



Ministry of Forestry and
Wildlife



Kenya Forestry Research
Institute



Japan International Cooperation
Agency

MINISTRY OF FORESTRY AND WILDLIFE (M of F &W)
KENYA FORESTRY RESEARCH INSTITUTE (KEFRI)
AND
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
(A contribution towards increasing Kenya tree cover to 10%)

MINUTES OF MEETING
OF
1ST JOINT COORDINATING COMMITTEE (1ST JCC)
ON
THE PROJECT ON DEVELOPMENT OF DROUGHT TOLERANT TREES
FOR
ADAPTATION TO CLIMATE CHANGE IN THE DRYLANDS
OF KENYA
HELD ON TUESDAY, 25TH SEPTEMBER, 2012
AT
THE MINISTRY OF FORESTRY AND WILDLIFE HEADQUARTERS
TELEPOSTA TOWERS - NAIROBI

Signed: October 2012

Minutes of meeting of 1st joint coordinating committee (1st JCC) on the project on development of drought tolerant trees for adaptation to Climate Change in the Drylands of Kenya – towards in creating tree cover to 10%. Page 1

MINISTRY OF FORESTRY AND WILDLIFE (M of F &W)
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MINUTES OF MEETING (M/M)
OF
1ST JOINT COORDINATING COMMITTEE (1ST JCC)

THESE MINUTES OF MEETING OF 1ST JOINT COORDINATING COMMITTEE (1ST JCC) ON THE PROJECT ON DEVELOPMENT OF DROUGHT TOLERANT TREES FOR ADAPTATION TO CLIMATE CHANGE IN THE DRYLANDS OF KENYA ("Project") is made on the 25th day of September two thousand and twelve. The Ministry of Forestry and Wildlife (MoF&W), and the Kenya Forestry Research Institute (KEFRI) which expression shall, where the contents so admits include its successors and assignees on one hand and the Japan International Cooperation Agency (JICA) on the other hand which expression so admits include its successors and assignees.

WHEREAS,

The conclusion and the direction of the project for the coming five years are summarized in four themes as below.

Firstly, in order to strengthen KEFRI's capacity for conducting research on genetic diversity of indigenous tree species (*Melia volkensii* and *Acacia tortilis* as pioneer trials) the following actions shall be taken:

- Capacity training for KEFRI staff in diversity studies of indigenous tree species
- Development of DNA markers for *Melia volkensii* and *Acacia tortilis*

- Genotyping of *Melia volkensii* and *Acacia tortilis* Plus trees
- Conducting research on genetic diversity of *Melia volkensii* and *Acacia tortilis*.

Secondly, in order to strengthen KEFRI's capacity for implementing forest tree breeding of indigenous species (*Melia volkensii* and *Acacia tortilis* as pioneer trials) the following actions shall be taken concurrently with the first actions:

- Selection of *Melia volkensii* and *Acacia tortilis* Plus trees;
- Establishment of *Melia volkensii* and *Acacia tortilis* seed orchards
- Selection of superior clones.

Thirdly, in order to establish quality seed and seedling supply system for *Melia volkensii* the following actions shall be taken;

- Development of guideline for securing quality seed and seedling production, and distribution.
- Piloting the production and distribution guideline
- Revising and finalizing the seed production and distribution guideline

Fourthly, in order to create and raise awareness of relevant stakeholders on the importance of using quality seed and seedlings the following actions shall be taken;

- At least two project awareness events (seminars, workshops, trainings) shall be held annually.

M of F &W, KEFRI and JICA recognizing the conclusion and direction of the above project now come to the understanding on collaboration arrangement for support through this Minutes of Meeting

SIGNED AT NAIROBI BY THE DULY AUTHORIZED REPRESENTATIVES OF THE PARTIES ON THE DAY AND YEAR AS WRITTEN ABOVE



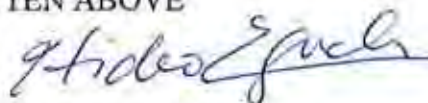
Mr. Lawrence Mwadime N., CBS

Ag. Permanent Secretary

Ministry of Forestry and Wildlife

The Republic of Kenya

Date 10/12/2012



Mr. Hideo EGUCHI

Chief Representative

JICA Kenya Office

Date 18/12/2012


Dr Ben Chikamai

Director 
Kenya Forestry Research Institute

Republic of Kenya

Date 14/12/2012

Mr. Makoto OZAWA

Chief Advisor 
JICA project Team

Date 14/12/2012

THE ATTACHED DOCUMENT ON 1ST JCC MEETING

The meeting started at 10.00am

Agenda

1. Opening remarks by both the Permanent Secretary of ministry of Forestry and Wildlife and Director KEFRI.
2. Brief from Mr. Hideo Eguchi, Chief Representative of JICA KENYA office
3. Presentation by Dr. Muturi, Dr. Fujisawa and Mr. Ozawa
4. Questions and answers
5. AOB

Minute – 1: Opening remarks

Permanent Secretary (PS), Ministry of Forestry and Wildlife

Mr. Gideon Gathaara, the Conservation Secretary, Ministry of Forestry and Wildlife represented the PS. Mr. Gathaara gave apologies for the PS who was attending another meeting.

