboring countries. 5-2 70% of participating countries evaluate the regional coordination useful.	· Access data of the website · Records of the meetings. · Project reports · Interview of participating countries.			

Activities	Inputs		Important Assumption
	The Japanese Side	The Kenyan Side	
Output 1 (Policy Support) 1-1 Review existing/planned forest-related policies/strategies. 1-2 Conduct gap analysis between the existing forest-related policies/strategies and their actual implementation at field level. 1-3 Develop a monitoring mechanism of forest-related policy/strategy implementation through stakeholder consultation. 1-4 Practice and strengthen the monitoring mechanism to manage forest-related policies/strategies in MENRRDA and KFS. 1-5 Harmonize development partners' activities. 1-6 Prepare a recommendation to the policy level based on project field activities utilizing NFMS (National Forest Monitoring System).	1 Personal 【Long-term expert】 (1) Chief adviser/Forest policy (2) Regional cooperation/Coordinator (3) Forestry Extension 【Short-term expert (Consultant)】 (1) NFMS /FRL/MRV (Measurement, Reporting and Verification) (2) Tree breeding (3) Experts as necessary	【Project management unit】 (1) Project Director - MENRRDA (2) Director, KFS (3) Director, KEFRI 【OUTPUT Level】 (1) Project Manager - MENRRDA (2) Component managers – MENRRDA, KFS, KEFRI (3) Counterpart/Administrative personnel 【Administrative staff】 (1) Secretary (2) Driver (3) Other staff	· Ongoing relevant initiatives such as 1) formulation of national forest programme, 2) revision of Kenya NFMS Road Map, 3) upscaling of forest inventory to national level, are cooperative with the Project. · Data from collaborating institutions including DRSRS and RCMRD (Regional Center for Mapping of Resources for Development) are made available.
Output 2 (Pilot Implementation through County Governments and Private Sector) 2-1 Conduct a feasibility study and examine the approach for pilot implementation. 2-2 Assist the pilot counties to prepare and carry out a forest management & implementation plan for promoting forest by utilizing the improved seedlings. 2-3 Design and implement a scheme to work with private sector to promote the use of improved seedlings. 2-4 Collaborate with NGO and CBO for pilot activities to expand the use of improved seedlings. 2-5 Examine the feasibility of making REDD+ pilot projects (county/project level) from among the pilot implementation conducted above, and formulate Project Document and match investors if feasible.	2 Counterpart Training 3 Machinery, Equipment and Materials (1) Equipment for NFMS (2) Equipment for tree breeding extension (3) Equipment for information sharing (4) Vehicles (5) Other necessary machinery, equipment and materials for the implementation of the project	2 Land and Facilities (1) Project office in Nairobi (MENRRDA, (2) Land and nursery for forest tree seed and seedling activities 3 Administrative and Operational Cost	· Selection of pilot county governments is completed timely for efficient activity operation.
Output 3 (REDD+ Readiness) 3-1 Design, develop and test the NFMS for Kenya. 3-2 Operationalize the NFMS. 3-3 Conduct accuracy assessment of 2014 Land Use (LU) Map which is developed by DRSRS (Directorate of Resource Surveys & Remote Sensing). 3-4 Create LU change (LUC) map and Forest Cover Change Map using 4 historical data of LU maps (1990, 2000, 2010, 2014). 3-5 Collect information on emission factors and develop 2014 Carbon Map. 3-6 Analyze the land use changes based on 4 histrical data of LU maps. 3-7 Develop and evaluate FRL (Forest Reference Level) with stakeholders. 3-8 Operate yearly forest cover change monitoring. 3-9 Create 2020 Land Use Map. 3-10 Train C/P for new technology or methodology of MRV and test them for future development of MRV system in Kenya.	4 Supplementary budget for local expenditure		**Pre-Conditions** · Devolution of forest extension functions is agreed between KFS and county governments by March 2016 as stated by relevant acts.
Output 4 (Tree Breeding) 4-1 Improve the quality of clonal seed orchards of Melia volkensii. 4-2 Study of artificial crossing toward 2nd generation of Melia volkensii. 4-3 Improve the seedling seed stands of Acacia tortilis. 4-4 Support to establish clonal seed orchards in the pilot counties. 4-5 Train improved seed and seedling suppliers.			<Issues and countermesures>
Output 5 (Regional Cooperation) 5-1 Design the scope and prepare a TOR of regional cooperation by networking with related countries. 5-2 Hold regional cooperation meetings and forum. 5-3 Collect good practice information for strengthening the resilience to climate change and drought in Sub-Saharan Africa from Kenya and surrounding countries. 5-4 Accumulate the collected information, and establish the database on KEFRI's website. 5-5 Share the collected knowledge with and transfer technologies to other countries in Sub-Sahara Africa.			

