Appendix-6

Record of Discussion and Amendment

RECORD OF DISCUSSIONS

ON

THE PROJECT FOR ENHANCING NATIONAL FOREST MONITORING SYSTEM FOR THE PROMOTION OF SUSTAINABLE NATURAL RESOURCE MANAGEMENT

IN

THE REPUBLIC OF BOTSWANA

AGREED UPON BETWEEN

MINISTRY OF ENVIRONMENT, WILDLIFE AND TOURISM

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Gaborone, 28 November 2012

熊谷信弘

Mr. Nobuhiro KUMAGAI
For/Chief Representative
South Africa Office
Japan International Cooperation Agency

Mr. Edmont B. Moabi
Permanent Secretary
Ministry of Environment, Wildlife and Tourism,
The Republic of Botswana

Based on the minutes of meetings on the Detailed Planning Survey on the "Forest Resource Management based on Sharing with Community and Wildlife" signed on 11 July, 2012 (Appendix 3) between the Ministry of Environment, Wildlife and Tourism (hereinafter referred to as "MEWT") represented by the Department of Forestry and Range Resources (hereinafter referred to as "DFRR") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA held a series of discussions with MEWT and relevant organizations to develop a detailed plan of "the Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management" (hereinafter referred to as "the Project").

Both parties agreed the details of the Project and the main points discussed as described in Appendix 1 and Appendix 2 respectively.

Both parties also agreed that MEWT, the counterpart to JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of the Republic of Botswana.

The Project will be implemented within the Note Verbale exchanged on 12 January 2012 between the Government of Japan (hereinafter referred to as "GOJ") and the Government of Botswana (hereinafter referred to as "GOB"). (Appendix 4)

Appendix 1: Project Description
Appendix 2: Main Points Discussed
Appendix 3: Minutes of Meetings on the Detailed Planning Survey
Appendix 4: Note Verbale (BOT/122/01/11)

Appendix 1

PROJECT DESCRIPTION

I. BACKGROUND

The total land area of Botswana is 582, 000 km^2 including 113,000 km^2 of forest areas (FAO2010). The country has remarkably rich, diverse and globally famous ecosystems such as Okavango Delta and Chobe National Park where a lot of rare species are found. The forests in Botswana are important natural resources not only for the habitat of rare species but also for local economies to obtain various materials and products such as fuel wood, mopane warm and palm.

These rich ecosystems are also expected to be a means of diversifying country's economy through promotion of ecotourism since Botswana's economy heavily depends on diamonds. However, in recent years, increasing pressures on forests become apparent by frequent forest fires, overuse of forest resources by local communities and damage caused by over populated elephants.

To address these issues, GOB has established several policies and acts since 1990, including "Vision2016", "National Development Plan 10" and "Botswana National Conservation Strategy", and been promoting community-based natural resource management. In order to formulate appropriate community-based forest management plans, it is necessary to figure out the state of forest resources and update it through regular monitoring. However, GOB is facing several challenges to establish such a system due to insufficient knowledge, experiences and human resources of DFRR.

Under the circumstances, GOB requested the cooperation of GOJ for establishing nation-wide forest distribution maps and unified national forest inventory system, as well as preparation of community participatory forest resource management plan in modeled areas and practicing that plan in pilot communities.

In response to the request, GOJ and JICA has dispatched a survey team and discussed an outline of the Project with DFRR. As a result of discussions, GOB and JICA agreed that the Project will focus on the development of a nation-wide forest distribution map, national forest inventory system, forest GIS database, national forest monitoring plan and capacity building of the relevant personnel of DFRR for these activities.

II. OUTLINE OF THE PROJECT

1. Title of the Project

The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management

2. Expected Goals which will be attained after the Project Completion

(1) Goal of the Proposed Plan

The state of forests in the country is accurately updated through regular monitoring utilizing the national forest monitoring system.

(2) Goal which will be attained by utilizing the Proposed Plan

Sustainable Forest Management in the country is promoted by sharing and utilizing information obtained through national forest monitoring among relevant stakeholders including government agencies and local communities.

3. Outputs

(1) A nation-wide forest distribution map, as a benchmark forest map, is produced.
(2) A methodology for the national forest inventory is established.
(3) DFRR is equipped with a forest geographic information system (GIS) database.
(4) A national forest monitoring plan is developed.

4. Activities

1-1. Make a basic training plan on the utilization of remote-sensing for the relevant personnel of DFRR.
1-2. Conduct basic training on the utilization of remote-sensing for the relevant personnel of DFRR.
1-3. Define specifications of satellite images based on the utilization purpose of the forest distribution map and obtain the necessary satellite images.
1-4. Consider preliminary forest type classification.
1-5. Conduct primary interpretation and analysis of satellite images.
1-6. Conduct ground truth to verify the result of primary interpretation and analysis of satellite images.
1-7. Conduct secondary interpretation and analysis of satellite images based on the result of 1-6, as necessary.
1-8. Conduct ground truth to verify the result of secondary interpretation and analysis of satellite images, as necessary.
1-9. Finalize the forest type classification based on the result of 1-5, 1-6, 1-7, and 1-8.
1-10. Produce a nation-wide forest distribution map, as a benchmark forest map, in accordance with the finalized forest type classification.
1-11. Compile a manual covering the process from 1-1 to 1-9 to be utilized by DFRR.

2-1. Review methods and results of the past forest inventory implemented in Botswana.

2-2. Consider improved methods and procedures of national forest inventory.
2-3. Conduct ground surveys in pilot areas based on 2-2.
2-4. Compile the results of ground surveys.
2-5. Review and finalize the methods and procedures of national forest inventory.
2-6. Compile a manual for national forest inventory to be utilized by DFRR.

3-1. Make a basic training plan on the utilization of forest GIS for the relevant personnel of DFRR.
3-2. Conduct basic training on the utilization of forest GIS for the relevant personnel of DFRR.
3-3. Consider the utilization method of forest GIS at DFRR HQ and DFRR District Offices.
3-4. Investigate and obtain spatial data available in Botswana and store them in forest GIS database.
3-5. Store the data set of nation-wide forest distribution map and national forest inventory in forest GIS database.
3-6. Demonstrate the utilization of forest GIS for pilot areas.
3-7. Verify the function of forest GIS database and improve it, as necessary.
3-8. Compile a manual for forest GIS to be utilized by DFRR.

4-1. Consider design and utilization policy of national forest monitoring system integrated the above-mentioned outputs 1, 2 and 3.
4-2. Establish national forest monitoring plan based on 4-1.

5. Input
(1) Input by JICA
(a) Dispatch of Mission
Team Leader
Remote Sensing
Forest GIS/Database
Forest Inventory
Coordinator
(b) Training in Japan and/or other countries
(c) Necessary equipment (A tentative list of equipment is shown in the Annex 4.)

Input other than indicated above will be determined through mutual consultations between JICA and MEWT during the implementation of the Project, as necessary.
All equipment procured relevant to the Project implementation will remain as the property of GOB by the end of the Project period.

(2) Input by MEWT
MEWT will take necessary measures to provide at its own expense:

(a) Services of MEWT's counterpart personnel and administrative personnel as referred to in II-6;
(b) Suitably furnished office space

(c) Maintenance of all government property to be used for the implementation of the Project;
(d) Information as well as support in obtaining medical service;
(e) Credentials or identification cards;
(f) Available data (including maps and photographs) and information related to the Project;
(g) Water, electricity and internet necessary for the implementation of the Project;
(h) Expenses necessary for transportation within the Republic of Botswana of the equipment referred to in II-5 (1) c as well as for the installation, operation and maintenance thereof; and

6. Implementation Structure

The Project organization chart is given in the Annex 1. The roles and assignments of relevant organizations are as follows:

(1) MEWT

(a) Director of DFRR will be responsible for overall administration and implementation of the Project as the Project Director.
(b) Principal Scientific Officer I or higher of DFRR will be responsible for the management and coordination between relevant divisions of the Project as the Project Manager.
(c) Personnel of DFRR will be assigned to carry out project activities under the guidance of the Project Director and the Project Manager.

(2) JICA Experts

The JICA experts will give necessary technical guidance, advice and recommendations to MEWT on any matters pertaining to the implementation of the Project.

(3) Joint Coordinating Committee

Joint Coordinating Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held whenever deems it necessary. A list of proposed members of JCC is shown in the Annex 2.

(4) Technical Working Group

Technical Working Group (hereinafter referred to as "TWG") will be established to discuss technical and administrative issues relevant to the Project and to share the progress of the Project. TWG will include personnel of DFRR and JICA Experts and hold the meeting on regular basis in order to secure the smooth implementation of the Project.

7. Project Site(s) and Beneficiaries

(1) Project site

The target area is the whole area of the Republic of Botswana.

(2) Beneficiaries

(a) Direct: Personnel of MEWT and relevant organizations engaged in forest monitoring

(b) Indirect: the whole nationals of the Republic of Botswana

8. Duration
The duration of the Project will be three (3) years from February 2013. A tentative plan of operation is shown in the Annex 3.

9. Reports
JICA in cooperation with DFRR will prepare and submit the following reports to the MEWT. All these reports will also be submitted electronically.

(1) 20 copies of Inception Report at the commencement of the first work period in the Republic of Botswana in English.
(2) 20 copies of Interim Report at the time about 18 months after the commencement of the first work period in the Republic of Botswana in English.
(3) 20 copies of Draft Final Report at the end of the last work period in the Republic of Botswana in English.
(4) 25 copies of Final Report within one (1) month after the receipt of the comments on the Draft Final Report in English.

10. Environmental and Social Considerations
MEWT and JICA agreed to take into consideration the guidelines on environmental and social matters of both sides.

III. UNDERTAKINGS OF MEWT AND GOB

1. MEWT and GOB will take necessary measures to:

(i) ensure that the technologies and knowledge acquired by the Republic of Botswana nationals as a result of Japanese technical cooperation contributes to the economic and social development of the Republic of Botswana, and that the knowledge and experience acquired by the personnel of the Republic of Botswana from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project; and

(ii) grant privileges, exemptions and benefits to members of the JICA missions referred to in II-5 (1) above and their families, which are no less favorable than those granted to experts and members of the missions and their families of third countries or international organizations performing similar missions in the Republic of Botswana.

2. Other privileges, exemptions and benefits will be provided in accordance with the Note Verbale exchanged on 12 January 2012 between the GOJ and the Ministry of Foreign Affairs and International Cooperation of GOB (Appendix 4).

IV. EVALUATION

JICA will conduct the following evaluations and surveys to mainly verify

sustainability and impact of the Project and draw lessons. The MEWT is required to provide necessary support for them.

1. Ex-post evaluation three (3) years after the project completion, in principle
2. Follow-up surveys on necessity basis

V. PROMOTION OF PUBLIC SUPPORT

For the purpose of promoting support for the Project, MEWT will take appropriate measures to make the Project widely known to the people of the Republic of Botswana.

VI. MUTUAL CONSULTATION

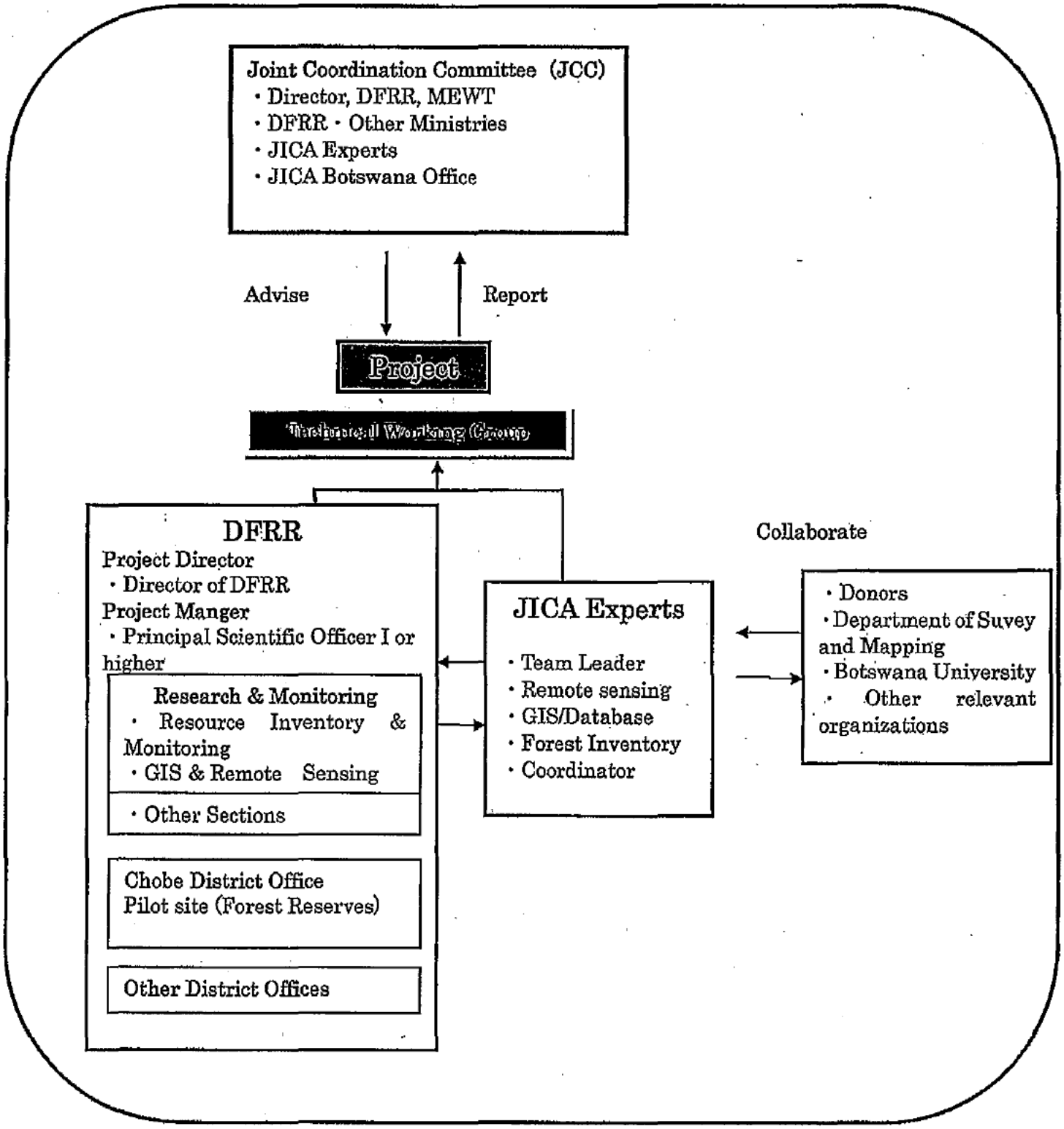
JICA and MEWT will consult each other whenever any major issues arise in the course of Project implementation.

VII. AMENDMENTS

The record of discussions may be amended by the minutes of meetings between JICA and MEWT.
The minutes of meetings will be signed by authorized persons of each side who may be different from the signers of the record of discussions.

Annex 1: Project Organization Chart
Annex 2: Functions and List of Proposed Members of Joint Coordinating Committee
Annex 3: Plan of Operation (PO) (Tentative)
Annex 4: List of Equipment (Tentative)

Annex 1: Project Organization Chart



Annex 2: Functions and List of Proposed Members of Joint Coordinating Committee

1. Functions

The Joint Coordinating Committee (JCC) will be established. The JCC will be held whenever deems it necessary. The functions of the JCC are as follows:

(1) To facilitate coordination with relevant authorities
(2) To review the overall progress of the project activities; and
(3) To review and exchange views on major issues arising from or in concerning the Project and recommend corrective measures.

2. Composition

(1) Chairperson: Director of DFRR, MEWT
(2) Members:
  (a) Botswana side
  - Director of DFRR, MEWT
  - Director of Department of Wildlife and National Parks, MEWT
  - Director of Environmental Affairs, MEWT
  - Representatives of the Ministry of Finance
  - Representatives of the Ministry of Foreign Affairs and International Cooperation
  - Representatives of Department of Survey and Mapping, the Ministry of Land and Housing
  - Other personnel concerned with the Project appointed by the Chairperson if necessary

  (b) Japanese side
  - JICA Mission Members
  - Resident Representative, JICA Botswana Office
  - Other personnel concerned, to be nominated by JICA if necessary

NOTE:
- The Chairperson may request and admit attendance of other personnel concerned with the Project, as needed.
- Official(s) of the Embassy of Japan may attend the JCC as observer(s).