Mr. Gathaara started by remarks on the project's importance. He said that the project is very important for Kenya because out of the Kenya's 582,000 Sq. km 80% is Arid and Semi Arid Lands (ASALs). Some of these regions, which were previously regarded as low potential, are now being considered high potential in natural resource base. He further highlighted the importance of mitigating climate change through improved drought tolerant trees in the ASALs. He stated therefore that the Government through the Ministry of Forestry and Wildlife has high expectations from the project in development of the ASALs in their potential role in contributing to increasing tree cover to 10% in the Country.

Director KEFRI

The Director KEFRI expressed the honour of hosting the project at KEFRI and said that he was happy to have the official launch of the project at the Ministry of Forestry and Wildlife, which coincided with the 1st JCC.

Minute – 2: Brief from Mr. Hideo Eguchi, Chief Representative of JICA Kenya office

Mr. Eguchi started by highlighting the sectors that JICA supports namely; Infrastructure, Agriculture, Human health, Environment (Forestry, Water and Sanitation). He also said that Climate Change has also become core to JICA support. Mr. Eguchi said that Kenya is

a vulnerable country to Climate Change and hence must prepare to adapt. The current project is geared to this end in addition to helping Kenya achieve vision 2030 goal of 10% forest cover. He further highlighted the importance of the project to JICA's focus on the environment, mentioning Japan's contribution to TICAD (Tokyo International Conference on African Development). The project will in 5 years try to demonstrate adoptable methodologies by farmers and also by other African countries. He stressed that JICA has a long history of collaboration with KERFI and KFS and is therefore confident that the two institutions have the capacity to implement the project with success.

Minute 3: Presentation by Dr. Muturi, Dr. Fujisawa and Mr. Ozawa

Dr. Muturi, Project Manager, KEFRI

Dr. Muturi re-emphasized the fact that Kenya is basically a dryland country and that the two main tree species to be developed (*Melia volkensii* and *Acacia tortilis*) are found in the Drylands; with *Melia* occurring mainly in Eastern region and *Acacia* more widely spread. The proposed trees are resilient in the drylands and can therefore offer great opportunities for timber and biomass production respectively. Dr Muturi said the project has selected two species as pilot species. The major reason being that *Acacia tortilis* has quality fodder and charcoal, which have resulted to great pressure being exerted on the natural stands leading to possible genetic erosion. *Melia volkensii* has been overexploited for timber and fodder causing genetic erosion. Climate Change is further threatening the distribution range of the two species and hence development of drought tolerant varieties is a priority. He further said that *Melia* was chosen because KEFRI has had previous studies on the species and genetic selection would be easier. *Melia* can also be used for Carbon sequestration and hence mitigate Climate Change. Two traits will be used, genetic quality for timber production and drought tolerance for adaptation to Climate Change. The intervention will be through selection of “plus trees” (High quality) and through subsequent selections, the relative frequency of such plus trees will be increased and hence improved varieties developed.

Dr. Fujisawa, Head Breeding Division (FTBC)

Dr Fujisawa started by describing the project design. He said the project has four main components;

- Genetic diversity and its capacity building
- Breeding of indigenous trees capacity building
- Quality seeds and seedling supply system
- Stakeholder awareness on Quality seeds and seedling

The project involves DNA analysis to assist in genetic diversity and development of guidelines for the genetic conservation of the two species. The training in Japan has already started with development of genetic markers for *Acacia tortilis*. Breeding operation of *Melia* has also started by selection of plus trees and grafting them on pre-raised rootstocks. The graft will be used to establish clonal seed orchards in 2012 at Kitui and Kibwezi. However, breeding operation of *Acacia tortilis* will start in 2013 by selection of plus trees. Dr Fujisawa also gave the Project's Plan of Operation and Annual Plan of Operation for the Yr 2012, explaining the slight changes to clarify the activities.

Mr. Ozawa, Project's Chief Advisor, JICA

Mr. Ozawa gave the project outline as capacity building and stakeholder awareness. He indicated that the extension activity would focus on *Melia volkensii* due to the limited time to study *Acacia tortilis*. He said the project would develop production and distribution guideline based on the results of market research on seed production and wood utilization needs. Demonstration plots will be established in combination with supplemental progeny tests. There will also be training courses in conjunction with the third country-training program. Mr. Ozawa indicated the project beneficiaries, target area and staff assignment for both Kenya and Japan.

Minute 4: Questions and answers

A session of questions and answers was opened and the questions and answers are tabulated below.