2) PDM-Version 1 (November 2016)

Annex 1 Project Design Matrix (PDM)

Project Title: Capacity Development Project for Sustainable Forest Management in the Republic of Kenya | Version 1

Implementing Agency: MENR (Ministry of Environment and Natural Resources), KFS (Kenya Forest Service), KEFRI (Kenya Forestry Research Institute) and County Governments | Dated: 9 November, 2016

Target Group: Direct Beneficiaries: Staff of implementing agencies and collaborating organizations

Indirect Beneficiaries: Population of pilot Counties and activity areas of NGO/CBO/private entities in Output 2

Period of Project: June, 2016 – June, 2021 (5 years)

Project Site: Nationwide, and ASALs (Arid and Semi-arid Lands) for Output 2 and Output 4.   Model Site: Pilot Counties for Output 2 will be selected in project activities.

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Sustainable forest management is promoted in Kenya towards the national forest cover target of 10%.	1 Result-based payment for REDD+ from international community is provided for Kenya. 2 50% of ASAL counties introduce the activities promoted by the Project.	· Citation in public documents · Observation of activities			
Project Purpose Capacity at the national and county level for sustainable forest management is strengthened.	1 70% of direct beneficiaries recognize the improvement of policy implementation. 2 At least 2 other Counties refer to the forest management & implementation plan as a good example to emulate for forest management. 3 The developed National Forest Monitoring System is utilized in Kenya. 4 At least 2 Countries adopt the technologies transferred by the regional cooperation. 5 Two areas of REDD+ readiness stage, namely the establishment of NFMS (National Forest Monitoring System) and FRL (Forest Reference Level), are completed. 6 Improved seed/seedlings are provided to at least 3 other Counties and 5 entities of NGO, CBO (Community-based Organization) or private sector.	· Project reports · Citation in public documents · Interview · Operation of NFMS · Report to UNFCCC (United Nations Framework Convention on Climate Change)	· There is no major changes of government institutional arrangement on forest and climate change policy.		
Outputs Output 1 (Policy Support) Implementing and monitoring capacities of forest-related policies/strategies at the national level are enhanced.	1-1 The participatory monitoring process is functional based on the National Forest Programme results framework. 1-2 70% of stakeholders recognize the recommendation prepared by the Project as applicable and effective. 1-3 70% of development partners recognize other partners forest related activities.	· Remarks and interview · Project reports · Interview	· Relevant policies currently under deliberation (National Forest Policy, Forest Conservation & Management Bill, National Climate Change Framework Policy, etc.) are finalized.		
Output 2 (Pilot Implementation through County Governments and Private Sector) Capacities of selected County governments, private sector, NGO and CBO are enhanced through implementing pilot forest management activities.	2-1 2 Counties develop forest management & implementation plans. 2-2 Collaboration with private sector is promoting for forest management activities. 2-3 A report on possible REDD+ activities at a project level is prepared based on the pilot implementation.	· Observation of activities at field based on the plan. · Project reports · Proposal/report submitted			
Output 3 (REDD+ Readiness) Technical capacities for REDD+ readiness activities in KFS are strengthened.	3-1 NFMS is established. 3-2 FRL is established in consultation with other stakeholders. 3-3 Land Use Map of 2020 is created. 3-4 Annual forest cover monitoring is conducted until the end of project.	· Public document · Creation of the map · Project reports.			
Output 4 (Tree Breeding) The capacity of breeding techniques for drought tolerant trees in KEFRI is improved.	4-1 Plus trees of Melia volkensii and Acacia tortilis are selected in the seed orchards and stands in Tiva and Kibwezi. 4-2 Researchers of KEFRI acquire the skills of artificial crossing technique. 4-3 Tree seed orchards of Melia volkensii are established in the pilot Counties.	· Project reports · Visit/observation of the tree · Interview of researchers · Demonstration of the techniques			
Output 5 (Regional Cooperation) Capacity of regional cooperation in KEFRI is intensified by promoting knowledge sharing and transfer of technologies for strengthening the resilience to climate change and drought in Sub-Sahara Africa.	5-1 Database on strengthening the resilience to climate change and drought in Sub-Saharan Africa is referred to by neighbouring countries. 5-2 70% of participating countries evaluate the regional cooperation useful.	· Access data of the website · Records of the meetings. · Project reports · Interview of participating countries.			