Annex 3: Plan of Operation (PO) (Tentaltive)

Project Name: The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management
Project Area: The Whole Country of Botswana
Duration: Three Years starting from February 2013 (Tentative)
Target Beneficiaries: Department of Forest and Range Resource (DFRR)

As of July 11, 2012

Outputs	Activities	Responsible ecological person	
		DFRR	JICA
1. A nation-wide forest distribution map, as a benchmark forest map, is produced.			
1-1	Make a basic training plan on the utilization of remote-sensing for the relevant personnel of DFRR.	Senior Scientific Officer/ Scientific Officer	RS Expert
1-2	Conduct basic training on the utilization of remote-sensing for the relevant personnel of DFRR.	Senior Scientific Officer/ Scientific Officer	RS Expert
1-3	Define specifications of satellite images based on the utilization purpose of the forest distribution map and obtain the necessary satellite images.	Technical Officer/ Scientific Officer	RS Expert
1-4	Consider preliminary forest type classification.	Technical Officer/ Scientific Officer	RS Expert
1-5	Conduct primary interpretation and analysis of satellite images.	Technical Officer/ Scientific Officer	RS Expert
1-6	Conduct ground truth to verify the result of primary interpretation and analysis of satellite images.	Technical Officer/ Scientific Officer	RS Expert
1-7	Conduct secondary interpretation and analysis of satellite images based on the result of 1-6, as necessary.	Technical Officer/ Scientific Officer	RS Expert
1-8	Conduct ground truth to verify the result of secondary interpretation and analysis of satellite images, as necessary.	Technical Officer/ Scientific Officer	RS Expert
1-9	Finalize the forest type classification based on the result of 1-5, 1-6, and 1-7.	Technical Officer/ Scientific Officer	RS Expert
1-10	Produce a nation-wide forest distribution map, as a benchmark forest map, in accordance with the finalized forest type classification.	Technical Officer/ Scientific Officer	RS Expert
1-11	Compile a manual covering the process from 1-1 to 1-9 to be utilized by DFRR.	Technical Officer/ Scientific Officer	RS Expert
2. A methodology for the national forest inventory is established.			
2-1	Review methods and results of the past forest inventory implemented in Botswana.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert
2-2	Examine improved methods and procedures of national forest inventory.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert
2-3	Conduct ground surveys in pilot areas based on 2-2.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert
2-4	Compile the results of ground surveys.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert
2-5	Review and finalize the methods and procedures of national forest inventory.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert
2-6	Compile a manual for national forest inventory to be utilized by DFRR.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert
3. DFRR is equipped with a forest geographic information system (GIS) database.			
3-1	Make a basic training plan on the utilization of forest GIS for the relevant personnel of DFRR.	Senior Scientific Officer/ Scientific Officer	GIS Expert
3-2	Conduct basic training on the utilization of forest GIS for the relevant personnel of DFRR.	Senior Scientific Officer/ Scientific Officer	GIS Expert
3-3	Consider the utilization method of forest GIS at DFRR HQ and DFRR District Offices.	Senior Scientific Officer/ Scientific Officer	GIS Expert
3-4	Investigate and obtain spatial data available in Botswana and store them in forest GIS database.	Senior Scientific Officer/ Scientific Officer	GIS Expert
3-5	Store the data set of nation-wide forest distribution map and national forest inventory in forest GIS database.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	GIS Expert
3-6	Demonstrate the utilization of forest GIS for pilot areas.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	GIS Expert
3-7	Verify the function of forest GIS database and improve it, as necessary.	Senior Scientific Officer/ Scientific Officer	GIS Expert
3-8	Compile a manual for forest GIS to be utilized by DFRR.	Senior Scientific Officer/ Scientific Officer	GIS Expert
4. A national forest monitoring plan is developed.			
4-1	Consider design and utilization policy of national forest monitoring system integrated the above-mentioned outputs 1, 2 and 3.	All Project Officers	All Experts
4-2	Establish national forest monitoring plan based on 4-1.	All Project Officers	All Experts

Annex 4. List of Equipment (Tentative)

Item	Quantity	
	HQ	District Office
Software		
1 GIS Software		
ArcGIS (ArcInfo License)	1	
ArcGIS (ArcEditor License)	1	
ArcGIS 3D Analyst	2	
ArcGIS Spatial Analyst	2	
2 Remote-Sensing analysis software		
ENVI Floating License	2	
ENVI Atmospheric Correction Module	2	
ENVI DEM Extraction Module	2	
ENVI Orthorectification Module	2	
ENVI Ex Module	2	
eCognition Developer	1	
eCognition Architect	1	
3 LANDSAT satellite images	1	
4 High resolution satellite images	1	
Hardware for GIS/Remote-Sensing		
5 Personnal Computers	4	1
6 UPS	4	1
7 Network Attached Storage (NAS)	1	1
8 A0 Plotter	1	
9 A3 Colour-page Printers	1	1
10 A0 Scanner	1	
11 Anti-virus softwares	4	1
12 Office-softwares (Word-processer, Spreadsheat, Acrobat Pro, etc...)	4	1
13 Equipments for network (Cable, hub, ...)	1	
14 Consumable items for Plotters, Printers	1	1
Ground Truth for Remote-Sensing		
15 Handy-type GPS	7	3
16 Digital Cameras	4	1
Forest Inventory Surveys		
17 Hypsometer Haga	5	
18 Bitterlich	3	
19 Hypsometer BLUME-LEISS	5	
20 Clinometer Suunto	5	
21 Compass	5	
22 Calipers	5	
23 Diameter Tapes	10	
24 Measuring Tapes	5	
25 Ranging Rod	10	
26 Tree Tags	10000	
Other equipments		
27 Automobiles (4WD/ Pick up double cabin)	1	1
28 Multi Function Printer (Scanning, Copying)	1	
29 Projectors	1	1

Appendix 2

MAIN POINTS DISCUSSED

Both parties confirmed that:

i) DFRR will formulate a project team consisted of enough number of relevant personnel who work with the members of the JICA missions referred to in II-5 (1) (a) above in order to secure the smooth implementation of the project activities and to maximize the transfer of skills and technology developed by the Project;

ii) expected outputs and information generated from the Project, such as a nation-wide forest distribution map, forest GIS database, national forest monitoring plan and relevant manuals, will belong to GOB and will be fully utilized for the economic and social development of the Republic of Botswana; and

iii) the Project is expected to contribute to mitigation of and adaptation to climate change.

Appendix 3

MINUTES OF MEETINGS ON THE DETAILED PLANNING SURVEY

Minutes of Meetings sighed on 11 July 2012 by both parties is attached.

Appendix 4

REPUBLIC OF BOTSWANA

NOTE NO: EA 16/7 XLIII (30) H6

The Ministry of Foreign Affairs and International Cooperation of the Republic of Botswana presents its complements to the Embassy of Japan and has the honour to invite reference to the Embassy's note verbale reference no. BOT/122/01/11 in regards to the project named "Forest Resource Management based on sharing with Community and Wildlife".

The Ministry has further the honour to inform the esteemed Embassy that it agrees to all the terms of the Embassy's note verbale.

The Ministry of Foreign Affairs and International Cooperation availls itself of this opportunity to renew to the Embassy of Japan the assurances of its highest consideration.

12 January 2012

Gaborone

Embassy of Japan

Gaborone

Embassy of Japan

Private Bag 00222 Tel: 3914456
Gaborone, Botswana Fax: 3914468

NOTE VERBALE

BOT/122/01/11

The Embassy of Japan in Botswana presents its compliments to the Ministry of Foreign Affairs and International Cooperation of the Republic of Botswana and has the honor to refer to recent discussions held between representatives of the Government of Japan and the Government of Botswana concerning the project on "Forest Resource Management based on Sharing with Community and Wildlife", and to propose the following:

1. The "Forest Resource Management based on Sharing with Community and Wildlife" project will be carried out by the Japan International Cooperation Agency (hereinafter referred to as "JICA") in accordance with the relevant laws and regulations of Japan.

2. The Government of Botswana shall accord privileges, immunities and other benefits to the Japanese survey team necessary for the implementation of the project, and shall take necessary measures to ensure security of the survey team members.

3. The details and procedures for cooperation in the present understanding, including specific privileges, immunities and other benefits to be accorded to the Japanese survey team as mentioned in paragraph 2. above, will be provided for in the arrangements to be agreed upon between JICA and the Ministry of Environment, Wildlife and Tourism.

The Embassy of Japan has further the honour to propose that the present Note Verbale and the Ministry's Note Verbale in reply accepting on behalf of the Government of Botswana the foregoing proposal, shall be regarded as constituting an agreement between the two Governments, which shall enter into force on the date of the Ministry's Note Verbale in reply.

The Embassy of Japan in Botswana avails itself of this opportunity to renew to the Ministry of Foreign Affairs and International Cooperation of the Republic of Botswana the assurances of its highest consideration.

Embassy of Japan

Gaborone

17th November, 2011

EMBASSY OF JAPAN · 日本国大使館 · BOTSWANA

MINUTES OF MEETING
BETWEEN
THE JAPANESE DETAILED PLANNING SURVEY TEAM
AND
BOTSWANA GOVERNMENT REPRESENTATIVES
ON
JAPANESE TECHNICAL COOPERATION
FOR
THE PROJECT OF FOREST RESOURCE MANAGEMENT BASED ON SHARING WITH COMMUNITY AND WILDLIFE

The Japanese Detailed Planning Survey Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Hiroki MIYAZONO, visited the Government of Botswana (hereinafter referred to as "GOB") from 28 June 2012 to 15 July 2012, for the purpose of formulating the technical cooperation project of "Forest Resource Management based on Sharing with Community and Wildlife" (hereinafter referred to as "the Project").

During its stay, the Team had a series of discussions and exchanged views on the Project with the Botswana government representatives.

As a result of the discussions, the Team and the Botswana Government representatives agreed on the matters referred to in the document attached hereto.

Gaborone, 11 July 2012

Mr. Hiroki MIYAZONO
Leader
Detailed Planning Survey Team
Japan International Cooperation Agency

Mr. Edmont B. Moabi
Permanent Secretary
Ministry of Environment, Wildlife and Tourism,
The Republic of Botswana

THE ATTACHED DOCUMENT

Both sides agreed on the following points.

1. Title of the Project

Considering the objectives and content of the Project, the project title should be changed to "the Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management".

2. Framework of the Project

The draft Record of Discussion (hereinafter referred to as "R/D") which stipulates the framework of the Project is appropriate. The agreed draft R/D is shown in ANNEX I.

3. Coordination among relevant organizations

The Ministry of Environment, Wildlife and Tourism (hereinafter referred to as "MEWT") represented by the Department of Forestry and Range Resources (hereinafter referred to as "DFRR") will be responsible for ensuring coordination among organizations relevant to the Project.

4. Synergy with other projects

MEWT will ensure that the inputs and achievements of other relevant projects will be effectively utilized so that the impact of the Project is enhanced.

5. Establishment of Technical Working Group

The Project will establish the Technical Working Group to facilitate the development of national forest monitoring system. The group will include technical personnel from DFRR and JICA Project team members.

6. Appointment of necessary personnel

DFRR will endeavor to appoint and maintain personnel necessary for the effective implementation of the Project including officers responsible for remote sensing, GIS database, forest inventory and forest management.

7. Securing of budget

DFRR will endeavor to cover, within its allocated budget, the cost of inputs to be provided by GOB set forth in the R/D.

8. Capacity enhancement

Capacity enhancement will be mainstreamed into all activities of the Project. Both

structured and on-the-job training will be given to officers engaged in the Project so that DFRR will be able to continue forest inventory and forest management on its own after the completion of the Project.

9. Dissemination of project results

DFRR will endeavor to share the achievements of the Project and the lessons learned with other countries through mechanisms such as the Southern African Development Community (SADC).

10. Ensuring sustainability

DFRR will endeavor to ensure that the achievements of the Project will be sustained and enhanced after the termination of the Project.

11. Provisional schedule until project commencement

The signing of the R/D is expected in September 2012, after the completion of internal procedures for project approval by JICA. The commencement of the Project is expected in February 2013.

ANNEX I Draft R/D

ANNEX I

(Draft)

RECORD OF DISCUSSIONS

ON

THE PROJECT FOR ENHANCING NATIONAL FOREST MONITORING SYSTEM FOR THE PROMOTION OF SUSTAINABLE NATURAL RESOURCE MANAGEMENT

IN

THE REPUBLIC OF BOTSWANA

AGREED UPON BETWEEN

MINISTRY OF ENVIRONMENT, WILDLIFE AND TOURISM

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Gaborone, [date]

Mr. Toshiyuki NAKAMURA Chief Representative, South Africa Office, Japan International Cooperation Agency	Mr. Edmont B. Moabi Permanent Secretary Ministry of Environment, Wildlife and Tourism, The Republic of Botswana

Based on the minutes of meetings on the Detailed Planning Survey on the "Forest Resource Management based on Sharing with Community and Wildlife" signed on 11 July, 2012 between the Ministry of Environment, Wildlife and Tourism (hereinafter referred to as "MEWT") represented by the Department of Forestry and Range Resources (hereinafter referred to as "DFRR") and the Japan International Cooperation Agency (hereinafter referred to as "JICA"), JICA held a series of discussions with MEWT and relevant organizations to develop a detailed plan of "the Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management" (hereinafter referred to as "the Project").

Both parties agreed the details of the Project and the main points discussed as described in Appendix 1 and Appendix 2 respectively.

Both parties also agreed that MEWT, the counterpart to JICA, will be responsible for the implementation of the Project in cooperation with JICA, coordinate with other relevant organizations and ensure that the self-reliant operation of the Project is sustained during and after the implementation period in order to contribute toward social and economic development of the Republic of Botswana.

The Project will be implemented within the Note Verbale exchanged on 12 January 2012 between the Government of Japan (hereinafter referred to as "GOJ") and the Ministry of Foreign Affairs and International Cooperation of the Republic of Botswana (hereinafter referred to as "ROB"). (Appendix 4)

Appendix 1: Project Description
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Appendix 3: Minutes of Meetings on the Detailed Planning Survey
Appendix 4: Note Verbale (BOT/122/01/11)

Appendix 1

PROJECT DESCRIPTION

Both parties confirmed that there is no change in the Project Description agreed on in the minutes of meetings on the concerning Preparatory Survey on the Project signed on 11 July, 2012(Appendix 3).

I. BACKGROUND

The total land area of Botswana is 582, 000 km^2 including 113,000 km^2 of forest areas (FAO2010). The country has remarkably rich, diverse and globally famous ecosystems such as Okavango Delta and Chobe National Park where a lot of rare species are found. The forests in Botswana are important natural resources not only for the habitat of rare species but also for local economies to obtain various materials and products such as fuel wood, mopane warm and palm.

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To address these issues, ROB has established several policies and acts since 1990, including "Vision2016", "National Development Plan 10" and "Botswana National Conservation Strategy", and been promoting community-based natural resource management. In order to formulate appropriate community-based forest management plans, it is necessary to figure out the state of forest resources and update it through regular monitoring. However, ROB is facing several challenges to establish such a system due to insufficient knowledge, experiences and human resources of DFRR.

Under the circumstances, ROB requested the cooperation of GOJ for establishing nation-wide forest distribution maps and unified national forest inventory system, as well as preparation of community participatory forest resource management plan in modeled areas and practicing that plan in pilot communities.

In response to the request, GOJ and JICA has dispatched a survey team and discussed an outline of the Project with DFRR. As a result of discussions, ROB and JICA agreed that the Project will focus on the development of a nation-wide forest distribution map, national forest inventory system, forest GIS database, national forest monitoring plan and capacity building of the relevant personnel of DFRR for these activities.

II. OUTLINE OF THE PROJECT

1. Title of the Project

The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management

2. Expected Goals which will be attained after the Project Completion

(1) Goal of the Proposed Plan

The state of forests in the country is accurately updated through regular monitoring utilizing the national forest monitoring system.

(2) Goal which will be attained by utilizing the Proposed Plan

Sustainable Forest Management in the country is promoted by sharing and utilizing information obtained through national forest monitoring among relevant stakeholders including government agencies and local communities.

3. Outputs

1. A nation-wide forest distribution map, as a benchmark forest map, is produced.
2. A methodology for the national forest inventory is established.
3. DFRR is equipped with a forest geographic information system (GIS) database.
4. A national forest monitoring plan is developed.

4. Activities

1-1. Make a basic training plan on the utilization of remote-sensing for the relevant personnel of DFRR.
1-2. Conduct basic training on the utilization of remote-sensing for the relevant personnel of DFRR.
1-3. Define specifications of satellite images based on the utilization purpose of the forest distribution map and obtain the necessary satellite images.
1-4. Consider preliminary forest type classification.
1-5. Conduct primary interpretation and analysis of satellite images.
1-6. Conduct ground truth to verify the result of primary interpretation and analysis of satellite images.
1-7. Conduct secondary interpretation and analysis of satellite images based on the result of 1-6, as necessary.
1-8. Conduct ground truth to verify the result of secondary interpretation and analysis of satellite images, as necessary.
1-9. Finalize the forest type classification based on the result of 1-5, 1-6, 1-7, and 1-8.
1-10. Produce a nation-wide forest distribution map, as a benchmark forest map, in accordance with the finalized forest type classification.

1-11. Compile a manual covering the process from 1-1 to 1-9 to be utilized by DFRR.

2-1. Review methods and results of the past forest inventory implemented in Botswana.
2-2. Consider improved methods and procedures of national forest inventory.
2-3. Conduct ground surveys in pilot areas based on 2-2.
2-4. Compile the results of ground surveys.
2-5. Review and finalize the methods and procedures of national forest inventory.
2-6. Compile a manual for national forest inventory to be utilized by DFRR.

3-1. Make a basic training plan on the utilization of forest GIS for the relevant personnel of DFRR.
3-2. Conduct basic training on the utilization of forest GIS for the relevant personnel of DFRR.
3-3. Consider the utilization method of forest GIS at DFRR HQ and DFRR District Offices.
3-4. Investigate and obtain spatial data available in Botswana and store them in forest GIS database.
3-5. Store the data set of nation-wide forest distribution map and national forest inventory in forest GIS database.
3-6. Demonstrate the utilization of forest GIS for pilot areas.
3-7. Verify the function of forest GIS database and improve it, as necessary.
3-8. Compile a manual for forest GIS to be utilized by DFRR.

4-1. Consider design and utilization policy of national forest monitoring system integrated the above-mentioned outputs 1, 2 and 3.
4-2. Establish national forest monitoring plan based on 4-1.

5. Input
(1) Input by JICA
(a) Dispatch of Mission
Team Leader
Remote Sensing
Forest GIS/Database
Forest Inventory
Coordinator
(b) Training in Japan and/or other countries
(c) Necessary equipment (A tentative list of equipment is shown in the Annex 4.)

Input other than indicated above will be determined through mutual consultations between JICA and MEWT during the implementation of the Project, as necessary.
All equipment procured relevant to the Project implementation will remain as the property of GOB by the end of the Project period.

(2) Input by MEWT
MEWT will take necessary measures to provide at its own expense:

(a) Services of MEWT's counterpart personnel and administrative personnel as referred to in II-6;
(b) Suitably furnished office space
(c) Maintenance of all government property to be used for the implementation of the Project;
(d) Information as well as support in obtaining medical service;
(e) Credentials or identification cards;
(f) Available data (including maps and photographs) and information related to the Project;
(g) Water, electricity and internet necessary for the implementation of the Project;
(h) Expenses necessary for transportation within the Republic of Botswana of the equipment referred to in II-5 (1) c as well as for the installation, operation and maintenance thereof; and

6. Implementation Structure
The Project organization chart is given in the Annex 1. The roles and assignments of relevant organizations are as follows:

(1) MEWT
(a) Director of DFRR will be responsible for overall administration and implementation of the Project as the Project Director.
(b) Principal Scientific Officer I or higher of DFRR will be responsible for the management and coordination between relevant divisions of the Project as the Project Manager.
(c) Personnel of DFRR will be assigned to carry out project activities under the guidance of the Project Director and the Project Manager.