Question	Answer
The Director KEFRI asked clarification on the strategy for research on <i>Melia volkensii</i> and whether the project would select plus trees for <i>A. tortilis</i> .	Jason Kariuki said that scion collection for <i>Melia volkensii</i> had started in September and that the exercise would last till end of September so as to have grafted 60 plus trees and that for <i>A. tortilis</i>

<p>Mr Gathaara expressed the need for generating and packaging basic information for <i>A. tortilis</i></p> <p>Mr Simanto (KFS) also expressed the same need for mapping out <i>A. tortilis</i> resource in Kenya. He also requested that technology packaging and dissemination forums be built in the project so as to come up with simple packages for stakeholders</p>	<p>100 plus trees to be selected by 2013.</p>
<p>Mr. Eguchi asked the clarification on the implementation bodies of each component of the Project. He also asked the procedure for research protocol in Kenya.</p>	<p>Dr. Chikamai said the government procedures for research are followed where the Ministry takes responsibility of policy and KEFRI implements the research. Mr. Gathaara added the issues pertaining to the project will be handled by the JCC but if there are issues of bio-prospecting then the Government will follow the procedures for that.</p> <p>Dr. Muturi added that the project is basically a research project and as such KEFRI takes the mandate for research while KFS takes the mandate for extension while other beneficiaries and stakeholders like farmers will benefit from improved tree varieties.</p>
<p>Prof Kinuthia asked the role of the University of Nairobi in the project.</p> <p>He mentioned a general concern about the community exploitation of trees in Kenya and asked whether the project can assist in sensitizing the community in the reduction of such degradation.</p>	<p>Dr. Muturi said that the University joins the partnership of the project with collaborators and this has potential benefits of expanding the university collaboration with Japanese institutions that are already factored in the project.</p>
<p>Ms. Fukai asked who will be the biggest beneficiary whether small farmers or large farmers.</p>	<p>It was clarified that both small farmers and large farmers stand to benefit.</p>

Mr Ngugi of JICA wanted to know how the project areas were chosen and how Kibwezi did come in the project.	Mr. Kariuki explained that Kibwezi is in Makueni District, which is included in the project.
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Minute 7: AOB

Dr. Chikamai thanked the chairman for formally launching the project, which had officially started on 1st of July 2012 and the JCC.

Mr. Eguchi thanked the chair for formally launching the project and expressed confidence in the implementation team.

Mr. Mutoro thanked the chair on behalf of the MoA and other stakeholders for formally launching the project and found the project timely. He requested the strengthening of extension to assist integrating trees with agriculture and also requested further capacity building in agroforestry extension.

The chairman closed the meeting at 11.56 AM

LIST OF PARTICIPANTS ON ON 1ST JCC MEETING

No	Name	Designation/Institution	Station	Email
1	Mr. Gideon Gathaara	Conservation Secretary MoF&W	Teleposta	gideongathara@yahoo.com
2	Dr. Ben Chikamai	Director KEFRI	KEFRI Muguga	director@kefri.org
3	Mr. Hideo Eguchi	Chief representative, JICA Kenya	JICA Kenya	Eguchi.Hideo@jica.go.jp
4	Dr. Gabbriel Muturi	Project manager KEFRI	KEFRI Muguga	gabrielmukuria2012@gmail.com
5	Mr. Makoto Ozawa	Chief Advisor, JICA	KEFRI Muguga	kj-forestry1@hotmail.co.jp
6	Mr. Masaki Narumi	Project coordinator, JICA	KEFRI Muguga	kj-forestry2@hotmail.co.jp
7	Dr. Yoshitake Fujisawa	Head of Breeding, FTBC	FFPRI Japan	fujisawa@affrc.go.jp

8	Ms Meri Fukai	Project foundation advisor	JICA Kenya	Fukai.Meri@jica.go.jp
9	Mr. Robert Gatonga	Economist, MoF Kenya	Treasury	rwgatonga@gmail.com
10	Prof. R.K.Ngugi	University of Nairobi	CAVS	rkgugi@gmail.com
11	Mr. John N Ngugi	Senior Program Officer	JICA Kenya	JohnNgugi.ky@jica.go.jp
12	Eng. Wafula Mutoro	Ministry of Agriculture	MOA, Kenya	wafulamutoro@ymail.com
13	Mr. Oscar Simanto	Senior Assistant Director	KFS, Kenya	oscarsimanto@gmail.com
14	Ms Lucy Kamande	P.N.R.S	MENR/CCS	lkmumbi@ymai.com
15	Mr. Jason Kariuki	Assistant project manager	KEFRI Muguga	kariukijason@yahoo.com
16	Dr. James Ndufa	Field Manager	KEFRI Kitui	jkndufa@yahoo.com
17	Mr. Joseph Machua	Assistant Project Manager	KEFRI Muguga	machuaj@yahoo.com

Project on Development of Drought Tolerant Trees for Adaptation to Climate Change in Drylands of Kenya

The Second Joint Coordinating Committee Meeting
12th February 2013, Nairobi, KENYA