Activities	Inputs		Important Assumption
	The Japanese Side	The Kenyan Side	
Output 1 (Policy Support) 1-1 Review existing/planned forest-related policies/strategies. 1-2 Conduct gap analysis between the existing forest-related policies/strategies and their actual implementation at field level. 1-3 Support participatory monitoring process of forest-related policy/strategy. 1-4 Compile and facilitate information sharing on existing forest related partner's activities. 1-5 Prepare policy briefs based on project field activities utilizing NFMS (National Forest Monitoring System). **Output 2 (Pilot Implementation through County Governments and Private Sector)** 2-1 Conduct a feasibility study and examine the approach for pilot implementation and select pilot Counties. 2-2 Assist the pilot counties to promote sustainable forest management. 2-3 Design and implement a scheme to work with private sector to promote the use of improved seedlings. 2-4 Collaborate with NGO and CBO for pilot activities to expand the use of improved seedlings. 2-5 Examine the feasibility of making REDD+ pilot projects (county/project level) from among the pilot implementation conducted above, and formulate Project Document and match investors if feasible. **Output 3 (REDD+ Readiness)** 3-1 Design, develop and test the NFMS for Kenya. 3-2 Operationalize the Forest Information Platform. 3-3 Conduct accuracy assessment of 2014 Land Cover/Land Use Map which is developed by SLEEK (System for Land-Based Emission Estimation in Kenya). 3-4 Create land cover/land use change maps using 4 historical data of land cover/land use maps. 3-5 Collect information on emission factors, set emission factors and develop 2014 Carbon Map. 3-6 Analyse the land cover/land use changes based on the 4 time historical data of land cover/land use maps. 3-7 Develop and evaluate FRL (Forest Reference Level) with stakeholders. 3-8 Operate yearly forest cover change monitoring. 3-9 Create 2020 Land Cover/Land Use Map. 3-10 Train C/P for new technology or methodology of MRV (Measurement Reporting Verification) and test them for future development of MRV system in Kenya **Output 4 (Tree Breeding)** 4-1 Improve the quality of clonal seed orchards of Melia volkensii. 4-2 Study of artificial crossing toward 2nd generation of Melia volkensii. 4-3 Improve the seedling seed stands of Acacia tortilis. 4-4 Support to establish clonal seed orchards in the pilot Counties. 4-5 Train improved seed and seedling suppliers. **Output 5 (Regional Cooperation)** 5-1 Design the scope and prepare a TOR of regional cooperation by networking with related countries. 5-2 Hold regional cooperation meetings and forum. 5-3 Collect good practice information for strengthening the resilience to climate change and drought in Sub-Saharan Africa from Kenya and surrounding countries. 5-4 Accumulate the collected information, and establish the database on KEFRI's website. 5-5 Share the collected knowledge with and transfer technologies to other countries in Sub-Sahara Africa. 5-6 Improve access to finance to combat desertification.	1 Personal 【Long-term expert】 (1) Chief adviser/Forest policy (2) Regional cooperation/Coordinator (3) Forestry Extension 【Short-term expert (Consultant)】 (1) NFMS /FRL/MRV (Measurement, Reporting and Verification) (2) Tree breeding (3) Experts as necessary 2 Counterpart Training 3 Machinery, Equipment and Materials (1) Equipment for NFMS (2) Equipment for tree breeding extension (3) Equipment for information sharing (4) Vehicles (5) Other necessary machinery, equipment and 4 Supplementary budget for local expenditure	【Project management unit】 (1) Project Director - MENR (2) Director, KFS (3) Director, KEFRI 【OUTPUT Level】 (1) Project Manager - MENR (2) Component managers – MENR, KFS, (3) Counterpart/Administrative personnel 【Administrative staff】 (1) Secretary (2) Driver (3) Other staff 2 Land and Facilities (1) Project office in Nairobi (MENR, KFS, KEFRI) (2) Land and nursery for forest tree seed and seedling activities 3 Administrative and Operational Cost	・Ongoing relevant initiatives such as 1) formulation of national forest programme, 2) revision of Kenya NFMS Road Map, 3) upscaling of forest inventory to national level, are cooperative with the Project. ・Data from collaborating institutions including DRSRS and RCMRD (Regional Center for Mapping of Resources for Development) are made available. ・Selection of pilot County governments is completed timely for efficient activity operation.
			Pre-Conditions
			・Devolution of forest extension functions is agreed between KFS and county governments by March 2016 as stated by relevant acts.
			<Issues and countermeasures>

3) PDM-Version 2 (December 2017)

Project Design Matrix (PDM)

Project Title: Capacity Development Project for Sustainable Forest Management in the Republic of Kenya

Implementing Agency: MENR (Ministry of Environment and Natural Resources), KFS (Kenya Forest Service), KEFRI (Kenya Forestry Research Institute) and County Governments

Target Group: Direct Beneficiaries: Staff of implementing agencies and collaborating organizations

Indirect Beneficiaries: Population of pilot Counties and activity areas of NGO/CBO/private entities in Output 2

Period of Project: June, 2016 – June, 2021 (5 years)

Project Site: Nationwide, and ASALs (Arid and Semi-arid Lands) for Output 2 and Output 4.   Model Site: Embu County and Taita Taveta County are as Pilot Counties for Output 2.