(2) JICA Experts
The JICA experts will give necessary technical guidance, advice and recommendations to MEWT on any matters pertaining to the implementation of the Project.

(3) Joint Coordinating Committee
Joint Coordinating Committee (hereinafter referred to as "JCC") will be established in order to facilitate inter-organizational coordination. JCC will be held whenever deems it necessary. A list of proposed members of JCC is shown in the Annex 2.

7. Project Site(s) and Beneficiaries
(1) Project site
The target area is the whole area of the Republic of Botswana.
(2) Beneficiaries
(a) Direct: Personnel of MEWT and relevant organizations engaged in forest monitoring

(b) Indirect: the whole nationals of the Republic of Botswana

8. Duration
The duration of the Project will be three (3) years from February 2013. A tentative plan of operation is shown in the Appendix 3.

9. Reports
JICA will prepare and submit the following reports to the MEWT. All these reports will also be submitted electronically.

(1) 20 copies of Inception Report at the commencement of the first work period in the Republic of Botswana in English.
(2) 20 copies of Interim Report at the time about 18 months after the commencement of the first work period in the Republic of Botswana in English.
(3) 20 copies of Draft Final Report at the end of the last work period in the Republic of Botswana in English.
(4) 25 copies of Final Report within one (1) month after the receipt of the comments on the Draft Final Report in English.

10. Environmental and Social Considerations
MEWT agreed to abide by 'JICA Guidelines for Environmental and Social Considerations' in order to ensure that appropriate considerations will be made for the environmental and social impacts of the Project.

III. UNDERTAKINGS OF MEWT AND ROB

1. MEWT and ROB will take necessary measures to:

(i) ensure that the technologies and knowledge acquired by the Republic of Botswana nationals as a result of Japanese technical cooperation contributes to the economic and social development of the Republic of Botswana, and that the knowledge and experience acquired by the personnel of the Republic of Botswana from technical training as well as the equipment provided by JICA will be utilized effectively in the implementation of the Project; and

(ii) grant privileges, exemptions and benefits to members of the JICA missions referred to in II-5 (1) above and their families, which are no less favorable than those granted to experts and members of the missions and their families of third countries or international organizations performing similar missions in the Republic of Botswana.

2. Other privileges, exemptions and benefits will be provided in accordance with the Note Verbale exchanged on 12 January 2012 between the GOJ and the Ministry of Foreign Affairs and International Cooperation of ROB (Appendix 4).

IV. EVALUATION

JICA will conduct the following evaluations and surveys to mainly verify sustainability and impact of the Project and draw lessons. The MEWT is required to provide necessary support for them.

1. Ex-post evaluation three (3) years after the project completion, in principle
2. Follow-up surveys on necessity basis

V. PROMOTION OF PUBLIC SUPPORT

For the purpose of promoting support for the Project, MEWT will take appropriate measures to make the Project widely known to the people of the Republic of Botswana.

VI. MUTUAL CONSULTATION

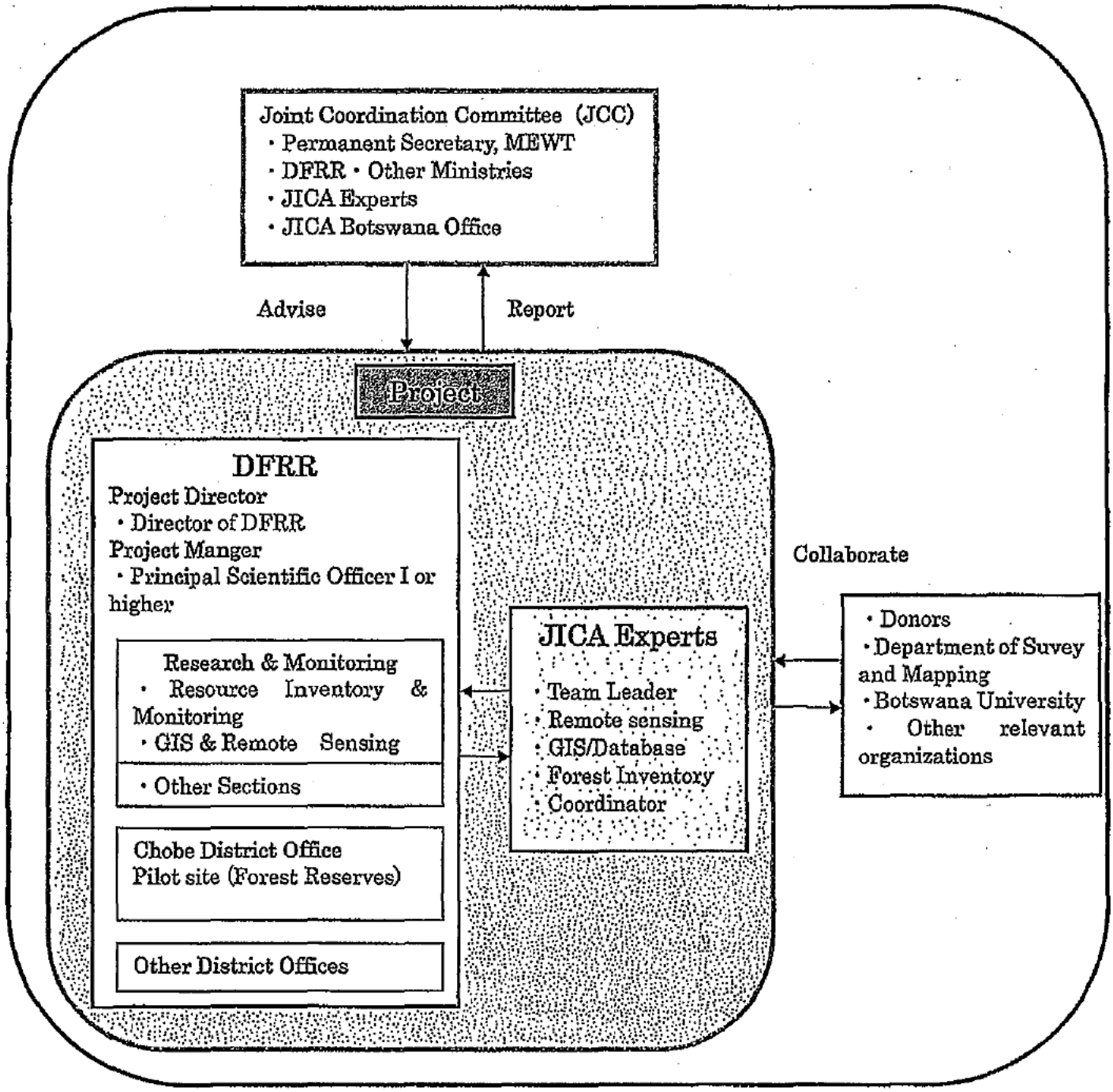
JICA and MEWT will consult each other whenever any major issues arise in the course of Project implementation.

VII. AMENDMENTS

The record of discussions may be amended by the minutes of meetings between JICA and MEWT.
The minutes of meetings will be signed by authorized persons of each side who may be different from the signers of the record of discussions.

Annex 1: Project Organization Chart
Annex 2: Functions and List of Proposed Members of Joint Coordinating Committee
Annex 3: Plan of Operation (PO) (Tentaitive)
Annex 4: List of Equipment (Tentative)

Annex 1: Project Organization Chart



Annex 2: Functions and List of Proposed Members of Joint Coordinating Committee

1. Functions

The Joint Coordinating Committee (JCC) will be established. The JCC will be held whenever deems it necessary. The functions of the JCC are as follows:

(1) To facilitate coordination with relevant authorities
(2) To review the overall progress of the project activities; and
(3) To review and exchange views on major issues arising from or in concerning the Project and recommend corrective measures.

2. Composition

(1) Chairperson: Deputy Permanent Secretary (Natural Resources), MEWT
(2) Members:
  (a) Botswana side
  - Director of DFRR, MEWT
  - Director of Department of Wildlife and National Parks, MEWT
  - Director of Environmental Affairs, MEWT
  - Representatives of the Ministry of Finance
  - Representatives of the Ministry of Foreign Affairs and International Cooperation
  - Representatives of Department of Survey and Mapping, the Ministry of Land and Housing
  - Other personnel concerned with the Project appointed by the Chairperson if necessary

  (b) Japanese side
  - JICA Mission Members
  - Resident Representative, JICA Botswana Office
  - Other personnel concerned, to be nominated by JICA if necessary

NOTE:
- The Chairperson may request and admit attendance of other personnel concerned with the Project, as needed.
- Official(s) of the Embassy of Japan may attend the JCC as observer(s).

Annex 3: Plan of Operation (PO) (Tentative)

Project Name: The Project for Extending National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management
Project Area: The Whole Country of Botswana
Duration: Three Years starting from February 2013 (Tentative)
Target Beneficiaries: Department of Forest and Range Resource (DFRR)

As of July 11, 2012

Outputs	Activities	Responsible sectional persons (DFRR)	Responsible sectional persons (JICA)	Year 1 -4Q	Year 2 -1Q -2Q -3Q -4Q	Year 3 -1Q -2Q -3Q -4Q	Year 4 -1Q -2Q -3Q -4Q
1. A nation-wide forest distribution map, as a benchmark forest map, is produced.							
1-1	Make a basic training plan on the utilization of remote-sensing for the relevant personnel of DFRR.	Senior Scientific Officer/ Scientific Officer	RS Expert				
1-2	Conduct basic training on the utilization of remote-sensing for the relevant personnel of DFRR.	Senior Scientific Officer/ Scientific Officer	RS Expert				
1-3	Define specifications of satellite images based on the utilization purpose of the forest distribution map and obtain the necessary satellite images.	Technical Officer/ Scientific Officer	RS Expert				
1-4	Consider preliminary forest type classification.	Technical Officer/ Scientific Officer	RS Expert				
1-5	Conduct primary interpretation and analysis of satellite images.	Technical Officer/ Scientific Officer	RS Expert				
1-6	Conduct ground truth to verify the result of primary interpretation and analysis of satellite images.	Technical Officer/ Scientific Officer	RS Expert				
1-7	Conduct secondary interpretation and analysis of satellite images based on the result of 1-6, as necessary.	Technical Officer/ Scientific Officer	RS Expert				
1-8	Conduct ground truth to verify the result of secondary interpretation and analysis of satellite images, as necessary.	Technical Officer/ Scientific Officer	RS Expert				
1-9	Finalize the forest type classification based on the result of 1-5, 1-6, and 1-7.	Technical Officer/ Scientific Officer	RS Expert				
1-10	Produce a nation-wide forest distribution map, as a benchmark forest map, in accordance with the finalized forest type classification.	Technical Officer/ Scientific Officer	RS Expert				
1-11	Compile a manual covering the process from 1-1 to 1-9 to be utilized by DFRR.	Technical Officer/ Scientific Officer	RS Expert				
2. A methodology for the national forest inventory is established.							
2-1	Review methods and results of the past forest inventory implemented in Botswana.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert				
2-2	Examine improved methods and procedures of national forest inventory.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert				
2-3	Conduct ground surveys in pilot areas based on 2-2.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert				
2-4	Compile the results of ground surveys.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert				
2-5	Review and finalize the methods and procedures of national forest inventory.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert				
2-6	Compile a manual for national forest inventory to be utilized by DFRR.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	Inventory Expert				
3. DFRR is equipped with a forest geographic information system (GIS) database.							
3-1	Make a basic training plan on the utilization of forest GIS for the relevant personnel of DFRR.	Senior Scientific Officer/ Scientific Officer	GIS Expert				
3-2	Conduct basic training on the utilization of forest GIS for the relevant personnel of DFRR.	Senior Scientific Officer/ Scientific Officer	GIS Expert				
3-3	Consider the utilization method of forest GIS at DFRR HQ and DFRR District Offices.	Senior Scientific Officer/ Scientific Officer	GIS Expert				
3-4	Investigate and obtain spatial data available in Botswana and store them in forest GIS database.	Senior Scientific Officer/ Scientific Officer	GIS Expert				
3-5	Store the data set of nation-wide forest distribution map and national forest inventory in forest GIS database.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	GIS Expert				
3-6	Demonstrate the utilization of forest GIS for pilot areas.	Senior Scientific Officer/ Scientific Officer/ Technical Officer	GIS Expert				
3-7	Verify the function of forest GIS database and improve it, as necessary.	Senior Scientific Officer/ Scientific Officer	GIS Expert				
3-8	Compile a manual for forest GIS to be utilized by DFRR.	Senior Scientific Officer/ Scientific Officer	GIS Expert				
4. A national forest monitoring plan is developed.							
4-1	Consider design and utilization policy of national forest monitoring system integrated the above-mentioned outputs 1, 2 and 3.	All Project Officers	All Experts				
4-2	Establish national forest monitoring plan based on 4-1.	All Project Officers	All Experts				

Annex 4. List of Equipment (Tentative)

Item	Quantity	
	HQ	District Office
Software		
1 GIS Software		
ArcGIS (ArcInfo License)	1	
ArcGIS (ArcEditor License)	1	
ArcGIS 3D Analyst	2	
ArcGIS Spatial Analyst	2	
2 Remote-Sensing analysis software		
ENVI Floating License	2	
ENVI Atmospheric Correction Module	2	
ENVI DEM Extraction Module	2	
ENVI Orthorectification Module	2	
ENVI Ex Module	2	
eCognition Developer	1	
eCognition Architect	1	
3 LANDSAT satellite images	1	
4 High resolution satellite images	1	
Hardware for GIS/Remote-Sensing		
5 Personnal Computers	4	1
6 UPS	4	1
7 Network Attached Storage (NAS)	1	1
8 A0 Plotter	1	
9 A3 Colour-page Printers	1	1
10 A0 Scanner	1	
11 Anti-virus softwares	4	1
12 Office-softwares (Word-processer, Spreadsheat, Acrobat Pro, etc...)	4	1
13 Equipments for network (Cable, hub, ...)	1	
14 Consumable items for Plotters, Printers	1	1
Ground Truth for Remote-Sensing		
15 Handy-type GPS	7	3
16 Digital Cameras	4	1
Forest Inventory Surveys		
17 Hypsometer Haga	5	
18 Bitterlich	3	
19 Hypsometer BLUME-LEISS	5	
20 Clinometer Suunto	5	
21 Compass	5	
22 Calipers	5	
23 Diameter Tapes	10	
24 Measuring Tapes	5	
25 Ranging Rod	10	
26 Tree Tags	10000	
Other equipments		
27 Automobiles (4WD/ Pick up double cabin)	1	1
28 Multi Function Printer (Scanning, Copying)	1	
29 Projectors	1	1

Appendix 2

MAIN POINTS DISCUSSED

To be completed after discussion prior to the signing of the R/D.

Appendix 3

MINUTES OF MEETINGS ON THE DETAILED PLANNING SURVEY

To be attached prior to the signing of the R/D.

Appendix 3

Appendix 4

REPUBLIC OF BOTSWANA

NOTE NO: EA 16/7 XLIII (30) H6

The Ministry of Foreign Affairs and International Cooperation of the Republic of Botswana presents its complements to the Embassy of Japan and has the honour to invite reference to the Embassy's note verbale reference no. BOT/122/01/11 in regards to the project named "Forest Resource Management based on sharing with Community and Wildlife".

The Ministry has further the honour to inform the esteemed Embassy that it agrees to all the terms of the Embassy's note verbale.

The Ministry of Foreign Affairs and International Cooperation avails itself of this opportunity to renew to the Embassy of Japan the assurances of its highest consideration.

12 January 2012

Gaborone

Embassy of Japan

Gaborone

Embassy of Japan

Private Bag 00222 Tel: 3914456
Gaborone, Botswana Fax: 3914458

NOTE VERBALE

BOT/122/01/11

The Embassy of Japan in Botswana presents its compliments to the Ministry of Foreign Affairs and International Cooperation of the Republic of Botswana and has the honor to refer to recent discussions held between representatives of the Government of Japan and the Government of Botswana concerning the project on "Forest Resource Management based on Sharing with Community and Wildlife", and to propose the following:

1. The "Forest Resource Management based on Sharing with Community and Wildlife" project will be carried out by the Japan International Cooperation Agency (hereinafter referred to as "JICA") in accordance with the relevant laws and regulations of Japan.

2. The Government of Botswana shall accord privileges, immunities and other benefits to the Japanese survey team necessary for the implementation of the project, and shall take necessary measures to ensure security of the survey team members.

3. The details and procedures for cooperation in the present understanding, including specific privileges, immunities and other benefits to be accorded to the Japanese survey team as mentioned in paragraph 2. above, will be provided for in the arrangements to be agreed upon between JICA and the Ministry of Environment, Wildlife and Tourism.

The Embassy of Japan has further the honour to propose that the present Note Verbale and the Ministry's Note Verbale in reply accepting on behalf of the Government of Botswana the foregoing proposal, shall be regarded as constituting an agreement between the two Governments, which shall enter into force on the date of the Ministry's Note Verbale in reply.

The Embassy of Japan in Botswana avails itself of this opportunity to renew to the Ministry of Foreign Affairs and International Cooperation of the Republic of Botswana the assurances of its highest consideration.