PROJECT DURATION
2012 - 2017



Presenters: KEFRI, FTBC & JICA

1 Project Outline

2 Results of the First Term

- a) DNA Analysis
- b) Tree Breeding
- c) Extension

3 Plan of the Second Term

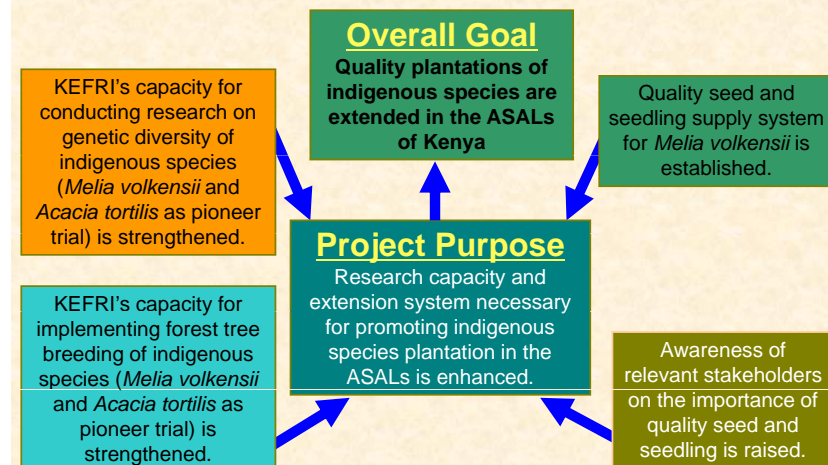
- a) DNA Analysis
- b) Tree Breeding
- c) Extension

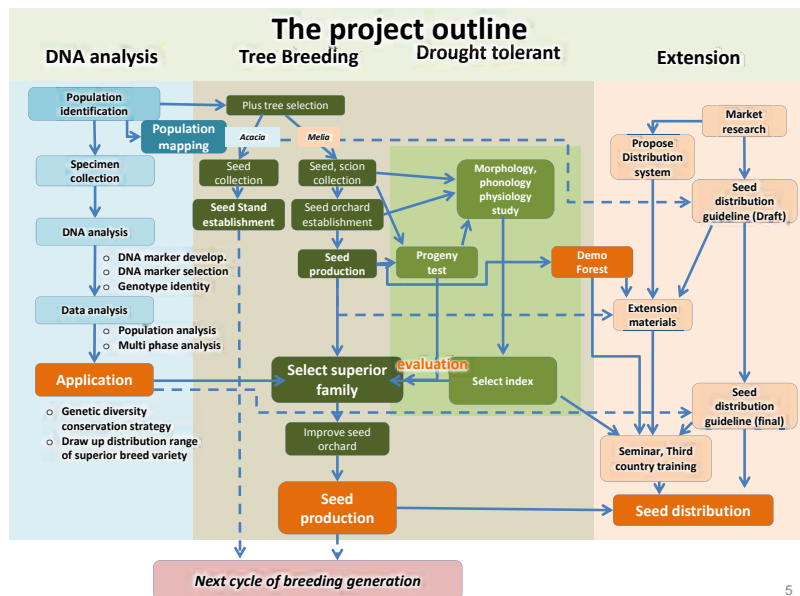
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Project Duration, Implementers, Beneficiaries & Target Area

Project Period	5 years; From July 2012 to June 2017
Project Implementers	KEFRI, FTBC and KFS
Beneficiaries	Staff members of KEFRI and KFS, inhabitants of ASALs of Kenya
Project target Areas	Muguga (KEFRI HQs), Kitui, Makueni, Garissa, Embu

PROJECT DESIGN





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2 Results of the First Term

a) DNA Analysis

1. Delineate *Melia volkensii* and *Acacia tortilis* populations



240 *Melia* and 120 *Acacia* were mapped and sampled.

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2. Determine genetic diversity of *Melia volkensii* and *Acacia tortilis* populations

- 15 microsatellite markers were developed and screened in *Melia*.
- 154 microsatellite markers were developed in *Acacia*.
- Analysis on genotypes of collected samples is ongoing.



2 b) TREE BREEDING OPERATION - Overview

- Raising of *Melia* rootstock at Kitui Centre
- Scion collection from 60 *Plus* trees in 7 transects in September and October 2012
- Grafting of 72 scions for each of the 60 CPTs in September and October 2012
- Planting of a total of 1800 grafted seedlings (from 60 plus trees, 30 grafts each) at Kitui Seed Orchard site in Nov and Dec 2012
- Planting of a total of 1300 grafted seedlings at Kibwezi Seed Orchard site in January 2013
- Tending activities: Weeding, removal of buds has started at Kitui Orchard
- Watering being done for seedlings planted at Kibwezi site

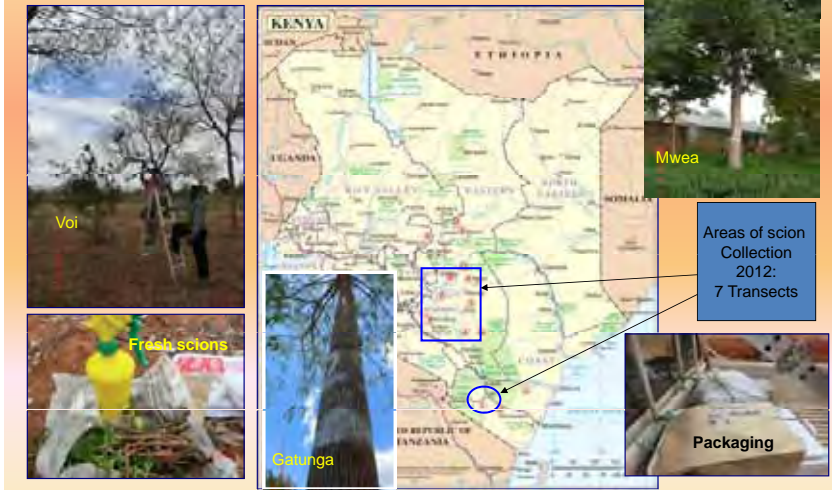
2 b) I: Raising of Melia rootstock

❖ A total of 7,000 Melia root stock for use in grafting was raised at Kitui Centre from February 2012