Version 2

Dated: 5 December 2017

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption	Achievement	Remarks
Overall Goal Sustainable forest management is promoted in Kenya towards the national forest cover target of 10%.	1 Result-based payment for REDD+ from international community is provided for Kenya. 2 50% of ASAL counties introduce the activities promoted by the Project.	· Citation in public documents · Observation of activities			
Project Purpose Capacity at the national and county level for sustainable forest management is strengthened.	1 70% of direct beneficiaries recognize the improvement of policy implementation. 2 At least 2 other Counties refer to the forest management & implementation plan as a good example to emulate for forest management. 3 The developed National Forest Monitoring System is utilized in Kenya. 4 At least 2 Countries adopt the technologies transferred by the regional cooperation. 5 Two areas of REDD+ readiness stage, namely the establishment of NFMS (National Forest Monitoring System) and FRL (Forest Reference Level), are completed. 6 Improved seeds/seedlings are provided to at least 3 other Counties and 5 entities of NGO, CBO (Community-based Organization) or private sector.	· Project reports · Citation in public documents · Interview · Operation of NFMS · Report to UNFCCC (United Nations Framework Convention on Climate Change)	· There is no major changes of government institutional arrangement on forest and climate change policy.		
Outputs Output 1 (Policy Support) Implementing and monitoring capacities of forest-related policies/strategies at the national level are enhanced.	1-1 The participatory monitoring process is functional based on the National Forest Programme results framework. 1-2 70% of stakeholders recognize the recommendation prepared by the Project as applicable and effective. 1-3 70% of development partners recognize other partners forest related activities.	· Remarks and interview · Project reports · Interview	· Relevant policies currently under deliberation (National Forest Policy, Forest Conservation & Management Bill, National Climate Change Framework Policy, etc.) are finalized.		
Output 2 (Pilot Implementation through County Governments and Private Sector) Capacities of selected County governments, private sector, NGO and CBO are enhanced through implementing pilot forest management activities.	2-1 Two Counties develop forest management & implementation plans. 2-2 Collaboration with private sector is promoted for forest management activities. 2-3 A report on possible REDD+ activities at a project level is prepared based on the pilot implementation.	· Observation of activities at field based on the plan. · Project reports · Proposal/report submitted			
Output 3 (REDD+ Readiness) Technical capacities for REDD+ readiness activities in KFS are strengthened.	3-1 NFMS is established. 3-2 FRL is established in consultation with other stakeholders. 3-3 Land Use Map of 2020 is created. 3-4 Annual forest cover monitoring is conducted until the end of project.	· Public document · Creation of the map · Project reports.			
Output 4 (Tree Breeding) The capacity of breeding techniques for drought tolerant trees in KEFRI is improved.	4-1 Plus trees of Melia volkensii and Acacia tortilis are selected in the seed orchards and stands in Tiva and Kibwezi. 4-2 Researchers of KEFRI acquire the skills of artificial crossing technique.	· Project reports · Visit/observation of the tree · Interview of researchers · Demonstration of the techniques			
Output 5 (Regional Cooperation) Capacity of regional cooperation in KEFRI is intensified by promoting knowledge sharing and transfer of technologies for strengthening the resilience to climate change and drought in Sub-Sahara Africa.	5-1 Database on strengthening the resilience to climate change and drought in Sub-Saharan Africa is referred to by neighbouring countries. 5-2 70% of participating countries evaluate the regional cooperation useful.	· Access data of the website · Records of the meetings. · Project reports · Interview of participating countries.			