Embassy of Japan

Gaborone

17th November, 2011

EMBASSY OF JAPAN
在ボツワナ日本国大使館
BOTSWANA

AMENDMENT OF RECORD OF DISCUSSIONS

BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY AND MINISTRY OF ENVIRONMENT, WILDLIFE AND TOURISM OF THE GOVERNMENT OF THE REPUBLIC OF BOTSWANA

ON JAPANESE TECHNICAL COOPERATION

FOR

THE PROJECT OF ENHANCING NATIONAL FOREST MONITORING SYSTEM FOR THE PROMOTION OF SUSTAINABLE NATURAL RESOURCE MANAGEMENT

Gaborone, 05/10/ 2015

Mr. Akihiko Hoshino
Resident Representative
Botswana Office
Japan International Cooperation Agency

Mr. Elias M. Magosi
Permanent Secretary
Ministry of Environment, Wildlife and Tourism

The Republic of Botswana

AMENDMENT OF RECORD OF DISCUSSIONS

THIS AMENDMENT OF RECORD OF DISCUSSIONS, made and entered into on this XXXth June 2015 by and between the Japan International Cooperation Agency (hereinafter referred to as "JICA") and the Ministry of Environment, Wildlife and Tourism (hereinafter referred to as "MEWT") represented by the Department of Forestry and Range Resources (hereinafter referred to as "DFRR"), The Republic of Botswana as the amendment of the original Record of Discussions (hereinafter referred to as "R/D") on Japanese Technical Cooperation for the Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management (hereinafter referred to as "the Project").

WITNESSETH

NOW, THEREFORE, the parties hereto hereby agree as follows:

1. Appendix 1 "Article Ⅱ.OUT LINE OF THE PROJECT" in the original R/D, shall be amended as follows ;

1-1 The following words are added in "3. Outputs"

(5) Developed National Forest Monitoring System (NFMS) will be utilized by related governmental organizations including DFRR District offices and other ministries to share information and to produce appropriate data for sustainable forest management.

(6) NFMS will be applied to forest fire management which contributes to the sustainable forest management.

(7) NFMS will be applied to the Community-Based Natural Resource Management (CBNRM) as part of the sustainable forest management.

(8) Knowledge and experience obtained in the Project will be shared inside/outside Botswana in collaboration with SADC and other Developing Partners.

1-2 The following words are added in "4. Activities"

5-1-1. Assess the capacity of the DFRR District offices in the pilot area (personnel, equipment, communication, and the duty of work) and clarify the availability of the data regarding the forest management

5-1-2. Review the data storage specification to the central Forest GIS DB

5-1-3. Assess the needs for the contents to be delivered to the other ministries

5-1-4. Filtering the deliver contents to the DFRR District offices and the other ministries

5-1-5. Design and construct the WEB-based information distribution prototype system

5-1-6. Customize the deliver contents in consideration of the internet conditions and register the data

5-1-7. Implement the training on the operation of the WEB-based information distribution prototype system

5-1-8. Develop the operation manual for the Information Dissemination Web system.

5-2-1. Assess the capacity and the needs of the focal person/organization for the FRA and/or GHG inventory

5-2-2. Implement the training on the reporting for the FRA and/or GHG inventory by use of the F-GIS-DB

5-2-3. Implement the QAQC (AGB)

5-2-4 Conduct the training on the estimation of the AGB/BGB.

6-1. Integration of the fire management information to the F-GIS-DB and its effective use"

6-2. Review the fire monitoring system in DFRR and confirm the availabilities of the fire related data

6-3. Develop the fire related theme maps (forest fire hazard map, map of the high-frequency fire area and the fire breaks, map of the biomass loss due to the fire etc. It depends on the availabilities of the fire related data)

6-4. Develop the related manuals

7-1. Collect and analyze the data about the legal framework, procedure and the stakeholders of the CBNRM

7-2. Identify the CBNRM potential areas through the following activities;

- Collect the primary and the secondary information (Information on the registered CBO's in the pilot areas (population, local economy, usage of the natural resources etc.), 2) Interview with the regional offices regarding the potential areas)
- Analyze the high-potential areas for the CBNRM by using the forest and the land-use changes information based on the detailed forest distribution map which are developed in the first phase of the Project
- Identify the potential areas for the CBNRM based on the results obtained through the two above mentioned activities

7-3. Develop the NTFP map in the pilot areas

7-4. Develop a tentative zoning map in the CBNRM potential areas

7-5. Organize a workshop (or conduct the interview) with the local residents in the identified CBNRM potential areas

7-6. Develop a participatory forest monitoring method

7-7. Organize the participatory workshop (or conduct the interview) in order to review the information on the natural resources in the identified potential areas

7-8. Identify and select the appropriate technology for the use of the forest resources

7-9. Support to develop the tentative CBNRM plan (Land-use and natural resource management plan)

8-1. Compile the knowledge and experience obtained in the Project.
8-3. Identify appropriate knowledge and experience to be shared inside/outside Botswana.
8-2. Hold seminars to share the knowledge and experiences inside/outside Botswana in collaboration with SADC and other Developing Partners.

1-3 The Following words are added in "5. Input (1) Input by JICA"
(d) Dispatch of Long-term Expert(s) (e.g. Forest Management)

1-4 "8. Duration"
The words "The duration of the Project will be three ('3) years from February 2013. A tentative plan of operation is shown in the Annex 3." shall be deleted and "The Project period is July 2013 to December 2017." shall be substituted in lieu thereof.

All the other articles of the original R/D shall remain unchanged.

IN WITNESS WHEREOF, the parties hereto have caused this Amendment of R/D to be signed, as of the day and year first above written, in their respective names in duplicate, each party retaining one (1) copy thereof.

(End)

Appendix-7

Man-Month Table

Assignment Plan and Performance (FY1)

Appendix-7 Man-Month Table

	Assignment	NAME	Affiliation	2013 1st Year 6	7	8	9	10	11	12	2014 1	2	3	Man Month Total in BW	in JP
Work in Botswana	Team Leader / Forest Resource Management	TEJIMA Shigeharu (Mr.)	OC		45(1.5)				30(1.0)		39(1.3)+10(0.33)			3.80 (4.13)	
	Forest Remote Sensing 1	SUZUKI Kei (Mr.)	JAFTA											0.00	
	Forest Remote Sensing 2	SASAKAWA Hiroshi (Mr.)	JAFTA			30(1.0)			30(1.0)		25(0.83)			2.83	
	Forest Remote Sensing 3	FURUTA Tomoko (Ms.)	JAFTA			30(1.0)			30(1.0)		31(1.03)			3.03	
	Forest GIS Database	NANAUMI Takashi (Mr.)	JAFTA		30(1.0)			30(1.0)			15(0.5)			2.50	
	Forest Inventory 1	NISHIO Akinori (Mr.)	JAFTA		45(1.5)			30(1.0)			40(1.33)			3.83	
	Project Assistant / Forest Inventory 2	YASUHISA Motohiro (Mr.)	OC				63(2.1)				55(1.83)			3.93	
	Biodiversity / Assistant Forest Inventory 1	WATARI Yuya (Mr.)	JAFTA			14(0.47)								0.47	
	Assistant Forest Inventory 2	SUGAWARA Fumio (Ms.)	OC								45(1.5)+10(0.33)			1.50 (1.83)	
														21.89 (22.56)	
Work in Japan	Team Leader / Forest Resource Management	TEJIMA Shigeharu (Mr.)	OC	2(0.1)									6(0.3)		0.40
	Forest Remote Sensing 1	SUZUKI Kei (Mr.)	JAFTA												0.00
	Forest Remote Sensing 2	SASAKAWA Hiroshi (Mr.)	JAFTA												1.20
	Forest Remote Sensing 3	FURUTA Tomoko (Ms.)	JAFTA												1.20
	Forest GIS Database	NANAUMI Takashi (Mr.)	JAFTA												1.40
	Forest Inventory 1	NISHIO Akinori (Mr.)	JAFTA	2(0.1)								2(0.1)	4(0.2)		0.40
	Supervision Training in Japan	SUGAWARA Fumio (Ms.)	OC							18(0.9)					0.90
															5.50
Reports				△ Work Plan		ICR							△ CR		
Work Schedule and Total														21.89	5.50
														27.39	

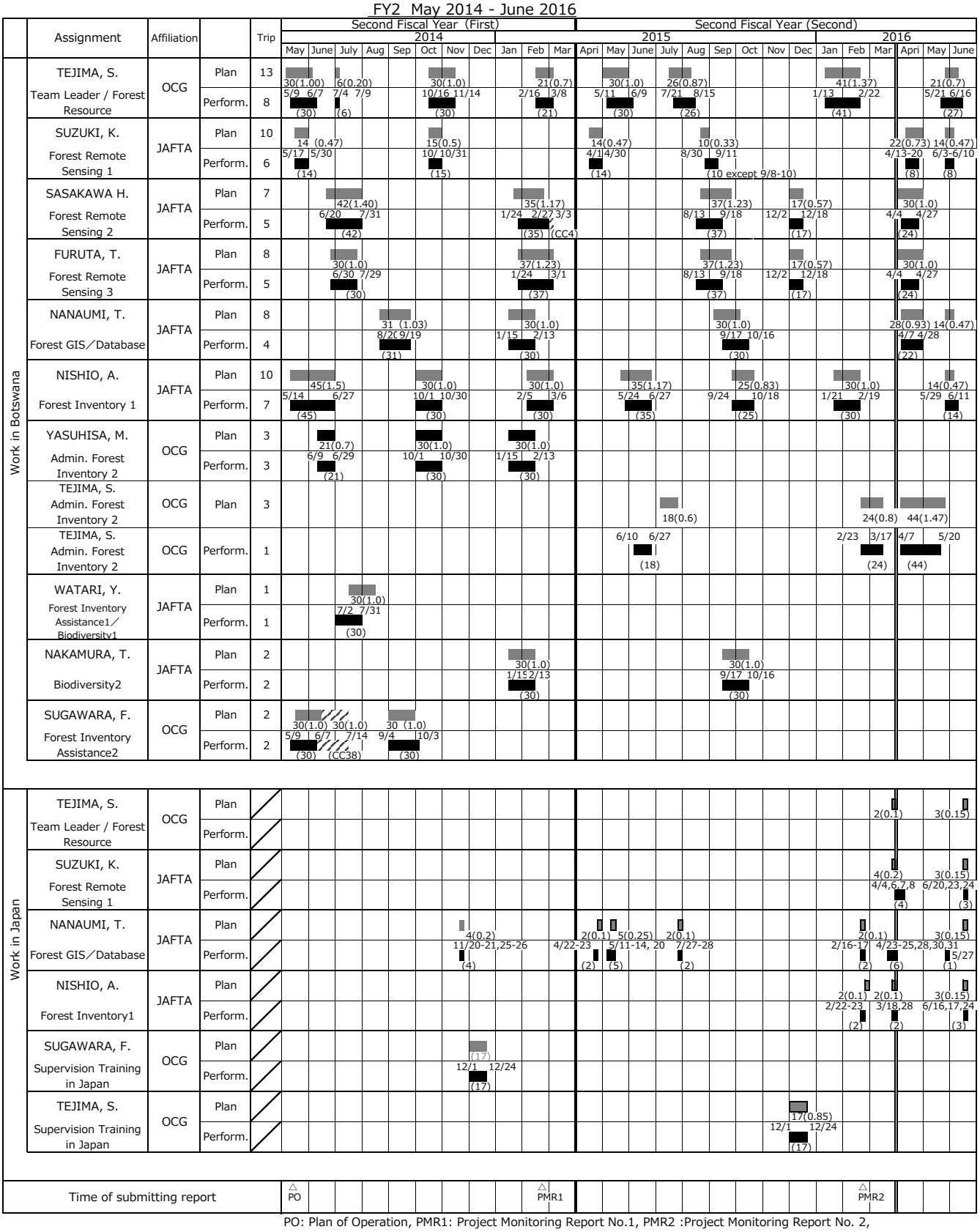
OC: Oriental Consultants Co. Ltd. / JAFTA: Japan Forest Technology Association

Legend:
- Work in Botswana
- Work in Japan
- Work in Botswana (assignment not included in the contract, covered by the consultant)

ICR : Inception Report
CR : Completion Report

ASSIGNMENT PLAN AND PERFORMANCE (FY2-1)

FY2 May 2014 - June 2016



PO: Plan of Operation, PMR1: Project Monitoring Report No.1, PMR2 :Project Monitoring Report No. 2,
Date format: MM/DD

Legend
Performance…
Plan…
Contribution of company (CC)…

ASSIGNMENT PLAN AND PERFORMANCE (FY2-2)

FY2 Extension Phase (July 2016 - December 2017)

	Assignment	Name	Affiliation		Trip	Extension Phase 2016 July	Aug	Sep	Oct	Nov	Dec	2017 Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Day	Month
Work in Botswana	Team Leader / Forest Resource Management	TEJIMA, S.	OCG	Plan	13		30(1.0)			30(1.0)			30(1.0)			30(1.0)						30(1.0)		355	11.83
				Perform.	13		7/27-8/25 (30)			11/2 12/2 (31)			1/10-2/11 (33)			5/15-6/5 (22)						10/24-11/22 (30)		357	11.90
	Forest Remote Sensing 1	SUZUKI, K.	JAFTA	Plan	10		15(0.5)			30(1.0)			15(0.5)			15(0.5)								164	5.47
				Perform.	6																	10/27-11/6 (11)		80	2.67
	Forest Remote Sensing 2	SASAKAWA, H.	JAFTA	Plan	7							30(1.0)							30(1.0)					221	7.37
				Perform	9		8/15-9/9 (26)			11/8 12/17 (40)						5/8-6/6 (30)				8/28-9/20 (24)				275	9.17
	Forest Remote Sensing 3	FURUTA, T.	JAFTA	Plan	8			30(1.0)			30(1.0)							29(0.97)						240	8.00
				Perform.	10		8/15-9/9 (26)			11/8-12/17 (40)		1/30-2/25 (27)				5/8-6/6 (30)				8/28-10/6 (40)				308	10.27
	Forest GIS／Database	NANAUMI, T.	JAFTA	Plan	8	30(1.0)		45(1.5)														30(1.0)		238	7.93
				Perform.	5	7/21-30 (10)		9/16-9/28 (13)										9/14-9/26		10/12-10/23 (13)	(12)	11/2-3 (2)		163	5.43
	Forest GIS Assistance	MAI, K.	JAFTA	Plan	1			30(1.0)																30	1.00
				Perform.	4			9/15-10/14 (30)									6/5-6/14 (10)			9/14-9/27 (14)		11/15-17,20-21,30-12/1 (7)		61	2.03
	Forest Inventory1	NISHIO, A.	JAFTA	Plan	10		30(1.0)			30(1.0)				30(1.0)										299	9.97
				Perform.	10		7/27-8/18 (23)			10/27 - 12/5 (40)		1/10-2/11 (33)												305	10.17
	Administration/ Forest Inventory2	YASUHISA M.	OCG	Plan	3																			81	2.70
				Perform.	3																			81	2.70
		TEJIMA, S.	OCG	Plan	3																			86	2.87
				Perform.	1																			86	2.87
		MATSUZAKI, E.	OCG	Plan	2								30(1.0)					30(1.0)						60	2.00
				Perform.	2							1/10-2/11 (33)					6/6-7/8 (33)				10/31-11/9 (10)			76	2.53
	Forest Inventory Assistance1/ Biodiversity1	WATARI, Y.	JAFTA	Plan	1																			30	1.00
				Perform.	1																			30	1.00
	Biodiversity 2	NAKAMURA, T.	JAFTA	Plan	2																			60	2.00
				Perform.	2																			60	2.00
	Forest Inventory Assistance 2	SUGAWARA, F.	OCG	Plan	2																			60	2.00
				Perform.	2																			60	2.00
	Administration/ CBNRM	WATANABE, R.	OCG	Plan	5			45(1.5)		45(1.5)			60(2.0)				35(1.17)				60(2.0)			245	8.17
				Perform.	5		7/27-9/29 (65)			10/26 - 12/9 (45)			1/10-3/10 (60)				6/6-7/10 (35)			9/30-10/22 (23)	10/23-11/29 (38)			228	7.60
																								Subtotal (Work in Botswana) 【Plan】		2,169	72.31
																								Subtotal (Work in Botswana)【Performance】		2,170	72.33
Work in Japan	Team Leader / Forest Resource Management	TEJIMA, S.	OCG	Plan										2(0.1)								3(0.15)		10	0.50
				Perform.			7/15,19-22 5(0.25)															11/27-12/1 4.5(0.23)		9.5	0.48
	Forest Remote Sensing 1	SUZUKI, K.	JAFTA	Plan																				7	0.35
				Perform.																				7	0.35
	Forest GIS／Database	NANAUMI, T.	JAFTA	Plan				13(0.65)																31	1.55
				Perform.						12/13-16 4(0.2)		1/18-20 3(0.15)							8/24-25 2(0.1)					31	1.55
	Forest Inventory1	NISHIO, A.	JAFTA	Plan																				7	0.35
				Perform.																				7	0.35
	Surpervision Training in Japan	SUGAWARA, F.	OCG	Plan																				17	0.85
				Perform.																				17	0.85
		TEJIMA, S.	OCG	Plan																				17	0.85
				Perform.																				17	0.85
																								Subtotal(Work in Japan)【Plan】		89.00	4.45
																								Subtotal (Work in Japan)【Performance】		88.50	4.43
Time of submitting report						△ ITR								△ PMR3								△ DFR	△ FR		

PO: Plan of Operation, PMR1: Project Monitoring Report No.1, PMR2 :Project Monitoring Report No. 2, ITR: Interm Report、PMR3 : Project Monitoring Report No.3

DFR: Draft Final Report、FR : Final Report, Date format: MM/DD

Plan (MM)	72.31	4.45
	76.76	
Performance (MM)	72.33	4.43
	76.76	

Legend

OCG : Oriental Consultants Global
JAFTA : Japan Forest Technology Association
Contribution of company (CC)

Appendix-8

JCC Minutes of Meeting

Minutes of the Meeting
of
the 1st JCC
on
The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management

In the Republic of Botswana

Department of Forestry and Range Resources
Ministry of Environment, Wildlife and Tourism
and
Japan International Cooperation Agency

Gaborone, January 30th, 2014

Mr J. J. Moloi
Acting Director, Department of Forestry and Range Resources (DFRR), Ministry of Environment, Wildlife and Tourism (MEWT)

Mr TEJIMA Shigeharu
Team Leader / Forest Resource Management, The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management, Japan International Cooperation Agency

Minutes of Meeting of the 1st JCC meeting

The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management In the Republic of Botswana

The 1st Joint Coordinating Committee Meeting (hereinafter referred to as the "**JCC**") of "The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management" (hereinafter referred as to the "**Project**") was held on January 30th, 2014 at the conference room of Department of Forest and Range Resources (**DFRR**) in Gaborone.