2b) II: Collection of scions

Scions were collected from 60 Candidate Plus Trees (CPTs) in September & October 2012 in the locations shown in map



2b) III: Grafting of Melia

➤ Grafting was done simultaneously with scion collection in September and mid-October 2012

➤ 72 grafts were done at Kitui RRC for each of the 60 CPTs



2b) IV Planting of Melia Orchards

Planting was carried out in Kitui from 15th -18th December 2012. 1800 clonal grafts were planted in a design that will maximize crossing rather than self pollination among clones



Development of physiological criteria of evaluating variation of drought tolerance in melia

Drought avoidance vis a viz drought tolerance

- Plants ability to survive and or grow under drought depends on morphological adaptation and physiological mechanisms

- Morphological: - Root growth,
 - dormancy (deciduousness)
 - leaves characteristics

- Physiological: - Stomatal
 - Osmotic adjustment
 - Biochemical

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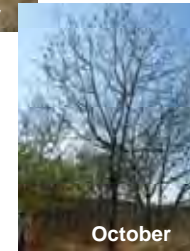
Phenology:- deciduousness



September



November



October



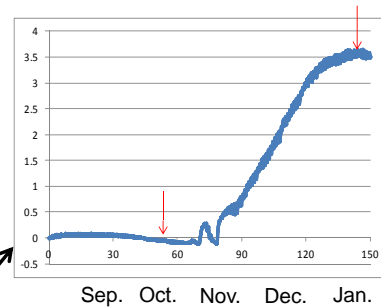
December

DRY SEASON

WET SEASON

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- Growth monitored with dendrometer
- Growth resumed shortly after onset of rains
- Dormancy sets in at onset of dry season

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Clonal variation in growth

- Growth differentiates inferior and superior provenances
- Such variation is mainly genetic if environmental conditions are similar



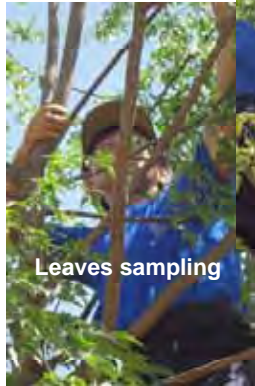
Mwatate inferior



Tseikuru superior

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Physiological evaluation of clonal variation



- Leaves sampled from inferior and superior clones to determine variation in leaf area
- Seeds collected from two clone types to test drought tolerance variation in ½ sib seedlings

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2 c) Extension

- Supply chain and quality seeds and seedlings (Activity 3)

1Market research

Preliminary discussion has started on the current status of the market of seed and seedling production/ distribution, as well as the market needs of timber, to develop the guideline.

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3 Plan of the Second Term

a) DNA Analysis

- To collect specimen and geographical information (continued)
(target; 3 *Melia* and 8 *Acacia* sub-groups)
- To compile the gathered information on the distribution of both species
- To develop and screen markers of *Melia* and *Acacia* (continued)
- To analyze genotypes by using developed markers

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Tree breeding operation (*Melia volkensis*)

Number of plus tree selection

Year	Number	Note
	60	Selected
2012	20	Selection from ASALs
2013	20	Selection from ASALs

Additional planting in seed orchard in 2013

Location	Number of Families to plant	Trees per Family	Number of Trees to plant	Note
Kitui	20	30	600	
Kibwezi	20+α	30	1100	Complementary planting : 25 families

Preparation of progeny trial sites

Progeny Test site : 3 regions (Kitui, Kibwezi, Embu), 3 sites per region
Supplemental Progeny Test site : 3 regions (Tseikuru, Mutha, Mwatate), 1site per region

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Tree breeding operation (*Acacia tortilis*)

Number of plus tree selection (*Acacia tortilis*)

Year	Number	Note
2013	100	Selection from ASALs

Preparation for *Acacia tortilis* seed stand establishment

Seed Stand: Tiva field station and Kibwezi sub Research Station

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Drought tolerance indices

Upon procurement of requisite plant physiology equipment, plant-soil water relations studies will be undertaken.