Activities	Inputs		Important Assumption
	The Japanese Side	The Kenyan Side	
Output 1 (Policy Support) 1-1　Review existing/planned forest-related policies/strategies. 1-2　Conduct gap analysis between the existing forest-related policies/strategies and their actual implementation at field level. 1-3　Support planning and monitoring of National Forest Progarmme. 1-4　Compile and facilitate information sharing on existing forest related partner's activities. 1-5　Prepare policy briefs based on project field activities utilizing NFMS (National Forest Monitoring System). **Output 2 (Pilot Implementation through County Governments and Private Sector)** 2-1　Conduct a feasibility study and examine the approach for pilot implementation and select pilot Counties. 2-2　Assist the pilot counties to promote sustainable forest management. 2-3　Design and implement a scheme to work with private sector to promote the use of improved seedlings. 2-4　Collaborate with NGO and CBO for pilot activities to expand the use of improved seedlings. 2-5　Examine the feasibility of making REDD+ pilot projects (county/project level) from among the pilot implementation conducted above, and formulate Project Document and match investors if feasible. **Output 3 (REDD+ Readiness)** 3-1　Design, develop and test the NFMS for Kenya. 3-2　Operationalize the Forest Information Platform. 3-3　Conduct accuracy assessment of 2014 Land Cover/Land Use Map which is developed by SLEEK (System for Land-Based Emission Estimation in Kenya). 3-4　Create land cover/land use change maps using 4 historical data of land cover/land use maps. 3-5　Collect information on emission factors,set emission factors and develop 2014 Carbon Map. 3-6　Analyse the land cover/land use changes based on the 4 time historical data of land cover/land use maps. 3-7　Develop and evaluate FRL (Forest Reference Level) with stakeholders. 3-8　Operate yearly forest cover change monitoring. 3-9　Create 2020 Land Cover/Land Use Map. 3-10　Train C/P for new technology or methodology of MRV (Measurement Reporting Verification) and test them for future development of MRV system in Kenya **Output 4 (Tree Breeding)** 4-1　Improve the quality of clonal seed orchards of Melia volkensii. 4-2　Study of artificial crossing toward 2nd generation of Melia volkensii. 4-3　Improve the seedling seed stands of Acacia tortilis. **Output 5 (Regional Cooperation)** 5-1　Design the scope and prepare a TOR of regional 5-2　Hold regional cooperation meetings and forum. 5-3　Collect good practice information for strengthening the resilience to climate change and drought in Sub- 5-4　Accumulate the collected information, and establish the 5-5　Share the collected knowledge with and transfer technologies to other countries in Sub-Sahara Africa. 5-6　Improve access to finance to combat desertification.	1　Personal 【Long-term expert】 (1)　Chief adviser/Forest policy (2)　Regional cooperation/Coordinator (3)　Forestry Extension 【Short-term expert (Consultant)】 (1)　NFMS /FRL/MRV (Measurement, Reporting and Verification) (2)　Tree breeding (3)　Experts as necessary 2　Counterpart Training 3　Machinery, Equipment and Materials (1)　Equipment for NFMS (2)　Equipment for tree breeding extension (3)　Equipment for information sharing (4)　Vehicles (5)　Other necessary machinery, equipment and 4　Supplementary budget for local expenditure	1　Personal 【Project management unit】 (1)　Project Director - MENR (2)　Director, KFS (3)　Director, KEFRI 【OUTPUT Level】 (1)　Project Manager - MENR (2)　Component managers – MENR, KFS, KEFRI (3)　Counterpart/Administrative personnel 【Administrative staff】 (1)　Secretary (2)　Driver (3)　Other staff 2　Land and Facilities (1)　Project office in Nairobi (MENR, KFS, KEFRI) (2)　Land and nursery for forest tree seed and seedling activities 3　Administrative and Operational Cost	・Ongoing relevant initiatives such as 1) formulation of national forest programme, 2) revision of Kenya NFMS Road Map, 3) upscaling of forest inventory to national level, are cooperative with the Project. ・Data from collaborating institutions including DRSRS and RCMRD (Regional Center for Mapping of Resources for Development) are made available. ・Selection of pilot County governments is completed timely for efficient activity operation. **Pre-Conditions** ・Devolution of forest extension functions is agreed between KFS and county governments by March 2016 as stated by relevant acts. **\<Issues and countermeasures\>**

4) PDM-Version 3 (August 2019)

Project Design Matrix

Project Title: Capacity Development Project for Sustainable Forest Management in the Republic of Kenya
Implementing Agency: MoEF (Ministry of Environment and Forestry), KFS (Kenya Forest Service), KEFRI (Kenya Forestry Research Institute) and County Governments
Target Group: Direct Beneficiaries: Staff of implementing agencies and collaborating organizations
Indirect Beneficiaries: Population of pilot Counties and activity areas of NGO/CBO/private entities in Output 2
Period of Project: June, 2016 – June, 2021 (5 years)
Project Site: Nationwide, and ASALs (Arid and Semi-arid Lands) for Output 2 and Output 4.   Model Site: Embu County and Taita Taveta County are as Pilot Counties for Output 2.