Department of Forestry and Range Resources (**DFRR**) of the Ministry of Environment, Wildlife and Tourism (**MEWT**), Japan International Cooperation Agency (**JICA**) and relevant parties of the Project joint JCC was chaired by the Acting Director of DFRR on 30th January 2014. The list of the participants is shown in Appendix 1.

1. Opening Remarks

Chairperson indicated that the project is a big milestone for the country as it's the first time to do forest inventory. He further commented that the official name for the project is too long for the people to remember hence the need to come up with Setswana name so that people can associate themselves with the project. The project team is given the task of coming up with both Setswana and Japanese name before the end of this year. This was labelled as an action item.

The **Chairperson** also remarked on the appointment of additional members by both Parties as provided for in the Record of Discussion (RD). He said though he was empowered by the RD to make appointments, this time he was leaving it to the members (representatives for the JCC) to make suggestions as to who they would want to sit in the JCC meetings. The suggestions have to be sent to the **Chairperson** by the next JCC.

2. Presentation of the Project

Project Manager (hereinafter referred to as the "**PM**") gave a brief background of the project, how the project came to be, what motivated the proposal of the project, the challenges they faced during the inception of period of the project and how they finally overcame the challenges they faced.

He then handed the floor to JICA Consultant Team Leader (hereinafter referred to as the "**TL**") who gave a brief presentation about the project. This included among other things, the objectives of the project, final targets and outputs of the Project, basic concepts on technical aspect of the Project, equipment to be procured. The floor was

then opened for questions and comments.

3. Questions and Comments on the Presentation of the Project:

Representative of Ministry of Finance in MEWT suggested that there was a need to liaise with e-government or IT section so that it could be established how the GIS database fit in with the e-governance.

In a response to this remark, **PM** answered that there was no problem with the Project's public relations, and that **TL** can provide necessary information. The **Consultant in charge of the Forest GIS Database**, indicated that there was need to consider the network system as forest GIS database carries a large volume of data and that complex structure will be needed, therefore. He said actually it would not be realistic to connect the database of the Projects to the e-Government.

Representative of Department of Environment Affairs (DEA) questioned what was the rationale behind selecting the pilot areas?

In responding to this question, the **TL** indicated that the two areas were selected based on the criteria such as 1) the areas except the Chobe and a part of Ngamiland Districts avoiding overlapping, 2) Population pressure, 3) Presence of the forest and various type of forest and protected area. They selected these areas because they are said to be highly populated with serious problems of land shortages. He said there was no need to monitor stable forest, rather considerations should be given to areas which are under pressure.

Regarding a comment on sampling plots and pilot areas, **Chairperson** indicated that the pilot areas were not the sampling sites, and that the sampling sites were going to be distributed across the country. He mentioned that the Project Team will not be confined to the pilot areas only but, will also cover the entire country. Detailed survey (for the satellite image analysis) will be done in those pilot areas.

3. Progress report of the Project:

Progress report of the Project was presented by the **TL**. The presentation was a summary of the project progress from the inception of the project till the day of the JCC meeting (30th January 2014). The presentation highlighted the project achievement by outputs so far, activities that have been carried out, assignments completed and equipment that has already been procured.

4. Questions and Comments on the Progress Report of the Project:

Representative of Ministry of Finance in MEWT asked about the total estimated cost of the project for the 3 years?

This question was not answered. The committee agreed that this should be an action item, for both the Botswana side and JICA for the next meeting. This was marked as an action item.

DEA representative expressed her concern about the use of satellite images as they may not be sufficient. She said satellite images may be used for detecting large impact, but some people may remove few trees which may not be noticeable in satellite. She further said that there was no provision for ground truth, if at all there is going to be ground trothing, this need to be reflected on the monitoring plan.

In response, PM indicated that ground truth would be done by the Project and the DFRR staff. He said data will be collected and analysed. He further explained that as they carry out this, they will be able to identify where trees have been remove/cut. The PM underscored the need to include communities in the implementation of this project as part of community empowerment in the resource management. He said that it would be better if the communities are educated to take care of the natural resources and manage them sustainably. These communities should therefore be involved in the system.

Chairperson stated that it was important to see how communities fit in the whole system with the view to promote ownership at local level.

DEA representative asked whether there was going to be inclusion or indigenous fruit trees, that is measurement of their value in the Inventory 2.

PM replied by saying that this was not possible given the limited resources available to the project. However he said that was something that could be considered in the future.

Chairperson: indicated that the classification was there, but what was lacking was the value of the resources and their contribution to the people's lives. The committee members were urged to reflect on that and identify the gaps, so as to compliment through another project if necessary.

DEA representative suggested that it was better if these elements were also included at this stage to reduce the costs as opposed to developing a new project which would cost more than if these elements are done synchronously with the current project.

In a response to this proposition, the **representative from Ministry of Foreign Affairs** advised that, putting in other elements will be too difficult at the stage. She said this project (NFMS) was accepted and funded based on the contents of the submitted project proposal, and that putting in more elements might delay the project as this

may have to go through another long process and that it may take sometime to complete.

The representative of the Ministry of Foreign Affairs commented that this was a huge project, and that it was supporting government's initiative. She said the project was expected to make an impact on the ground. It was further said that as a country we needed to sit down with Japanese counterparts and workout the modalities of ensuring that there was skills and technology transfer.

Agreements made:

i. It was agreed that the project should be officially launched so that people could know about it. It was said the sooner it is taken to the people the better. This task was given to the project team to see how and when the project could be officially launched.

ii. The JCC members agreed to meet at least once a year. However, the committee was also unanimous in that it could meet more than once if need be, depending on the urgency of the issue at hand. The next meeting is to be held next year (2015) January.

End

JJM

Appendix 1 List of Participants

List of Participants

1st JCC Meeting on 30th January 2014

No.	NAME	ORGANISATION	POSITION
1	Mr Joshua J. Moloi	DFRR	Chairperson, Acting Director
2	Ms B. E. Sesinyi	Ministry of Foreign Affairs & International Cooperation	Desk Officer -JAPAN
3	Ms Lucia Segatlhe	Ministry of Environment, Wildlife & Tourism (MEWT)	Representative of Ministry of Finance and Development Planning
4	D.K. Kgathi - Thite	Department of Environmental Affairs (DEA) / MEWT	Deputy Director
5	Mr Gofamodimo Mashame	Department of Survey & Mapping, Ministry of Lands & Housing	Land surveyor I
6	Mr SAKURAI Shin-ichi	Embassy of Japan in Botswana	Second Secretary
7	Mr SOYAMA Tunerari	JICA South Africa Office	Representative
8	Ms MIYATA Tomoko	JICA/JOCV Botswana	Project Formulation Adviser
9	Mr Motshereganyi Sekgopo	DFRR	Project Manager of the Project / Principal Forest and Range Resource Officer (PFRRO)
10	Mr Lesika Basalumi	DFRR	Chief Technical Officer (CTO)
11	Mr Keletso M. Seabo	DFRR	Forest and Range Resources Officer (FRRO)
12	Mr Tejima Shigeharu	JICA Consultant Team	Team Leader
13	Mr Nishio Akinori	JICA Consultant Team	Forest Inventory 1
14	Mr Yasuhisa Motohiro	JICA Consultant Team	Forest Inventory 2
15	Mr Nanaumi Takashi	JICA Consultant Team	Forest GIS database
16	Mr Sasakawa Hiroshi	JICA Consultant Team	Forest Remote Sensing 2
17	Ms Furuta Tomoko	JICA Consultant Team	Forest Remote Sensing 3
18	Ms Sugawara Fumio	JICA Consultant Team	Assistant Forest Inventory 2

Minutes of the Meeting
of
the 2nd Joint Coordinating Committee
on
The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management

In the Republic of Botswana

Department of Forestry and Range Resources
Ministry of Environment, Wildlife and Tourism
and
Japan International Cooperation Agency

Gaborone, June 3rd, 2015

Dr. M. Manthe-Tsuaneng

Director
Department of Forestry and Range Resources (DFRR),
Ministry of Environment, Wildlife and Tourism (MEWT)

Mr TEJIMA Shigeharu

Team Leader / Forest Resource Management, The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management, Japan International Cooperation Agency

Minutes of Meeting of the 2nd JCC meeting

The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management In the Republic of Botswana

The 2nd Joint Coordinating Committee Meeting (hereinafter referred to as the "**JCC**") of "The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management" (hereinafter referred as to the "**Project**") was held on June 3rd, 2015 at the conference room of Department of Environment Affairs, Ministry of Environment, Wildlife and Tourism (**MEWT**) in Gaborone.

Department of Forestry and Range Resources (**DFRR**) of the MEWT, Japan International Cooperation Agency (**JICA**) and the member of the committee participated in this meeting. The JCC was chaired by the Director of DFRR. The list of attendees is shown in Appendix- 1.

1. Opening Remarks

Chairperson explained the importance of the project, stating that this project is on its 2nd phase and shows some progress so far. She further stated that the forest monitoring project is a good project and is expected to be the first to produce the Nation-wide Forest Distribution Map (NFDM).

The **Chairperson** indicated that this is the 2nd JCC meeting which shows that there is progress. She urged the parties to be committed to make sure that this project becomes successful.

2. Project Progress Report

Team Leader of JICA Consultant Team of the Project (hereinafter referred to as the "**TL**") presented the summary of the monitoring report as a progress report of the Project for the period from April 2014 to January 2015. The presentation highlighted the project achievement by outputs so far, the assignment completed by the JICA Consultants, the activities, the outputs and the procurement of the equipment that have been carried out. The content of the presentation is attached as Appendix-2. The floor was then opened for questions and comments.

3. Questions and Comments on the progress report of the Project:

The Project Manager (hereinafter referred to as "**PM**") indicated that the forest definition should be based on the country's definition not the FAO's definition. He further stated that the version 1 of the NFDM was derived using the conventional classification method and some other countries definitions and, now there is more improvement as more information is provided before going to the field which gives a more meaningful understanding of the national forest definition.

He also explained how the sample plots works. The sample plots cover the whole country not only the eastern part of the country as it was shown on the map. The points that was shown on the map during the meeting are the inventory is taking place at the moment. The sample plots for the first round of the National Forest Inventory (NFI) focus on forested areas because the definition of woodland/shrubland

may change on the final classification based on the discussion through the Technical Working Group (TWG) meeting, which has already been held twice, on the 11th of November 2014 and the 28 of March, 2015.

The **PM** explained that the Okavango Delta looks like is covered by forest all over on the map which is not true on the ground and this will be corrected on the final version as the classification schema has also changed. Based on the map colours some activities were excluded such as agriculture, instead it falls under grassland classification to avoid the map to be more like to a land use map.

Chairperson indicated that based on the bar graph showing FDM Ver1 under comparison with existing data (FAO Global Cover map) FDM Ver1's definition is more like the FAO definition.

Representative of the Ministry of Finance and Development Planning (hereinafter reffered to as "**MFDP**") asked if the project is still on time, if all which was set for first year of the project was achieved and the challenges faced so far.

In responding to this question, the **PM** indicated that the project is meeting the timeline, its progress well. He outlined some few challenges such shortage of transportation during the field work, tight budget which leads to omit some activities.

Based on the trail camera which was used during the biodiversity survey period, **Chairperson** questioned how to use it in case the Department of Wildlife and National Park will want to use it in future? It is requested that we have to consider it so that they can learn how to use these cameras for poachers.

She further questioned, how far the camera can sense an object and how does it work?

TL responded to this question, answered that the camera can sense about 30 meters (22 meters precisely) far and it uses a sensor. All participants were shown a trail camera for a better understanding.

3. Extension of the project period

TL explained that the duration of the project is three years from February 2013, according to the **Record of the Discussion** dated on 28th November, 2012 (hereinafter referred to as "**RD**"). This duration shall be amended because the current Project will ends on June 2016.

Moreover, the DFRR and JICA have examined the extension phase of the Project and both parties agreed the basic concept of the extension phase as Minutes of Meeting dated 2nd April 2015.

TL explained the outline of the extension phase base on the concept agreed in the minutes and tentative Plan of Operation was presented as attached in the Appendix-3.

The **PM** added to what **TL** has discussed, stating that C02 flux chambers is included under acquisition of forest inventory equipment but it is not priority because of not much funds.

The **PM** also stated their mission as follows; having an expert on resource evaluation and having an expert on tree breeding.

4. Questions and Comments on the extension of the project period

Representative of MFDP asked **if WAVES**[1] project doesn't cover economic valuation **of forest to that extent.**

Chairperson in responding to this question said that WAVES project uses broad frameworks but this project will be zoning in or identifying and applying specific frameworks on the ground.

Representative of **MFDP** also asked if the potential areas of collaboration are supposed to be discussed by the committee or it's already agreed.

Chairperson responded by saying that it is already agreed and the proposed extension phase is passed through the MEWT to foreign affairs to be approved.

Adding on this, a representative of **Japanese Embassy** said that the official request has not yet reached their office.

4. Other issues

Chairperson advised that on the next meeting there should be a time where previous minutes are discussed and adopted, also including matter arising in the Agenda.

She also gave a notice of the World Forestry Congress XIV which will be held in Durban, South Africa in September 2015. During this week, the Government will have a booth to show the forestry activities and the Project has been requested to support and participate the Congress.

Agreements made:

i. All parties agreed that

- The progress of the Project had been implementing well according to the schedule despite the transportation problem for the forest inventory survey.
- The current project will be implemented till June 2015 and the extension phase starts from July 2016 and it ends in December 2017.
- The basic concepts and tentative plan of the operation for the extension phase have been presented as Appendix-3
- The RD shall be amended in those respects

ii. 3rd JCC meeting is scheduled for March, 2016

End

[1] Wealth Accounting and the Valuation of Ecosystem Services (WAVES)

Appendix – 1 List of attendees

NO	NAME	ORGANISATION	POSITION
1	M. Manthe-Tsuaneng	Department of Forestry and Range Resources (DFRR) / MEWT	Director
2	Lucia Segatlhe	Representative of the Ministry of Finance and Development Planning attached to the MEWT	Chief Economist
3	Kudakwashe Mpolokang	Department of Environment Affaires (DEA) / Ministry of Environment, Wildlife and Tourism (MEWT)	Natural Resource Officer
4	Malebogo Somolekae	Department of Wildlife and National Parks / MEWT	Principal wildlife officer I
5	Shinichi Sakurai	Japanese Embassy	Second Secretary
6	Akihiko Hoshino	JICA	Resident representative
7	Yasuaki Aihara	JICA Botswana	Assistant representative
8	Motsereganyi Sekgopo	Department of Forestry and Range Resources (DFRR) / MEWT	Project Manager, Principal Forestry and Range Resource Officer (PFRRO) I
9	Tejima Shigeharu	Oriental Consultants Global Co., Ltd.	Team Leader of JICA Consultant Team

Minutes of the Meeting
of
the 3rd Joint Coordinating Committee
on
The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management

In the Republic of Botswana

Department of Forestry and Range Resources
Ministry of Environment, Wildlife and Tourism
and
Japan International Cooperation Agency

Gaborone, April 21st, 2016

Mr. F. Monngae
Deputy Permanent Secretary (Natural Resources)
Ministry of Environment, Wildlife and Tourism (MEWT)

Mr TEJIMA Shigeharu
Team Leader / Forest Resource Management, The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management, Japan International Cooperation Agency

Minutes of Meeting of the 3rd JCC meeting

The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management In the Republic of Botswana

The 3rd Joint Coordinating Committee Meeting (hereinafter referred to as the "**JCC**") of "The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management" (hereinafter referred as to the "**Project**") was held on April 21st, 2016 at Maharaja Conference Centre in Gaborone.

Department of Forestry and Range Resources (**DFRR**) of the Ministry of Environment, Wildlife and Tourism (**MEWT**), Japanese Embassy, Japan International Cooperation Agency (**JICA**) and relevant parties of the Project participated in this meeting. The JCC was chaired by the Deputy Permanent Secretary. The list of attendees is shown in Appendix- 1.

1. Opening Remarks (Chairperson)

Deputy Permanent Secretary Mr Felix Monngae reminded the participants that this was the 3rd JCC meeting where the project progress report will be presented. He also reminded the committee that they shouldn't forget that this committee was formed in order to discuss the progress report yearly and also discuss the proposed or work plan for the coming fiscal year.

2. Minutes

Mr F. Monngae advised that an action sheet has to be added separately with an actionable items. Minutes were adopted.

3. Project Progress Report

Team Leader of JICA Consultant Team of the Project (hereinafter referred to as the "**TL**") Mr S. Tejima presented the summary of the monitoring report NO.2 as a progress report of the Project for the period from February 2015 to January 2016. The presentation highlighted the project outputs which are; i) the forest distribution map. ii) National forest inventory survey. iii) Forest GIS database. iv) National forest monitoring report. The procurement of equipment and challenges were also discussed.

First of all, he explained that technical working group was held on the 20th April 2016 for finalization of the forest type classification. He explained that riparian and typical have been revised in version3 around Okavango Delta to improve the accuracy assessment as was agreed by the technical working group. In version 3, accuracy of the riparian forest was 36% and now has improved to 57.7%. Typical forest' accuracy has

improved from 45.9% to 48.5%. Members of the technical working group agreed that the map can be launched.

I. Output 1 Nation-wide forest distribution map

Mr Tejima explained that since the project started, thematic maps using satellite images for the pilot areas have been created, this was to analyse land cover changes from 2000 to 2015 and to analyse above ground biomass changes between 2007 and 2009 using radar data and lastly, detailed forest distribution mapping using high resolution satellite data.