Soil moisture sensors

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3c) Extension

Activity 3 (Supply chain of quality seed and seedling)

1 Market research

- Survey to grasp market needs (interview/questionnaire survey)
- Analysis of collected data/information

2 Developing production/distribution guideline

- Compilation of tentative guideline

Activity 4 (Extension of quality seed distribution system)

1 Preparing training materials

- Discussion on the structure and contents
- Production of materials

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Tentative Schedule of Training in Japan, 2013

Course	Participant	2012	2013
Project management	PD	9	
	PM	20	
DNA analysis		60	30
		60	30
Breeding theory		45	30
		45	30
Breeding tech		25	25
		25	25
Drought tolerant			30
			30
Total	persons	8	8
	Days	289	230

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Plan of Operation

Activities	2012					Section & Project ID	Responsible Person
	Jan	Feb	Mar	Apr	May		
0 General issue							
0.1 Reception report							
0.2 JCC							
0.3 Evaluation							
0.4 Instructional seminar							
1 DNA analysis							
1.1 Training in Japan							
1.1.1 Determine <i>Melia volkensii</i> and <i>Acacia tortilis</i> accessions based on site acidity and soil nutrient availability							
1.1.2 Collect the specimens, leaf and seed from <i>Melia volkensii</i> populations							
1.1.3 Analyze the SSR DNA markers of <i>Melia volkensii</i> and <i>Acacia tortilis</i>							
1.1.4 Develop SSR markers to analyze the genetic relationship between populations							
1.1.5 Determine the genotypes of collected specimens by using developed SSR markers							
1.2 Develop guidelines for conservation of genetic resources of <i>Melia volkensii</i> and <i>Acacia tortilis</i>							
2 Tree breeding							
2.1 Training in Japan							
2.1.1 Select candidate plus trees of <i>Melia volkensii</i>							
2.1.2 Establish clonal seed orchards of <i>Melia volkensii</i>							
2.1.3 Prepare seed stock of <i>Melia volkensii</i> for grafting propagation							
2.1.4 Selection of clones of candidate plus trees							
2.1.5 Collect grafting propagation, and provide clone seedlings for clonal orchards							
2.1.6 Establish of clonal seed orchard in Kitui and Kilwek							
2.1.7 Evaluation of plus trees of <i>Melia volkensii</i> based on progeny performance							
2.1.8 Select drought tolerant plus trees of <i>Melia volkensii</i>							
2.1.9 Prepare a drought tolerance selection procedure							
2.1.10 Prepare a drought tolerance selection procedure							
2.1.11 Prepare a drought tolerance selection procedure							
2.1.12 Prepare a drought tolerance selection procedure							
2.1.13 Prepare a drought tolerance selection procedure							
2.1.14 Prepare a drought tolerance selection procedure							
2.2 Improve clonal seed orchard of <i>Melia volkensii</i>							
2.2.1 Select seedling material							
2.2.2 Collect seeds of candidate plus trees of <i>Melia volkensii</i>							
2.2.3 Prepare seedling from the collected seeds							
2.2.4 Prepare the seedling seed stand							
2.2.5 Establish the seedling seed stand							
3 Supply chain of Quality seed and seedling							
3.1 Market research							
3.2 Production and distribution guideline							
3.3 Pilot distribution							
3.4 Review and finalize seed distribution guideline							
4 Extension of quality seed distribution system							
4.1 Establish Demonstration forest							
4.2 Prepare Training material							
4.3 Seminar for stakeholders and NGOs							
4.4 Prepare Brochure							
4.5 Third country training							

Annual Plan of Operation (budget year :2012)

Activities	2012					Section & Project ID	Responsible Person
	Jan	Feb	Mar	Apr	May		
0 General issue							
0.1 Reception report							
0.2 JCC							
0.3 Evaluation							
0.4 Instructional seminar							
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1.1 Training in Japan							
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1.1.2 Collect the specimens, leaf and seed, from <i>Melia volkensii</i> populations							
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1.1.4 Develop the SSR DNA markers to analyze the genetic relationship between populations							
1.1.5 Determine the genotypes of collected specimens by using developed SSR markers							
1.2 Develop guidelines for conservation of genetic resources of <i>Melia volkensii</i> and <i>Acacia tortilis</i>							
2 Tree breeding							
2.1 Training in Japan							
2.1.1 Select candidate plus trees of <i>Melia volkensii</i>							
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2.1.14 Prepare a drought tolerance selection procedure							
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2.2.5 Establish the seedling seed stand							
3 Supply chain of Quality seed and seedling							
3.1 Market research							
3.2 Production and distribution guideline							
3.3 Pilot distribution							
3.4 Review and finalize seed distribution guideline							
4 Extension of quality seed distribution system							
4.1 Establish Demonstration forest							
4.2 Prepare Training material							
4.3 Seminar for stakeholders and NGOs							
4.4 Prepare Brochure							
4.5 Third country training							

Annual Plan of Operation (budget year : 2013)