Version 3
Dated: 30 August 2019

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal Sustainable forest management is promoted in Kenya towards the national forest cover target of 10%.	1 Monitoring by methodologies set in the NFMS (National Forest Monitoring System) and the Forest Information Platform as data management function of the NFMS is sustainably implemented and utilized respectively. 2 50% of ASAL counties introduce the activities promoted by the Project. 3 National Forest Programme is updated.	• Citation in public documents • Operation of NFMS • Observation of activities	
Project Purpose Capacity at the national and county level for sustainable forest management is strengthened.	1 70% of direct beneficiaries recognize the improvement of policy implementation. 2 At least 3 entities (government, private, NGO/CBO) and individuals newly start growing of improved Melia volkensii in the ASALs. 3 REDD+ readiness process is advanced by the establishment of NFMS and FRL (Forest Reference Level). 4 KEFRI as AI-CD (African Initiative for Combatting Desertification) Regional Hub holds at least 5 Regional/National meetings, workshops and trainings for knowledge sharing. 5 Distribution system of seeds and seedlings of improved Melia volkensii is improved.	• Project reports • Citation in public documents • Interview	• There is no major changes of government institutional arrangement on forest and climate change policy.
Outputs **Output 1 (Policy Support)** Implementing and monitoring capacities of forest-related policies/strategies at the national level are enhanced.	1-1 Monitoring and evaluation process of the National Forest Programme is established. 1-2 70% of stakeholders recognize the recommendation prepared by the Project as applicable and effective.	• Remarks and interview • Project reports • Interview	• Relevant policies currently under deliberation (National Forest Policy, Forest Conservation & Management Bill, National Climate Change Framework Policy, etc.) are finalized.
Output 2 (Forestry Extension in ASALs through public, private and NGOs/CBOs partnership) Capacities of public and private sectors, and NGOs/CBOs to promote tree growing in ASALs are enhanced through forestry extension activities.	2-1 PFMP (Participatory Forest Management Plan), FFS (Farmer Field School) and other forestry extension approaches are applied in a strategic and coordinated manner in the Pilot Counties. 2-2 Collaboration among private and public sectors, and NGOs/CBOs is enhanced to promote tree growing in ASALs 2-3 More than 10 times of seminars/trainings for related stakeholders are held to promote improved Melia volkensii growing.	• Observation of activities at field based on the plan. • Project reports • Proposal/report submitted	
Output 3 (REDD+ Readiness) Technical capacities for REDD+ readiness activities and forest monitoring for sustainable forest management in KFS are strengthened.	3-1 The methodology of forest monitoring under the NFMS is established and documented. 3-2 Forest Information Platform as data management function of the NFMS is developed. 3-3 FRL is established in consultation with other stakeholders for submission to the UNFCCC by the Kenyan Government. 3-4 Creation of Land Cover/Land Use Map of 2020 is undertaken.	• Project reports • Report to UNFCCC (United Nations Framework Convention on Climate Change)	
Output 4 (Tree Breeding) The capacity of breeding techniques for drought tolerant trees in KEFRI is improved.	4-1 Plus trees of Melia volkensii and Acacia tortilis are selected in the seed orchards and stands in Tiva and Kibwezi. 4-2 Researchers of KEFRI acquire the skills of artificial crossing technique.	• Project reports • Visit/observation of the tree • Interview of researchers • Demonstration of the techniques	
Output 5 (Regional Cooperation) Capacity of regional cooperation in KEFRI is intensified by promoting knowledge sharing and transfer of technologies for strengthening the resilience to climate change and drought in Sub-Sahara Africa.	5-1 Database on good practices to strengthen the resilience to climate change and drought in Sub-Saharan Africa is established to be referred by Kenya and other neighbouring countries. 5-2 70% of participating countries evaluate the regional cooperation useful.	• Access data of the website • Records of the meetings. • Project reports • Interview of participating countries.	

Activities	Inputs		Important Assumption
	The Japanese Side	**The Kenyan Side**	
Output 1 (Policy Support) 1-1 Review existing/planned forest-related policies/strategies. 1-2 Conduct gap analysis between the existing forest-related policies/strategies and their actual implementation at field level. 1-3 Support planning and monitoring of National Forest Programme. 1-4 Prepare policy briefs based on project field activities utilizing NFMS. **Output 2 (Forestry Extension in ASALs through public, private and NGOs/CBOs partnership)** 2-1 Conduct a feasibility study and examine the approach for pilot implementation and select pilot Counties. 2-2 Assist formulation and implementation of PFMP in the pilot Counties 2-3 Support farmers to conduct FFS in strategic collaboration with implementation of PFMP in the Pilot Counties 2-4 Promote collaboration among government institutions, private entities and NGOs/CBOs in enhancing tree growing in ASALs 2-5 Promote tree growing of improved Melia volkensii in ASALs **Output 3 (REDD+ Readiness)** 3-1 Design, develop and test the NFMS for Kenya. 3-2 Operationalize the Forest Information Platform. 3-3 Conduct accuracy assessment of 2014 Land Cover/Land Use Map which is developed by SLEEK (System for Land-Based Emission Estimation in Kenya). 3-4 Create land cover/land use change maps using 4 historical data of land cover/land use maps. 3-5 Collect information on emission factors, set emission factors and develop 2010 Carbon 3-6 Analyse the land cover/land use changes based on the 4 time historical data of land cover/land use maps. 3-7 Develop and evaluate FRL with stakeholders. 3-8 Strengthen capacities for creating 2020 Land Cover/Land Use Map. 3-9 Train C/P for new technology or methodology of MRV (Measurement Reporting Verification) and test them for future development of MRV system in Kenya. **Output 4 (Tree Breeding)** 4-1 Improve the quality of clonal seed orchards of Melia volkensii. 4-2 Study of artificial crossing toward 2nd generation of Melia volkensii. 4-3 Improve the seeding seed stands of Acacia tortilis. **Output 5 (Regional Cooperation)** 5-1 Design the scope and prepare a TOR of regional cooperation by networking with related countries. 5-2 Hold regional cooperation meetings and forum. 5-3 Collect good practice information for strengthening the resilience to climate change and drought in Sub-Saharan Africa from Kenya and surrounding countries. 5-4 Accumulate the collected information, and establish the database on KEFRI's website. 5-5 Share the collected knowledge and technologies with other countries in Sub-Sahara. 5-6 Improve access to finance to combat desertification.	1 Personal **[Long-term expert]** (1) Chief adviser/Forest policy (2) Regional cooperation/Coordinator (3) Forestry Extension **[Short-term expert (Consultant)]** (1) NFMS/FRL/MRV (Measurement, Reporting and Verification) (2) Tree breeding (3) Experts as necessary 2 Counterpart Training 3 Machinery, Equipment and Materials (1) Equipment for NFMS (2) Equipment for tree breeding extension (3) Equipment for information sharing (4) Vehicles (5) Other necessary machinery, equipment and 4 Supplementary budget for local expenditure	**[Project management unit]** (1) Project Director - MENR (2) Director, KFS (3) Director, KEFRI **[OUTPUT Level]** (1) Project Manager - MENR (2) Component managers – MENR, (3) Counterpart/Administrative personnel **[Administrative staff]** (1) Secretary (2) Driver (3) Other staff 2 Land and Facilities (1) Project office in Nairobi (MENR, (2) Land and nursery for forest tree seed 3 Administrative and Operational Cost	• Ongoing relevant initiatives such as 1) formulation of national forest programme, 2) revision of Kenya NFMS Road Map, 3) upscaling of forest inventory to national level, are cooperative with the Project. • Data from collaborating institutions including DRSRS and RCMRD (Regional Centre for Mapping of Resources for Development) are made available. • Selection of pilot County governments is completed timely for efficient activity operation. **Pre-Conditions** • Devolution of forest extension functions is agreed between KFS and county governments by March 2016 as stated by relevant acts. **<Issues and countermeasures>**