II. Output 2 National Forest Inventory Survey

He highlighted that the total number of permanent sample unit is 640 of which 285 is forest and 355 is woodland. These sample units have to be surveyed and they will stay the same for the future cycle of NFI. A total of 80 units have been surveyed so far. He indicated that to survey all the remaining units, a total of 376 has to be surveyed by the year 2016 and a total of 184 in the year of 2017. He also explained that biodiversity survey has been carried out using the automatic trail camera. A total of 38 animal species have been identified in Khutse Game Reserve using this trail camera.

III. Output 3 Forest GIS Database

He indicated that training on how to monitor forest area change has been conducted for enhancing the ability of the sustainable forest management. Training on how to create GIS layers have been conducted for transferring technics prior to starting full scale forest inventory survey and lastly, some practice manuals have been prepared as one of the output for the GIS database training.

IV. Output 4 Forest Monitoring Plan

He indicated that by including all the results derived from output 1 to 3, the forest monitoring plan will be developed in May 2016 and the overview of the plan will be shared in the June seminar. He then raised 2 questions: - what is the interval of the NFI 5?, 10? or ? and how to update the FDM?

Mr Tejima discussed the procurement of equipment. He indicated the project managed to purchase the following; satellite image, remote sensing software, RS/GIS hardware, forest inventory survey equipment, biodiversity survey equipment, project management equipment and 2 vehicles. The grand total is BWP 3, 457, 587.65.

He further discussed challenges on national forest inventory and these involve technical, safety/security issues, administrative/financial constraints and updating of

the forest distribution map in future which needs money for licences of remote sensing software.

4. Comments and Questions

The Project Manager, Mr M. Sekgopo highlighted that map title has be revised from 'National Forest Distribution Map' to 'Botswana Forest Distribution Map.' He also clarified on the issue of accuracy assessment that it is difficult to improve it because Botswana is a dry country hence makes it difficult to distinguish between woodland and forest. Landsat 8 imagery was used to create this map and Landsat has limitations due to its spatial resolution of 30m so to improve accuracy from 71.7% is going to be costly as a high resolution imagery is needed.

He also highlighted that DFRR staff are more involved in this project so they have acquired skills to continue with the NFI when the project ends. He said that they are also trained in GIS database and the plan is to link the data in the headquarters with the districts.

Dr Tsuaneng said that 71.7% is a good percentage. She then responded on the question asked by Mr Tejima on the presentation about the interval of the NFI, she proposed an interval of 5years.

Deputy Permanent Secretary: Do you have strategies to resolve the challenges

Answer: Mr Sekgopo said that they were just highlighting challenges faced but they always try to make sure that these challenges do not hinder the progress of the project.

Dr Tsuaneng advised that the project has to have a contract/agreement with the wildlife and BFD people because poachers will always be there so wildlife and BDF officers are needed all the time. She also advised that a component of location should be added in the schedule of the NFI so that the districts, BDF and wildlife people can have a clear schedule showing date and location.

5. Extension Phase of the Project

Mr S. Tejima explained that during the extension phase, National Forest Monitoring System will be applied to sustainable forest management, also the project will develop prototype information sharing system based on cloud IT environment. It will be involving district officers in order to keep DFRR headquarters database contents updated to the latest status all the time by getting feedback from regional officers.

NFMS will also be applied to forest fire management which contributes to sustainable forest management. Lastly, NMFS will be applied to the CBNRM as part of sustainable forest management.

6. Comments and questions

Dr Tsuaneng: Is NFMS linked with any GIS university in Japan where DFRR staff can be certified?
Answer: not yet

Mr Sekgopo informed participants about Mr Y. Onoue who will be part of the extension phase. Mr Onoue specialize in valuation of forest resources.

7. Other issues

Mr Tejima informed the participants that there will be a technical seminar beginning of June 2016 where the final map will be launched.

8. Closing Remarks: Chairperson

It is with a great pleasure for the Japanese government to help with the project to have the first forest map of our country. He also encouraged participants to work together during the extension phase so that it becomes successful.

Agreement made:

4th JCC meeting is scheduled for April 2017

.....END.....

The Third Joint Coordinating Committee

21st April, 2016

PARTICIPANT LIST

NO	NAME	ORGANISATION	POSITION
1	T. E. Kgomokhumo	DWNP	AWO
2	Akio Yamamoto	Embassy of Japan	Second Secretary
3	Hoshio	JICA Botswana	Resident Representative
4	Lilian Kerekang	JICA Botswana	Program Officer
5	F. Monngae	MEWT	DPS - NR
6	Hiroshi Sasakawa	JICA Consultant Team	RS
7	Tomoko Furuta	JICA Consultant Team	RS
8	Yoshio Onoue	JICA Expert	Economic Valuation
9	Takashi Nanaumi	JICA Consultant Team	GIS - DB Expert
10	Wazha Lucas	DFRR	PTO
11	Keletso M. Seabo	DFRR	FRROI
12	Tejima Shigeharu	JICA Consultant Team	Team Leader
13	Gaositwe L. Pelane	JICA Consultant Team	Office Manager
14	B. Keotswetse	JICA Consultant Team	Secretary
15	Tshenolo P. Gogola	DFRR	SFRRO
16	Gloria Komanyane	DFRR	SFRRO
17	Etsang B. Phokoletso	DFRR	SS
18	Dr M. Manthe - Tsuaneng	DFRR	Director
19	M. Sekgopo	DFRR	PFRROI

Minutes of the Meeting
of
the 4th Joint Coordinating Committee
on
The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management

In the Republic of Botswana

Department of Forestry and Range Resources
Ministry of Environment, Natural Resources Conservation and Tourism
and
Japan International Cooperation Agency

Gaborone, May 23rd, 2017

Mr. F. Monngae
Deputy Permanent Secretary (Natural Resources)
Ministry of Environment, Wildlife and Tourism (MEWT)

Mr TEJIMA Shigeharu
Team Leader / Forest Resource Management, The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management, Japan International Cooperation Agency

Minutes of Meeting of the 4th JCC meeting

The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management In the Republic of Botswana

The 4th Joint Coordinating Committee Meeting (hereinafter referred to as the "**JCC**") of "The Project for Enhancing National Forest Monitoring System for the Promotion of Sustainable Natural Resource Management" (hereinafter referred as to the "**Project**") was held on May 23rd, 2017 at the Department of Wildlife Conference Room in Gaborone.

Department of Forestry and Range Resources (**DFRR**) of the Ministry of Environment, Natural Resources Conservation and Tourism (**MENT**), Japanese Embassy, Japan International Cooperation Agency (**JICA**) and relevant parties of the Project participated in this meeting. The JCC was chaired by the Deputy Permanent Secretary. The list of attendees is shown in Appendix- 1.

1. Opening Remarks (Chairperson)

Deputy Permanent Secretary Mr Felix Monggae reminded the participants that this was the 4th JCC meeting where the project progress report and planning for the next period will be presented. He also reminded the committee that the project is coming to an end in December 2017.

2. Minutes

Minutes were read and adopted.

3. Introduction

Team Leader of JICA Consultant Team of the Project (hereinafter referred to as the "**TL**") Mr S. Tejima presented the summary of the project monitoring report NO.3 as a progress report of the Project for the period from July 2016 to March 2017. He started on the background and the extension phase of the project. He indicated that the project started in July 2013 to June 2016 and extension phase started in July 2016 which will be coming to an end in December 2017. The presentation highlighted the expected project outputs which are; i) a nation-wide forest distribution map. ii) A methodology for the national forest inventory. iii) Forest GIS database. iv) National forest monitoring plan.

He stated that 4 outputs were added in the extension phase and these are: 1) Developed NFMS to be utilised by related governmental organisations including DFRR district offices and other ministries to share information and to produce appropriate

data for sustainable forest management. 2) NFMS to be applied to forest fire management which contributes to sustainable forest management. 3) NFMS to be applied to the CBNRM as part of sustainable forest management. 4) Knowledge and experience obtained in the project to be shared inside/outside Botswana in collaboration with SADC and other developing partners. He said that Botswana forest distribution map was launched officially in June 2016.

4. Project Progress Report

In presenting the progress report, he indicated that firstly, interim report was submitted in July 2016 which shows the tentative plan of the national forest monitoring system and the launch of the Botswana forest distribution map. Secondly, the Project Monitoring Report No.3 was submitted in March2017 that has the results of the activities from July 2016 to March 2017 and the work plan of the upcoming term to the end of the project. Thirdly, draft final report will be submitted in October 2017 then lastly, final report will be submitted in November 2017 which is a final version of the NFMS plan including related material.

Mr Tejima presented on the progress by output in the extension phase:

I. Output 5: Developing NFMS

He explained that Forest GIS Database will be linked with regional offices and other ministries in doing this, is to keep database contents fresh all the time since various feedbacks such as ground truth data can be expected by themselves. He stated the major achievements are; a prototype system for sharing information among HQ and the district offices was developed using internet cloud web-based platform, validity check of the concept was confirmed by using fire break data in forest fire management and lastly, trainings on the operation of the web-based information sharing prototype system.

In this output, there is support to forest resources assessment which include: a) assessing the capacity and the needs of the focal person/organisation for the FRA/GHG inventory and this activity is completed. b) Implementing the training on the reporting for the FRA/GHG inventory by used of forest GIS database and this activity is partially completed. c) Implementation of QAQC-progress of the national forest inventory and is completed. d) Conducting the training on the estimation of the AGB/BGB and this activity is partially completed.

II. Output 6: Applying to Forest Fire Program

He stated that the objective of this output is to develop the fire-related thematic maps to meet the DFRR's requirement. In order to accomplish this, there should be a review

of the fire monitoring system in DFRR and confirm the availabilities of the fire related data. Thematic maps on fire according to data availability should be developed. Lastly, develop the related manuals. Few trainings have been carried out so far:

- Training 1-review of the firebreak information 1; editing GIS data using satellite imagery. (dated August 30-Sptember 2, 2016)
- Training 2-review of the firebreak information 2: editing attribute of GIS data using firebreak maintenance information (dated November 29 and 30, 2016)
- Training 3-Fire scar map (Chobe District) and it was carried out in December 6-9, 2016

III. Output 7: Applying to CBNRM

He indicated that in order to identify the CBNRM potential areas, they used the existing data and discussed with DFRR. Kgetsi ya Tsie Women Resources Enterprise Community Trust (KyT) was chosen. Thematic map in the pilot area was developed and existing data collected and this was done through the participation of KyT members. The second workshop was held with KyT members, the purpose was to learn how to utilise the thematic and satellite imagery map for natural resource management.

IV. Output 8: Sharing Knowledge and Experience

He indicated that through SADC-JICA forest technical cooperation, there was a JCC meeting in Tokyo in November 26, 2015. Another JCC meeting was held in Tanzania in September 7-9, 2016. In November 7-8, 2016, there was EWG in Johannesburg (Fire&IT). Another EWG is this week (May 23-24, 2017)

Knowledge sharing was also through national events such as national tree planting day which was held in Gweta in November 26, 2016.

5. Planning for the Next Period (Towards the Completion of the Project)

Work Plan for the coming term

Output 5: Developing NFM

Mr Tejima explained that the work plan for this output is to create an operation manual of how to estimate AGB/BGB. Secondly, to develop sampling design for implementing QAQC. Lastly, to conduct a training on automating AGB/BGB estimation.

Output 6: Applying to forest fire Program

He indicated that in this output, they are going to create DFRR original fire break GIS data. Secondly, create FDI. Thirdly, create fire zoning map. Fourthly, create burnt scar polygon. Lastly, create asset map.

Output 7: Applying to CBNRM

He stated that the work plan for output 7 is to develop the action plan in the pilot areas through the activities 7-1 to 7-4 and also to develop the good practice manual of the regarding CBNRM.

Output 8: Sharing Knowledge and Experiences

The work plan for this output is to compile the knowledge and experience obtained by the extension phase of the project. Secondly, to identify appropriate knowledge and experience to be shared inside/outside Botswana. Lastly, hold seminars to share the knowledge and experiences inside/outside Botswana in collaboration with SADC and other developing partners.

6. Recommendation

Mr Tejima recommended for a need of the security as there were number of theft incidents within the DFRR facilities.

Lastly, he said there is need for an establishment of the management unity for the NFMS in order to guarantee its sustainability.

7. Other issues

In conclusion, Mr Tejima explained that DFRR has proposed for cooperation between DFRR-JICA. There are 2 options of the projects which are concept 1; COE Program. Concept 2; Forest Reserves Master Plan and third option is by integration of good point of the concept 1 and concept 2. Concept 1 is to follow the achievement of NMFS and apply a new technology for NFMS which is necessary for the realization of the concept 2 also to design the forest management plan and monitor the forest reserves. The Combination of the Concept 1 & 2 is now the third option.

8. Comments and Questions

When commented on the proposed project, Dr Tsuaneng asked the committee to re-visit it and discuss it in detail as according to her, the National Forest Management Master Plan shall be given a priority as it's more needed than any other issues.

Mr Monggae asked about the date of the discussion of the final proposal and Mrs Segatlhe asked if there is any specific period of submission of proposals to JICA Botswana

Answer: Mr Ishida from JICA Botswana said that projects which will start operating in 2018, their proposals should be submitted by July 2017 later than that, they will start operating in the year 2019 if they are considered.

9. Closing Remarks: Mr Y. Ishida (JICA Botswana)

He expressed his sincere gratitude for the government of Botswana to agreeing to do a collaboration with the Japanese government in order to achieve forest sustainable management goal. He emphasized on making institutional arrangement with DFRR and a need to have at least 1 coordinator and 1 officer to be appointed to continue where the project left. He thanked everyone who participated and supported this project to achieve its aim.

Agreement made:

5th JCC meeting shall be held immediately after the seminar/workshop which will be held in November. Venue to be discussed with Headquarter

.....END.....

Appendix 1: Participants list

NO	NAME	ORGANISATION	POSITION
1	Y. Uemura	Embassy of Japan	Second Secretary
2	Y. Ishida	JICA Botswana	Resident Representative
3	F. Monngae	MENT	Chairman / Deputy PS
4	L. Segatlhe	MENT	Chief Economic
5	M. Munyadiwe	DWNP	Principal Wildlife Officer
6	M. Manthe-Tsuaneng	DFRR	Director
7	M. Sekgopo	DFRR	PFRROI / Project Manager - NFMS Project
8	Yoshio Onoue	DFRR / JICA	JICA Expert
9	Tejima Shigeharu	NFMS Project	Team Leader - JICA Consultant Team
10	Hiroshi Sasakawa	NFMS Project	Forest Remote Sensing 2
11	Tomoko Furuta	NFMS Project	Forest Remote Sensing 3

Appendix-9

Technical Transfer Report

Technical Transfer Plan and Evaluation

Output	Theme	Competency to be developed	Evaluation* Nov.2017	Capacity Assessment*	Timing & Period	Consultant in charge	Target person	Number of personnel	Tools of the training
Output 1 A nationwide forest distribution map is produced	1. Forest distribution map development by using middle resolution imageries	1) Can explain the methodology	3	0	FY1 – FY3	Remote Sensing 1, 2 & 3 & Local Consultant (sub-contracting work)	Technical staff of DFRR	3 to 5	OJT and manual making
		2) Can develop the analysis plan	2	0					
		3) Can conduct pre-processing and analysis of images	2	1					
		4) Can conduct the ground truth (GT) survey	3	2					
		5) Can assess the accuracy and conduct post-processing	2	1					
		6) Can revise the results and generate the forest distribution map	2	1					
	2. Forest type mapping by using high resolution imageries (RapidEye & SPOT6)	1) Can explain the methodology	2	0	FY1 – FY3	Remote Sensing 2 & 3	Technical staff of DFRR	3 to 5	OJT and manual making
		2) Can develop the analysis plan	2	0					
		3) Can conduct pre-processing and analysis of images	2	1					
		4) Can revise the results and generate the forest distribution map	2	1					
	3. Development of the biomass map using SAR data	1) Can explain the methodology	2	0	FY1 – FY3	Remote Sensing 3	Technical staff of DFRR	3 to 5	OJT and manual making
		2) Can develop the analysis plan	2	0					
		3) Can conduct pre-processing and analysis of images	2	1					
		4) Can revise the results and generate the forest distribution map	2	1					

Output	Theme	Competency to be developed	Evaluation* Nov.2017	Capacity Assessment*	Timing & Period	Consultant in charge	Target person	Number of personnel	Tools of the training
Output 2 A methodology for the national forest inventory is established	1. Pre-Forest Inventory Survey	1) Can use measurement equipment 2) Can explain the purpose of the pre-forest inventory 3) Can explain the methodology of the selection of the number of samples. 4) Can explain and implement the pre-forest inventory survey 5) Can input and analyse the data collected	4 3 4 4 4	2 2 0 2 1	FY1 Oct 2013 (4 days)	Forest Inventory Survey 1 & 2	Technical staff of DFRR	20	Lecture and field practice, OJT, manual making
Output 2 A methodology for the national forest inventory is established	2. Forest Inventory Survey	1) Can use the measurement equipment 2) Can explain how to use the measurement equipment to others 3) Can explain the purpose and the methodology of forest inventory survey 4) Can conduct the forest inventory survey 5) Can input and analyse the data collected 6) Can develop the report of the forest inventory survey 7) Can develop a forest inventory survey plan	4 4 4 3 3 3	2 2 1 1 1 1	FY2 (4 days)	Forest Inventory Survey 1 & 2	Technical staff of DFRR	20	Lecture and field practice OJT manual making