Activities	2013					Section & Project ID	Responsible Person
	Jan	Feb	Mar	Apr	May		
0 General issue							
0.1 JCC							
0.2 Project coordination (dispatching experts)							
0.3 Evaluation							
0.4 Instructional seminar							
1 DNA analysis							
1.1 Training in Japan							
1.1.1 Determine genetic diversity of <i>Melia volkensii</i> and <i>Acacia tortilis</i> populations based on site acidity and soil nutrient availability							
1.1.2 Collect the specimens, leaf and seed, from the collection of <i>Melia volkensii</i> and <i>Acacia tortilis</i> populations by using prepared reporting format, together with photographs and GPS data							
1.1.3 Analyze the gathered information of <i>Melia volkensii</i> and <i>Acacia tortilis</i> into the GIS system and develop the location map of populations							
1.1.4 Consider the location information of populations through the subordinate network of KEFRI, RPN and other available sources							
1.1.5 Implement the ground survey, and finalize the information of <i>Melia volkensii</i> population by using prepared reporting format together with photograph and GPS data							
1.2 Develop guidelines for conservation of genetic resources of <i>Melia volkensii</i> and <i>Acacia tortilis</i>							
2 Tree breeding							
2.1 Training in Japan							
2.1.1 Select candidate plus trees of <i>Melia volkensii</i>							
2.1.2 Establish clonal seed orchards of <i>Melia volkensii</i>							
2.1.3 Prepare seed stock of <i>Melia volkensii</i> for grafting propagation							
2.1.4 Selection of clones of candidate plus trees							
2.1.5 Collect grafting propagation, and provide clone seedlings for clonal seed orchards							
2.1.6 Establish of clonal seed orchard in Kitui and Kilwek							
2.1.7 Evaluation of plus trees of <i>Melia volkensii</i> based on progeny performance							
2.1.8 Select drought tolerant plus trees of <i>Melia volkensii</i>							
2.1.9 Prepare a drought tolerance selection procedure							
2.1.10 Prepare a drought tolerance selection procedure							
2.1.11 Prepare a drought tolerance selection procedure							
2.1.12 Prepare a drought tolerance selection procedure							
2.1.13 Prepare a drought tolerance selection procedure							
2.1.14 Prepare a drought tolerance selection procedure							
2.2 Improve clonal seed orchard of <i>Melia volkensii</i>							
2.2.1 Select seedling material							
2.2.2 Collect seeds of candidate plus trees of <i>Melia volkensii</i>							
2.2.3 Prepare seedling from the collected seeds							
2.2.4 Prepare the seedling seed stand							
2.2.5 Establish the seedling seed stand							
3 Supply chain of Quality seed and seedling							
3.1 Market research							
3.2 Production and distribution guideline							
3.3 Pilot distribution							
3.4 Review and finalize seed distribution guideline							
4 Extension of quality seed distribution system							
4.1 Establish Demonstration forest							
4.2 Prepare Training material							
4.3 Seminar for stakeholders and NGOs							
4.4 Prepare Brochure							
4.5 Third country training							

Thank you



Kitui Seed Orchard, 01/02/2013

Plan of Operation

Activities	1st term		2nd term			3rd term			4th term			5th term			Section & Program in KEFRI	Responsible Person		
	2012		2013			2014			2015			2016				KEFRI	JICA	
	3	4	1	2	3	4	1	2	3	4	1	2	3	4		1	2	
0 General issue																		Chief Advisor Dr Fujisawa
0.1 Inception report	+																	
0.2 JCC		+																
0.3 Evaluation																		
0.4 Intrnational seminar																		
1 DNA analysis																		Dr. Hanaoka
1.0 Training in Japan																		
1.1 Delineate <i>Melia volkensii</i> and <i>Acacia tortilis</i> populations based on site aridity and altitude																	GIS STD	Mr. Kiama
1.2 Determine genetic diversity of <i>Melia volkensii</i> and <i>Acacia tortilis</i> population																	Biotechnology DFP	Mr. Machua
1.2.1 Collect the specimens, leaf and seed, from <i>Melia volkensii</i> populations																		
1.2.2 Develop the SSR DNA markers of <i>Melia volkensii</i> and <i>Acacia tortilis</i>																		
1.2.3 Screen developed SSR markers in order to figure out genetic relationship between populations																		
1.2.4 Determine the genotypes of collected specimens by using developed SSR markers																		
1.3 Develop guideline for conservation of genetic resources of <i>Melia volkensii</i> and <i>Acacia tortilis</i>																		
2 Tree breeding																	Tree Breeding, DFP	Mr. Kariuki Dr. Miyashita
2.0 Training in Japan																		
2.1 Select candidate plus trees of <i>Melia volkensii</i>																		
2.2 Establish clonal seed orchards of <i>Melia volkensii</i>																		
2.2.1 Prepare root stock of <i>Melia volkensii</i> for grafting propagation																		
2.2.2 Collect twigs or scions of candidate plus trees																		
2.2.3 Conduct grafting propagation, and provide clone seedlings for clonal orchards																		
2.2.4 Establish of clonal seed orchard in Kitui and Kibwezi																		
2.3 Evaluation of plus trees of <i>Melia volkensii</i> based on progeny performance																		
2.4 Select drought tolerant from candidate <i>Melia volkensii</i> plus trees																		
2.4.1 Prepare a drought tolerant selection procedure																		
2.4.2 Consider the potential indicators for drought tolerant selection																		
2.4.3 Select drought tolerant index																		
2.4.4 Select drought tolerant <i>Melia volkensii</i> by index																		
2.5 Improve clonal seed orchards of <i>Melia volkensii</i>																		
2.6 Establish seedling seed stand of <i>Acacia tortilis</i>																		Mr. Machua and Mr. Omondi
2.6.1 Collect seeds of candidate plus tree of <i>Acacia tortilis</i>																		
2.6.2 Propagate seedling from the collected seeds																		
2.6.3 Prepare the seedling seed stand																		
2.6.4 Establish the seedling seed stand																		
3 Supply chain of Quality seed and seedling																	Seed Research TSP	Mr. Bernard Kamondo Chief Advisor Dr. Fujisawa
3.1 Market research																		
3.2 Production and distribution guideline																		
3.3 Pilot distribution																		
3.4 Revise and finalize seed distribution guideline																		
4 Extention of quality seed distribution system																	DFP	Mr. Giathi (Kitui) Mr. Muchiri (Kibwezi) Chief Advisor Dr. Fujisawa
4.1 Establish Demonstration forest																		Mr. Giathi (Kitui) Mr. Muchiri (Kibwezi)
4.2 Training material																		
4.3 Seminer for stakeholders and NGOs																		
4.4 Brouchure																		
4.5 Third country training																		