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5) PDM-Version 4 (January 20

Project Design Matrix

Project Title: Capacity Development Project for Sustainable Forest Management in the Republic of Kenya
Implementing Agency: MoEF (Ministry of Environment and Forestry), KFS (Kenya Forest Service), KEFRI (Kenya Forestry Research Institute) and County Governments
Target Group: Direct Beneficiaries: Staff of implementing agencies and collaborating organizations
Indirect Beneficiaries: Population of pilot Counties and activity areas of NGO/CBO/private entities in Output 2
Period of Project: June, 2016 – October 2021 (5 years and 4 months)
Project Site: Nationwide, and ASALs (Arid and Semi-arid Lands) for Output 2 and Output 4.   Model Site: Embu County and Taita Taveta County are as Pilot Counties for Output 2.

Version 4
Dated: Jan 28 2020

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal Sustainable forest management is promoted in Kenya towards the national forest cover target of 10%.	1 Monitoring by methodologies set in the NFMS (National Forest Monitoring System) and the Forest Information Platform as data management function of the NFMS is sustainably implemented and utilized respectively. 2 50% of ASAL counties introduce the activities promoted by the Project. 3 National Forest Programme is updated.	· Citation in public documents · Operation of NFMS · Observation of activities	
Project Purpose Capacity at the national and county level for sustainable forest management is strengthened.	1 70% of direct beneficiaries recognize the improvement of policy implementation. 2 At least 3 entities (government, private, NGO/CBO) and individuals newly start growing of improved Melia volkensii in the ASALs. 3 REDD+ readiness process is advanced by the establishment of NFMS and FRL (Forest Reference Level). 4 KEFRI as AI-CD (African Initiative for Combatting Desertification) Regional Hub holds at least 5 Regional/National meetings, workshops and trainings for knowledge sharing. 5 Distribution system of seeds and seedlings of improved *Melia volkensii* is improved.	· Project reports · Citation in public documents · Interview	· There is no major changes of government institutional arrangement on forest and climate change policy.
Outputs **Output 1 (Policy Support)** Implementing and monitoring capacities of forest-related policies/strategies at the national level are enhanced. **Output 2 (Forestry Extension in ASALs through public, private and NGOs/CBOs partnership)** Capacities of public and private sectors, and NGOs/CBOs to promote tree growing in ASALs are enhanced through forestry extension activities. **Output 3 (REDD+ Readiness)** Technical capacities for REDD+ readiness activities and forest monitoring for sustainable forest management in KFS are strengthened. **Output 4 (Tree Breeding)** The capacity of breeding techniques for drought tolerant trees in KEFRI is improved. **Output 5 (Regional Cooperation)** Capacity of regional cooperation in KEFRI is intensified by promoting knowledge sharing and transfer of technologies for strengthening the resilience to climate change and drought in Sub-Sahara Africa.	1-1 Monitoring and evaluation process of the National Forest Programme is established. 1-2 70% of stakeholders recognize the recommendation prepared by the Project as applicable and effective. 2-1 PFMP (Participatory Forest Management Plan), FFS (Farmer Field School) and other forestry extension approaches are applied in a strategic and coordinated manner in the Pilot Counties. 2-2 Collaboration among private and public sectors, and NGOs/CBOs is enhanced to promote tree growing in ASALs 2-3 More than 10 times of seminars/trainings for related stakeholders are held to promote improved Melia volkensii growing. 3-1 The methodology of forest monitoring under the NFMS is established and documented. 3-2 Forest Information Platform as data management function of the NFMS is developed. 3-3 FRL is established in consultation with other stakeholders for submission to the UNFCCC by the Kenyan Government. 3-4 Creation of Land Cover/Land Use Map of 2020 is undertaken. 4-1 Plus trees of *Melia volkensii* and *Acacia tortilis* are selected in the seed orchards and stands in Tiva and Kibwezi. 4-2 Researchers of KEFRI acquire the skills of artificial crossing technique. 5-1 Database on good practices to strengthen the resilience to climate change and drought in Sub-Saharan Africa is established to be referred by Kenya and other neighbouring countries. 5-2 70% of participating countries evaluate the regional cooperation useful.	· Remarks and interview · Project reports · Interview · Observation of activities at field based on the plan. · Project reports · Proposal/report submitted · Project reports · Report to UNFCCC (United Nations Framework Convention on Climate Change) · Project reports · Visit/observation of the tree · Interview of researchers · Demonstration of the techniques · Access data of the website · Records of the meetings. · Project reports · Interview of participating countries.	· Relevant policies currently under deliberation (National Forest Policy, Forest Conservation & Management Bill, National Climate Change Framework Policy, etc.) are finalized.