Output	Theme	Competency to be developed	Evaluation* Nov.2017	Capacity Assessment*	Timing & Period	Consultant in charge	Target person	Number of personnel	Tools of the training
	3. Refresher training	1) Can explain how to use the measurement equipment to others	4 4	2 1	FY1 January 2014 (4 days)	Forest Inventory Survey 1 & 2	Technical staff of DFRR	20	Lecture and field practice
		2) Can explain the purpose and the methodology of forest inventory surveys	3	1					
		3) Can input and analyse the data collected	3	1					
		4) Can develop the report of the forest inventory survey	3	1					
		5) Can develop a forest inventory survey plan							
	4. Biodiversity	1) Can explain, plan and conduct monitoring	2	0	FY2 & FY3	Forest Inventory Assistant 1 / Biodiversity			Lecture, field practice, OJT
		2) Can use and analyse the situation by using trail cameras	2	0					
Output 3 DFRR is equipped with a forest GIS database	1. Understanding of GIS database	1) Have an image of what the Forest GIS Database is. (Presentation of Japan's Forest Resource Database System)	3	1	FY1 (Sep 2013)	Forest GIS Database	Technical staff of DFRR and the staff of MRV inventory Project	15	Lecture, Q&A session
		2) Can handle GIS layers (Vector data and Image data) using GIS Software.	2	1	FY2 –FY3	Forest GIS Database	Technical staff of DFRR	5	OJT, Manual making
		3) Can use basic function of GIS Software.	2	1					
		4) Can make a presentation using GIS Software.	3	2					
		5) Can understand what Geo-database is.	3	2					
		6) Can manage Geo-database.	3	2					

Output	Theme	Competency to be developed	Evaluation* Nov.2017	Capacity Assessment*	Timing & Period	Consultant in charge	Target person	Number of personnel	Tools of the training
	2. Designing of GIS database (Geo-database)	1) Can design a simple geo-database 2) Can design a Forest GIS database 3) Can develop a Forest GIS database. 4) Can manage a Forest GIS database	2 2 2 2	0 0 0 0	FY3	Forest GIS Database	Technical staff of DFRR and the staff	3	OJT, Manual making
Output 4 A national forest monitoring plan is developed	1. National forest monitoring plan	1) DFRR can explain about a national forest monitoring plan 2) DFRR can operate the plan	4 3	0 0	FY3	Team Leader / Forest Resource Management	National forest monitoring body which will be formulated	-	JCC & Workshop

1. Number of trainees mobilised by the training category and theme

Number of trainees mobilized by year / Category and Theme	Number of Trainees mobilised by year (person)					Total Trainees mobilised by year (Man-Day)					Total Trainees mobilised (person)	Total Trainees mobilised (Man-Day)
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
Forest Inventory related training (Total)		**60**	**26**	**16**	**32**		**325**	**52**	**25**	**80**	**134**	**482**
BIODIVERSITY			13					13			13	13
CALCULATION OF VOLUME PER HECTOR OF EACH UNIT				7					7		7	7
DATA ENTERING AND PROCESSING		18					63				18	63
QAQC OF NATIONAL FOREST INVENTORY				9					18		9	18
REFRESHER TRAINING ON NATIONAL FOREST INVENTORY			13					39			13	39
REVIEW AND STANDARDIZATION OF METHODOLOGY					16					32	16	32
TRAINING ON NATIONAL FOREST INVENTORY		18					72				18	72
TRAINING ON USE OF THE FOREST GIS DATABASE/FOREST INVENTORY DATA IN PREPARATION FOR FRA REPORT					16					48	16	48
TRIAL FOREST INVENTORY SURVEY		24					190				24	190
Forest GIS-Database related training (Total)			**33**	**6**	**5**			**33**	**6**	**10**	**44**	**49**
ARCGIS ONLINE COLLECTOR BY SMARTPHONE				6					6		6	6
GIS DATABASE			33					33			33	33
MANUAL ON HOW TO USE ArcGIS ONLINE INCLUDING ACCOUNT SETTING,PREPARE DATA CREATE AND SHARE A MAP,USE COLLECTOR AND BACKUP DATA					5					10	5	10

Number of trainees mobilized by year / Category and Theme	Number of Trainees mobilised by year (person)					Total Trainees mobilised by year (Man-Day)					Total Trainees mobilised (person)	Total Trainees mobilised (Man-Day)
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
Forest Remote Sensing related training (Total)		**116**	**53**	**25**	**15**		**466**	**254**	**39**	**75**	**209**	**834**
ACCURACY ASSEMENT			10					18			10	18
ADVANCED REMOTE SENSING			20					58			20	58
BURNT SCAR FIELD SURVEY TRAINING				2					4		2	4
CLASSIFICATION A		18					90				18	90
CLASSIFICATION B		21					105				21	105
EFFECTIVE USE OF FOREST INFORMATION ON FIRE MANAGEMENT				11					11		11	11
FOREST INFORMATION TO FIRE MANAGEMENT				12					24		12	24
GENERAL INTRODUCTION OF SATELLITE IMAGE PROCESSING		14					14				14	14
GROUND-TRUTHING		21					194				21	194
PRE-CLASSIFICATION		21					42				21	42
PRE-PROCESSING		21					21				21	21
TRAINING ON EFFECTIVE USE OF THE FOREST INFORMATION TO THE FIRE MANAGEMENT					15					75	15	75
VERIFICATION DATA COLLECTION			8					23			8	23
VERIFICATION EXERCISE			15					155			15	155
Training in Japan (Total)	**3**	**3**	**3**			**54**	**51**	**54**			**9**	**159**
NFMS Training in Japan	3	3	3			63	63	63			9	159
Total	**3**	**179**	**115**	**47**	**52**	**54**	**842**	**393**	**70**	**165**	**396**	**1,524**

2. Trainees mobilised by District (total person)

Number of Trainees mobilised by District (unit: total person)														
District / Category and Theme	Francistown	Gaborone	Ghanzi	Goodhope	Kanye	Kasane	Maun	Mochudi	Molepolole	Ngamiland	Ramotswa	Serowe	Tsabong	**Total**
Total	**13**	**184**	**19**	**12**	**25**	**9**	**31**	**15**	**26**	**1**	**17**	**26**	**18**	**396**
Forest Inventory related training (Total)	8	52	5	4	9	3	13	6	9	1	7	10	7	**134**
BIODIVERSITY		7					2	1	1		1		1	**13**
CALCULATION OF VOLUME PER HECTOR OF EACH UNIT		5						1	1					**7**
DATA ENTERING AND PROCESSING	1	7	1	1	1		1	1	1	1	1	1	1	**18**
QAQC OF NATIONAL FOREST INVENTORY	2	3				1	1				1	1		**9**
REFRESHER TRAINING ON NATIONAL FOREST INVENTORY		7					2	1	1		1		1	**13**
REVIEW AND STANDARDIZATION OF METHODOLOGY	1	3	1	1	1	1	2	1	1		1	2	1	**16**
TRAINING ON NATIONAL FOREST INVENTORY	1	8	2		2		1		1			2	1	**18**
TRAINING ON USE OF THE FOREST GIS DATABASE/FOREST INVENTORY DATA IN PREPARATION FOR FRA REPORT	1	3	1	1	1	1	2	1	1		1	2	1	**16**
TRIAL FOREST INVENTORY SURVEY	2	9		1	4		2		2		1	2	1	**24**

Number of Trainees mobilised by District (unit: total person)														
District / Category and Theme	Francistown	Gaborone	Ghanzi	Goodhope	Kanye	Kasane	Maun	Mochudi	Molepolole	Ngamiland	Ramotswa	Serowe	Tsabong	**Total**
Forest GIS-Database related training (Total)		**27**	**1**	**1**	**1**		**4**	**2**	**3**		**2**	**1**	**2**	**44**
ARCGIS ONLINE COLLECTOR BY SMARTPHONE		6												**6**
GIS DATABASE		17	1	1	1		4	2	2		2	1	2	**33**
MANUAL ON HOW TO USE ArcGIS ONLINE INCLUDING ACCOUNT SETTING,PREPARE DATA CREATE AND SHARE A MAP,USE COLLECTOR AND BACKUP DATA		4							1					**5**
Forest Remote Sensing related training (Total)	**5**	**100**	**13**	**7**	**14**	**6**	**13**	**7**	**13**		**8**	**15**	**8**	**209**
ACCURACY ASSEMENT		7			1			1	1					**10**
ADVANCED REMOTE SENSING		12		1	1		2	1	1		1		1	**20**
BURNT SCAR FIELD SURVEY TRAINING		1				1								**2**
CLASSIFICATION A	1	6	1	1	1		2	1	1		1	2	1	**18**
CLASSIFICATION B		10	1	1	1		2	1	1		1	2	1	**21**
EFFECTIVE USE OF FOREST INFORMATION ON FIRE MANAGEMENT		6	1		1	1		1				1		**11**
FOREST INFORMATION TO FIRE MANAGEMENT		6	1				1		4					**12**

Number of Trainees mobilised by District (unit: total person)														
District / Category and Theme	Francistown	Gaborone	Ghanzi	Goodhope	Kanye	Kasane	Maun	Mochudi	Molepolole	Ngamiland	Ramotswa	Serowe	Tsabong	**Total**
GENERAL INTRODUCTION OF SATELLITE IMAGE PROCESSING	1	7	2	1			1				1	1		**14**
GROUND-TRUTHING	1	8	2	1	2	1	1		1		1	2	1	**21**
PRE-CLASSIFICATIO N	1	8	2	1	2	1	1		1		1	2	1	**21**
PRE-PROCESSING	1	8	2	1	2	1	1		1		1	2	1	**21**
TRAINING ON EFFECTIVE USE OF THE FOREST INFORMATION TO THE FIRE MANAGEMENT		7	1		1	1	1	1	1			1	1	**15**
VERIFICATION DATA COLLECTION		7			1									**8**
VERIFICATION EXERCISE		7			1		1	1	1		1	2	1	**15**
Training in Japan (Total)		**5**			**1**		**1**		**1**				**1**	**9**
NFMS Training in Japan		5			1		1		1				1	**9**

3. Trainees mobilised by District (Man-Day)

Number of trainees mobilised by District (unit: total Man-Day)														
District / Category and Theme	Francistown	Gaborone	Ghanzi	Goodhope	Kanye	Kasane	Maun	Mochudi	Molepolole	Ngamiland	Ramotswa	Serowe	Tsabong	Total
Total	**46**	**667**	**58**	**45**	**133**	**32**	**124**	**45**	**107**	**4**	**60**	**111**	**92**	**1,524**
Forest Inventory related training (Total)	**30**	**182**	**17**	**17**	**48**	**7**	**45**	**14**	**33**	**4**	**21**	**40**	**24**	**482**
BIODIVERSITY		7					2	1	1		1		1	13
CALCULATION OF VOLUME PER HECTOR OF EACH UNIT		5						1	1					7
DATA ENTERING AND PROCESSING	3	25	4	3	3		3	4	3	4	3	4	4	63
QAQC OF NATIONAL FOREST INVENTORY	4	6				2	2				2	2		18
REFRESHER TRAINING ON NATIONAL FOREST INVENTORY		21					6	3	3		3		3	39
REVIEW AND STANDARDIZATION OF METHODOLOGY	2	6	2	2	2	2	4	2	2		2	4	2	32
TRAINING ON NATIONAL FOREST INVENTORY	4	32	8		8		4		4			8	4	72
TRAINING ON USE OF THE FOREST GIS DATABASE/FOREST INVENTORY DATA IN PREPARATION FOR FRA REPORT	3	9	3	3	3	3	6	3	3		3	6	3	48
TRIAL FOREST INVENTORY SURVEY	14	71		9	32		18		16		7	16	7	190
Forest GIS-Database related training (Total)		31	1	1	1		4	2	4		2	1	2	49

Number of trainees mobilised by District (unit: total Man-Day)														
District / Category and Theme	Francistown	Gaborone	Ghanzi	Goodhope	Kanye	Kasane	Maun	Mochudi	Molepolole	Ngamiland	Ramotswa	Serowe	Tsabong	Total
ARCGIS ONLINE COLLECTOR BY SMARTPHONE		6												6
GIS DATABASE		**17**	**1**	**1**	**1**		**4**	**2**	**2**		**2**	**1**	**2**	**33**
MANUAL ON HOW TO USE ArcGIS ONLINE INCLUDING ACCOUNT SETTING,PREPARE DATA CREATE AND SHARE A MAP,USE COLLECTOR AND BACKUP DATA		8							2					10
Forest Remote Sensing related training (Total)	**16**	**365**	**40**	**27**	**67**	**25**	**57**	**29**	**53**		**37**	**70**	**48**	**834**
ACCURACY ASSEMENT		12			2			2	2					18
ADVANCED REMOTE SENSING		34		3	3		6	3	3		3		3	58
BURNT SCAR FIELD SURVEY TRAINING		2				2								4
CLASSIFICATION A	5	30	5	5	5		10	5	5		5	10	5	90
CLASSIFICATION B		50	5	5	5		10	5	5		5	10	5	105
EFFECTIVE USE OF FOREST INFORMATION ON FIRE MANAGEMENT		6	1		1	1		1				1		11
FOREST INFORMATION TO FIRE MANAGEMENT		12	2				2		8					24
GENERAL INTRODUCTION OF SATELLITE IMAGE	1	7	2	1			1				1	1		14

Number of trainees mobilised by District (unit: total Man-Day)														
District / Category and Theme	Francistown	Gaborone	Ghanzi	Goodhope	Kanye	Kasane	Maun	Mochudi	Molepolole	Ngamiland	Ramotswa	Serowe	Tsabong	Total
PROCESSING														
GROUND-TRUTHING	7	59	14	10	27	14	7		14		7	21	14	194
PRE-CLASSIFICATION	2	16	4	2	4	2	2		2		2	4	2	42
PRE-PROCESSING	1	8	2	1	2	1	1		1		1	2	1	21
TRAINING ON EFFECTIVE USE OF THE FOREST INFORMATION TO THE FIRE MANAGEMENT		35	5		5	5	5	5	5			5	5	75
VERIFICATION DATA COLLECTION		19			4									23
VERIFICATION EXERCISE		75			9		13	8	8		13	16	13	155
Training in Japan (Total)		**89**			**17**		**18**		**17**				**18**	**159**
NFMS Training in Japan		89			17		18		17				18	159

Appendix-10

Record of the Training in Japan

Record of the Training in Japan

Training in Japan was conducted three times in total, once a year, in 2013, 2014 and 2015. Three trainees were participated for each year and nine trainees were mobilised in total. This report describes that the list and number of the trainee, outline of each trainings and the action plans developed by the trainee as an output of the training are attached in the annex of this report.

1 Trainee dispatched to Japan

Training in Japan under the framework of the NFMS Project, was conducted for three times in the year 2013, 2014 and 2015. All trainees were the staff of the DFRR and three trainees by year and nine trainees in total were admitted. Next table shows the list of the trainee, term and the period of the Training in Japan.

Table- 1 List of the trainee, term and the period of the training in Japan

No.	Term / Period *	Name of the Trainee	Title (at the time)	Duty station
1	1st Training 3-20 Dec. 2013	Mr Anthony N. Tema	Chief Forestry & Range Resources Officer	Gaborone
2		Mr Motsheganyi Sekgopo	Project Manager of the NFMS Botswana Project Principal Forestry & Range Resources Officer I	Gaborone
3		Mr Keletso Seabo	Project leader of the SADC-MRV Project Assistant Scientific Officer	Gaborone
4	2nd Training 3-19 Dec. 2014	Ms.Tshenolo Gogola	Forestry & Range Resources officer	Gaborone
5		Mr.Wazha Lucas	Forestry & Range Resources officer	Kanye
6		Mr Etsang Phokoletso	Forestry & Range Resources officer	Molepolole
7	3rd Training 1-18 Dec. 2015	Ms Gloria Komanyane	Senior Forest Range Resource Officer	Gaborone
8		Mr Joseph Lesenya	Forest Range Resource Officer II	Tsabong
9		Ms Thomologo Mutukwa	Chief Technical Officer	Maun

*Note: traveling day was not included

出典：DFRR-JICA NFMS Botswana Project

2 Theme of the training

Training in Japan was conducted three times with the aim of strengthening technical capacity for the National Forest Monitoring System, such as satellite image analysing, forest inventory and forest GIS database through the lecture and exercises, and understanding the challenges associated with the NFMS.

Theme, outputs and the schedule for each training are shown as following:

2.1 Outlines of the Training

Training in Japan (FY1)：

- ❖ Theme : Training on satellite image analysis by using remote sensing for the development and updates of the forest distribution map
- ❖ Output1. To learn the efforts in Japan for the sustainable forest management by using the tools such as the Forest GIS Database, Forest Remote Sensing and the forest inventory

- ❖ Output 2. To learn the examples on the sustainable forest management, by using the forest information, in the Prefecture level.
- ❖ Output 3. To learn the examples on various forest information technologies.
- ❖ Output 4. To be able to show the direction and the improvement points for the forest information and the forest distribution map development and its updates through the above mentioned Outputs.

Table- 1 Schedule of the Training (FY1)

Date (MM/DD)	Time	Program	Organisation
12/3(Tue)	9:30-12:00	Briefing	JICA
	14:00-15:30	Courtesy Call to JICA	JICA
	15:30-16:30	Program Orientation, Explanation of training purpose, contents, schedule	OC
12/4(Wed)	10:30-12:30	Forest Administration in Japan	JAFTA
	13:30-16:30	Forest Planning System in Japan	
12/5(Thu)	10:00-12:00	Forest Information Management in Japan (Outline of the Forest Resource Database and National Forest Monitoring System in Japan), Server room tour	Japan Forestry Agency
	13:30-17:30	International trends in forest monitoring	JAFTA
12/6 (Fri)	10:00-12:20	Museum Tour (Satellite sensor using in Japan)	JAXA Tsukuba Space Centre
	13:30-13:50	Outline of GIS	Geospatial Information Authority of Japan
	13:55-14:20	Digital Japan Basic Map	
	14:25-14:50	Application of the Digital Basic Map	
	15:00-15:30	Museum Tour	
12/7(Sat)-12/8(San)		-	-
12/9 (Mon)	10:00-16:00	Vegetation in Japan	Tama Forest Science Garden
12/10 (Tue)		Move to GIFU	
	13:30-16:00	Tour and Observation of Gifu City Area using Satellite Images / Observation of the influence of sloping terrain in the landscape and vegetation using satellite images	JAFTA
12/11(Wed)	10:00-15:00	Management and updating of forest database of Gifu Prefecture	Forest Policy Dept., Gifu Prefectural Government
12/12(Thu)	10:00-15:00	Lecture and Forest Tour: Forest Inventory	Gifu Prefectural Research Institute for Forests
12/13(Fri)	10:00-12:00	Application of Remote Sensing for Forest Management	River Basin Research Centre Gifu Univ.
	-	Move to Tokyo	-
12/14(Sat)-12/15(San)		-	-
12/16(Mon)	9:00-12:00	Forest Survey using Ground-based Lasers	Chiba Univ.
		Move to Hokkaido	
12/17(Tue)	9:30-15:30	Monitoring of Environment using GIS / National Park Management using GAP Analysis	Rakuno Gakuen Univ.
12/18(Wed)	9:30-12:00	Invest model for biodiversity evaluation. / Wild Animals management in Hokkaido	Rakuno Gakuen Univ.
	13:30-15:00	Airborne mapping / GIS for local government	
12/19(Thu)	-	Move to Tokyo	-
12/20(Fri)	9:30-12:00	Preparation for action plan presentation / evaluation	OC
	13:30-15:30	Presentation of the Action Plan / Evaluation	

JAXA: Japan Aerospace Exploration Agency, JAFTA: Japan Forest Technology Association, OC: Oriental Consultants Co., Ltd.