Annual Plan of Operation 2013

Activities	2013												2014			Section & Program in KEFRI	Responsible Person	
	1st Q				2nd Q				3rd Q				4th Q				KEFRI	JICA
	4	5	6	7	8	9	10	11	12	1	2	3						
0 General issue																		
0.1 Inception report																	Chief Advisor Dr. Fujisawa	
0.2 JCC																		
0.2.1 Project coordination (dispatching experts)																		
0.3 Evaluation																		
0.4 International seminar																		
1 DNA analysis																	Dr. Hanaoka	
1.0.1 Training in Japan																		
1.0.2 Dispatch expert																		
1.1 Delineate <i>Melia volkensii</i> and <i>Acacia tortilis</i> populations based on site aridity and altitude															GIS STD	Mr. Kiama		
1.1.1 Implement the ground survey, and gather the information of <i>Melia volkensii</i> and <i>Acacia tortilis</i> population by using prepared reporting format together with photograph and GPS data																		
1.1.2 Compile the gathered information of <i>Melia volkensii</i> and <i>Acacia tortilis</i> into the GIS system and develop the location map of populations																		
1.1.3 Consider to develop GIS system for information integration																		
1.2 Determine genetic diversity of <i>Melia volkensii</i> and <i>Acacia tortilis</i> population															Biotechnology DFP	Mr. Machua		
1.2.1 Collect the specimens, leaf and seed, from <i>Melia volkensii</i> populations																		
1.2.2 Develop the SSR DNA markers of <i>Melia volkensii</i> and <i>Acacia tortilis</i>																		
1.2.3 Screen developed SSR markers in order to figure out genetic relationship between populations																		
1.2.4 Determine the genotypes of collected specimens by using developed SSR markers																		
1.3 Develop guideline for conservation of genetic resources of <i>Melia volkensii</i> and <i>Acacia tortilis</i>																		
2 Tree breeding															Tree Breeding, DFP	Mr. Kariuki	Dr. Miyashita	
2.0.1 Training in Japan																		
2.0.2 Dispatch expert																		
2.1 Select candidate plus trees of <i>Melia volkensii</i>																		
2.1.1 Conduct plus tree selection																		
2.2 Establish clonal seed orchards of <i>Melia volkensii</i>																		
2.2.1 Prepare eight thousands root stock of <i>Melia volkensii</i> for grafting																		
2.2.2 Collect twigs or scions of candidate plus trees																		
2.2.3 Conduct grafting propagation, and provide clone seedlings for clonal seed orchards																		
2.2.4 Planting in clonal seed orchard in Kitui and Kibwezi																		
2.3 Evaluation of plus trees of <i>Melia volkensii</i> based on progeny performance																		
2.3.1 Prepare the plantation sites of <i>Melia volkensii</i> for Progeny test																		
2.4 Select drought tolerant from candidate <i>Melia volkensii</i> plus trees																		
2.4.1 Prepare a small size progeny test for drought tolerant																		
2.4.2 Photosynthesis rate measurement																		
2.4.3 Chlorophyll fluorescence measurement																		
2.4.4 Hydropotential analysis																		
2.4.5 Morphologic analysis																		
2.5 Improve clonal orchards of <i>Melia volkensii</i>																		
2.6 Establish seedling seed stand of <i>Acacia tortilis</i>																		
2.6.1 Collect seeds of candidate plus tree of <i>Acacia tortilis</i>																		
2.6.2 Propagate seedlings from the collected seeds																		
2.6.3 Prepare the seedling seed stand of <i>Acacia tortilis</i>																		
3 Supply chain of Quality seed and seedling															Seed Research TSP	Mr. Bernard Kamondo	Chief Advisor Dr. Fujisawa	
3.1 Market research																		
3.2 Production and distribution guideline																		
3.3 Pilot distribution																		
3.4 Revise and finalize Seed Distribution Guideline																		
4 Extention of quality seed distribution system															DFP	Mr. Giathi (Kitui) Ms. Musyoki (Kibwezi)	Chief Advisor Dr. Fujisawa	
4.1 Establish Demonstration Forest																	Mr. Giathi (Kitui) Ms. Musyoki (Kibwezi)	
4.2 Prepare Training material																		
4.3 Seminer for stakeholders and NGOs																		
4.4 Brouchure distribution																		
4.5 Third country training																		