Activities	Inputs		Important Assumption
	The Japanese Side	**The Kenyan Side**	
Output 1 (Policy Support) 1-1 Review existing/planned forest-related policies/strategies. 1-2 Conduct gap analysis between the existing forest-related policies/strategies and their actual implementation at field level. 1-3 Support planning and monitoring of National Forest Programme and other forest-related policies/laws. 1-4 Release policy briefs based on project activities. **Output 2 (Forestry Extension in ASALs through public, private and NGOs/CBOs partnership)** 2-1 Conduct a feasibility study and examine the approach for pilot implementation and select pilot Counties. 2-2 Assist formulation and implementation of PFMP in the pilot Counties 2-3 Support farmers to conduct FFS in strategic collaboration with implementation of PFMP in the Pilot Counties 2-4 Promote collaboration among government institutions, private entities and NGOs/CBOs in enhancing tree growing in ASALs 2-5 Promote tree growing of improved *Melia volkensii* in ASALs **Output 3 (REDD+ Readiness)** 3-1 Design, develop and test the NFMS for Kenya. 3-2 Operationalize the Forest Information Platform. 3-3 Conduct accuracy assessment of 2014 Land Cover/Land Use Map which is developed by SLEEK (System for Land-Based Emission Estimation in Kenya). 3-4 Create land cover/land use change maps using 4 historical data of land cover/land use maps. 3-5 Collect information on emission factors, set emission factors and develop 2014 Carbon Map. 3-6 Analyse the land cover/land use changes based on the 4 time historical data of land cover/land use maps. 3-7 Develop and evaluate FRL with stakeholders. 3-8 Strengthen capacities for creating 2020 Land Cover/Land Use Map. 3-9 Train C/P for new technology or methodology of MRV (Measurement Reporting Verification) and test them for future development of MRV system in Kenya. **Output 4 (Tree Breeding)** 4-1 Improve the quality of clonal seed orchards of *Melia volkensii*. 4-2 Study of artificial crossing toward 2nd generation of *Melia volkensii*. 4-3 Improve the seedling seed stands of *Acacia tortilis*. **Output 5 (Regional Cooperation)** 5-1 Design the scope and prepare a TOR of regional cooperation by networking with related countries. 5-2 Hold regional cooperation meetings and forum. 5-3 Collect good practice information for strengthening the resilience to climate change and drought in Sub-Saharan Africa from Kenya and surrounding countries. 5-4 Accumulate the collected information, and establish the database on KEFRI's website. 5-5 Share the collected knowledge and technologies with other countries in Sub-Sahara Africa. 5-6 Improve access to finance to combat desertification.	1 Personal 【Long-term expert】 (1) Chief adviser/Forest policy (2) Regional cooperation/Coordinator (3) Forestry Extension 【Short-term expert (Consultant)】 (1) NFMS/FRL/MRV (Measurement, Reporting and Verification) (2) Tree breeding (3) Experts as necessary 2 Counterpart Training 3 Machinery, Equipment and Materials (1) Equipment for NFMS (2) Equipment for tree breeding extension (3) Equipment for information sharing (4) Vehicles (5) Other necessary machinery, equipment and 4 Supplementary budget for local expenditure	【Project management unit】 (1) Project Director - MENR (2) Director, KFS (3) Director, KEFRI 【OUTPUT Level】 (1) Project Manager - MENR (2) Component managers – MENR, KFS, (3) Counterpart/Administrative personnel 【Administrative staff】 (1) Secretary (2) Driver (3) Other staff 2 Land and Facilities (1) Project office in Nairobi (MENR, KFS, (2) Land and nursery for forest tree seed 3 Administrative and Operational Cost	· Ongoing relevant initiatives such as 1) formulation of national forest programme, 2) revision of Kenya NFMS Road Map, 3) upscaling of forest inventory to national level, are cooperative with the Project. · Data from collaborating institutions including DRSRS and RCMRD (Regional Centre for Mapping of Resources for Development) are made available. · Selection of pilot County governments is completed timely for efficient activity operation. **Pre-Conditions** · Devolution of forest extension functions is agreed between KFS and county governments by March 2016 as stated by relevant acts. **<Issues and countermeasures>**