2.2 Training in Japan (FY2)

Outline of the Training in Japan FY2：

- ❖ Output 1 To learn basic technology on the forest remote sensing, forest inventory survey
- ❖ Output 2 To learn applied forest inventory survey techniques
- ❖ Output 3 To understand the management and the utilization of the national and prefectural level forest monitoring system
- ❖ Output 4 To be able to show the direction and the improvement points for the forest monitoring system in Botswana, through the above mentioned Outputs

Table- 2 Schedule of the Training in Japan (FY2)

Date (MM/DD)	Time	Program	Organisation
12/3(Wed)	10:00 - 12:30	Orientation	OCG
	14:00 - 15:00	GIS Database in Japan	Forestry Agency
12/4(Thu)	10:30 - 13:00	Museum Tour	JAXA
	14:00 - 14:20	Presentation of the Geospatial Information Authority of Japan	Geospatial Information Authority of Japan
	14:25 - 14:50	Digital Japan Basic Map	
	14:55 - 15:20	Application of Basic Map	
	15:30 - 16:20	Museum Tour	
12/5(Fri)	10:00 - 15:00	Vegetation in Japan	Tama Forest Science Garden
12/6(Sat)	-	-	-
12/7(San)	-	-	-
12/8(Mon)	10:00 - 12:00	Forest Administration in Japan	JAFTA
	13:00 - 15:00	Forest Management System in Japan	
12/9(Tue)	10:00 - 12:00	National Forest Monitoring System in Japan	JAFTA
		Move to Gifu	
12/10(Wed)	10:00 - 15:00	History of relationship between wildlife and human	Gifu Univ.
12/11(Thu)	10:00 - 15:00	Forest and forestry in Gifu	Gifu Prefectural Government
		Management and updating of forest GIS database of Gifu Pref.	
		Natural Parks in Gifu Pref.	
12/12(Fri)	10:00 - 16:00	Application of the Ground-based Lasers	Forest Revitalization System Co. Ltd.
12/13(Sat)	-	-	-
12/14(San)	-	-	-
12/15(Mon)	10:00 - 16:00	Forest Inventory Survey	Gifu Prefectural Forest Institute
12/16(Tue)	-	Move to Tokyo / Preparation of Action Plan and Evaluation	-
12/17(Wed)	10:00 - 16:00	SAR image analysis / interpretation	RESTEC
12/18(Thu)	10:00 - 16:00	Basic Training on SAR	
12/19(Fri)	10:00 - 13:00	Basic Training on SAR	
	15:00 - 16:30	Action Plan / Evaluation	OCG

JAXA: Japan Aerospace Exploration Agency, JAFTA: Japan Forest Technology Association, RESTEC: Remote Sensing Technology Center of Japan, OCG: Oriental Consultants Global Co., Ltd.

2.3 Training in Japan (FY3)

Outline:

- ❖ Theme To improve forest monitoring related skills
- ❖ Output 1. To improve forest monitoring related knowledges

❖ Output 2. To improve forest monitoring related technologies

- in National and Prefectural level
- Economic valuation of the forest, community forest monitoring, Web-based forest information sharing system, Forest fire management, forest measurement by 3D Laser Scanner, the latest forest measurement technologies, forest remote sensing (Radar data) etc.

❖ Output 3. To be able to show the direction and the improvement points for the forest monitoring system in Botswana, through the above mentioned Output (Action plan making)

Table- 3 Schedule of the Training in Japan (FY3)

Date	Time	Program	Organisation
12/1	10:00 - 12:00	Briefing	JICA
	13:00 - 15:00	Orientation of the Program	OCG
12/ 2	10:30 - 11:30	National Forest Resource Database	Forestry Agency
	13:10 - 14:00	Outline of the forest resource monitoring in Japan	
	14:10 - 15:00	Forest fire management in Japan	
	15:10 - 16:30	Forest Planning System in Japan	
12/ 3	10:00 - 12:00	Damage analysis by wild animals and forest inventory survey	JAFTA
	13:30 15:00	Damage and countermeasure against Sika Deer	
12/ 4	10:00 - 16:00	Vegetation in Japan	Tama Forest Science Garden
12/ 5	-	-	-
12/ 6	-	-	-
12/ 7	10:00 - 12:00	Role and utilisation of the forest information system in Japan	PCKK
	13:00 - 15:00		
12/ 8		Move to Shizuoka Pref.	OCG
	13:00 - 15:00	Miho Coastal Pine Forest Reserve	
12/ 9	10:00 - 12:00	Forest GIS in Shizuoka Pref.	Shizuoka Prefectural Government
	13:00 - 14:00		
	14:00 - 15:00	Server room tour	
		Move to Toyota	
12/ 10	10:05 - 12:00	Forest Health Check (Participatory forest inventory) and Web-based forest information sharing system	Yahagi River Forest Volunteer Committee
	13:00 - 15:00		
12/ 11	-	Move to Tokyo	-
12/ 12	-	-	-
12/ 13	-	-	-
12/ 14	10:00 - 16:00	Application of the Ground-based Lasers	Forest Revitalization System Co. Ltd.
12/ 15	10:00 - 12:00	Latest forest measurement technologies	Chiba Univ.
	14:00 16:00	Basic Training on SAR	RESTEC
12/ 16	10:00 - 16:00	Basic Training on SAR	
12/ 17	10:00 - 16:00	SAR image analysis / interpretation	
12/ 18	9:30 - 12:00	Preparation of Action Plan / Evaluation	OCG
	13:30 - 15:30	Presentation of Action Plan / Evaluation	

JAXA: Japan Aerospace Exploration Agency, JAFTA: Japan Forest Technology Association, PCKK: Pacific Consultants Co., Ltd., RESTEC: Remote Sensing Technology Center of Japan, OCG: Oriental Consultants Global Co., Ltd.

3 Action Plan

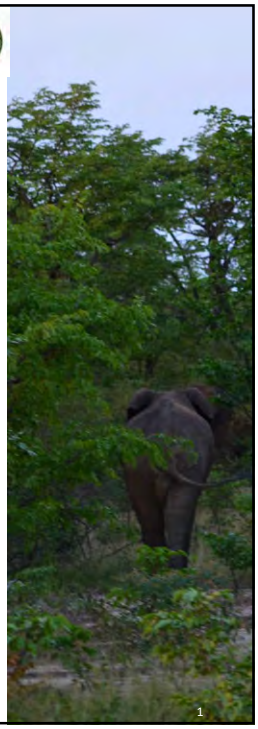
The Action Plans developed in FY1, FY2 and FY3, by trainees are attached in the annex.

Action Plan FY 1

NFMS
BOTSWANA

SWOT Analysis on Botswana's SFM using forest information

By:
Anthony Tema
Motsereganyi Sekgopo
Keletso Mike Seabo



1

NFMS
BOTSWANA

SWOT Analysis on Botswana's SFM using forest information

Strengths

- Good governance i.e. legislation documents promoting sustainable use of forest resources
- Availability of man power
- GIS and Remote sensing lab operational
- Staff trained on basic application of GIS & Remote sensing applications
- Experienced staff on forest data collection i.e. forest inventory

Weaknesses

- Poor implementation of legislation & policy
- No baseline data
- Lack of capacity to develop modern technology
- Insufficient funding for forest research
- Shortage of transport

2

NFMS
BOTSWANA

SWOT Analysis on Botswana's SFM using forest information

Opportunities

- Develop capacity building
- Secure modern forest monitoring technology
- Improved implementation of legislation & Policy
- Collaboration with other interested parties

Threats

- Staff retention i.e. loss of trained staff to other departments
- Lack of community awareness on sustainable use of forest resources
- Illegal and overharvesting of forest resources
- Policy conflict on resources utilization/management (Tourism vs. Forestry)
- Wildfire

3

Reflections of JICA training in Japan: Satellite image analysis for the Development of National Forest Monitoring System (NFMS) in Botswana

4

Background Information about Botswana

Botswana	Japan
Agricultural Resource Act, Herbage preservation Act , Forest Act & Forest Policy	Forest Act & Forest basic Act
Total land area(582000 km^2) Communal land (70%), Free hold (5 %), State land (25% i.e FR, NP, GR, Cities &Towns)	Natural (39%) & Artificial (28%) Forests: National & Non National
Forest reserves constitute 1% of total land area of Botswana	

5

Major Issues/ Challenges

Botswana	Japan
Lack of baseline data/technology Forest resources valuation Resource standing stock Signatory to International agreements REDD+, CITES, FRA, CBD,UNCCD, UNFCCC	**Baseline data available** •Forest resources valuation
Lack of skilled manpower	**Highly skilled manpower**
Inadequate modern technology	**Adequate modern technology**

6

Final target
(future image of Botswana NFMS)

- Accurate and timely information will promote better informed policy decision making
- Improved management of resources by DFRR & communities
- Sustainable utilization of resources by communities e.g. project establishment

7

Post 2014

- National forest baseline information available
- Fully operational forest GIS database available
- National forest distribution map available
- Highly competent technical staff on modern forest measurement technology i.e. both information generation and analytical expertise
- Use of high resolution and accurate forest measurement technology

8

Post 2014

- Accurate and timely forest resources information for informed decision making
- Community based management of resources
- Continued collaboration beyond the lifespan of NFMS project

9

Domo Arigatou Gozaimus

Thank you

10

Action Plan FY 2

INTRODUCTION

Botswana is a landlocked country located at the Centre of the southern Africa region, It is surrounded by countries such as Namibia in the west and north, Zambia and Zimbabwe in the north east, and South Africa in the east and south.

- **Area:** approximately 585,000 km²
- **Population:** 2 million (2011 pop. Census)
- **Capital City:** Gaborone
- **Districts:** 10 (considered as prefectures in Japan) Figure 1
- **Languages:** Setswana and English (Official)
- **Religion(s):** Christianity
- **Currency:** BWP/ Pula
- **Political status:** Multi-party state
- **Height above sea level:** 1000 m
- **Climate:** semi-arid (Annual rainfall and temp) *Botswana is 84% covered by Kalahari desert*.
- **Vegetation: -** Shrub Savannah Woodland. Figure 2

rests and woodlands >60% occur on communal/ tribal land.

reserves =1% occur in state land

Figure 1 BOTSWANA DISTRICTS

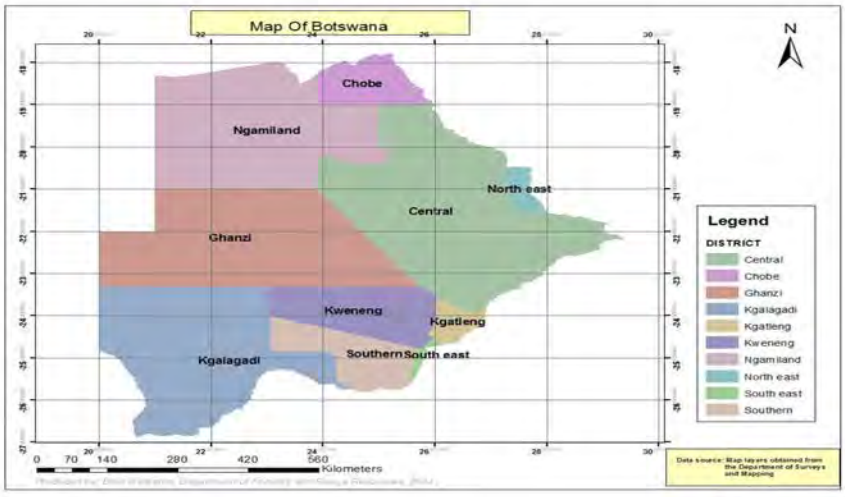
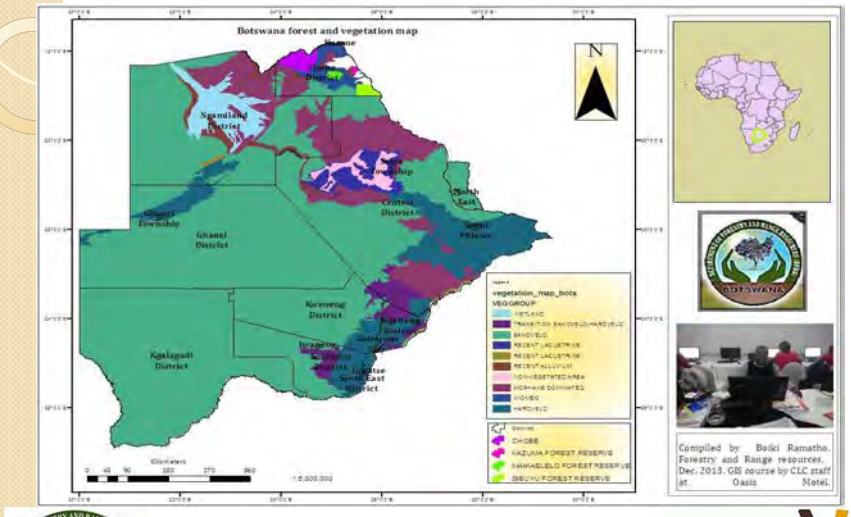


Figure 2 BOTSWANA VEGETATION MAP



BOTSWANA
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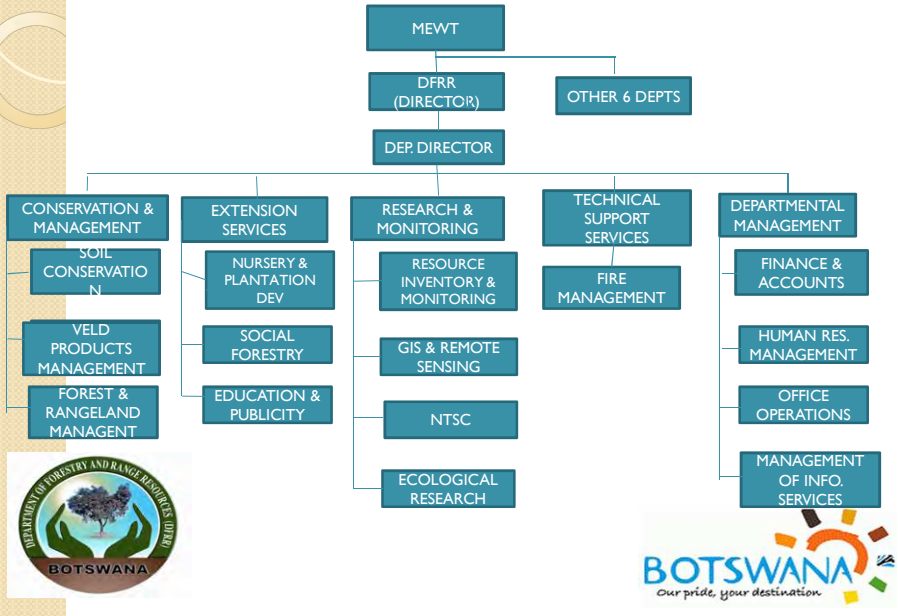
ORGANISATIONAL STRUCTURE FOR DFRR



BOTSWANA
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DEPARTMENTAL MISSION, VISION & VALUES

VISION

- To be a leader in the sustainable management and conservation of forest and range resources

MISSION

We exist to manage and conserve forest and range resources in order to insure their sustainable use and improve the socio economic development of Botswana

We do this through:

- Generation of information on forestry and range resources
- Promotion of Public Awareness on forest and range resources
- Promotion of income generating programmes for communities
- Management of wild land fires

VALUES: Commitment, Timeliness, Integrity, Team spirit, Honesty, Tolerance, Compassionate, Innovativeness, Gender Sensitiveness

DIVISIONAL OBJECTIVES

CONSERVATION & MANAGEMENT

Responsible for developing, implementing & monitoring policies & programmes in the conservation & utilisation of forest, range resources & other habitats.

EXTENSION SERVICES

Promote forest & range resources developments& provide extension services through awareness creation, provision of technical knowledge, educational skills, demonstration & training.

RESEARCH & MONITORING

Address vegetation resources related research in line with national & international scientific principles & standards.

TECHNICAL SUPPORT SERVICES

Responsible for wild land fire management

DEPARTMENTAL MANAGEMENT

Provide, coordinate & manage all departmental resources

CURRENT SITUATION OF BOTSWANA ON FOREST MANAGEMENT

- Land degradation
- Overgrazing/ Overstocking
- Deforestation
- Wild land fires
- Illegal mining activities
- Animal Damage (e.g. Elephants)
- Conflicting policies
- There are numerous forest reserves in the Chobe district, northern Nata state lands and the land north of the Okavango Delta, with inventories either already undertaken or being planned (Tamacha/ Mohembo-Ngamiland, Chobe, Makomoto-North East). Such inventories are effective in establishing the quantity of timber available.

MITIGATION MEASURES

- Concerted efforts are made to conserve and regenerate Botswana's valuable but ever-diminishing forest.
- Tree planting programmes are helping to alleviate this problem, at same time increasing public awareness of trees as protectors of the environment and providers of useful products.
- Management of wildland fires
- Land rehabilitation projects
- Community Based Natural Resources Management Programme (CBNRM)
- Establishment of Backyard Tree Nurseries
- National Tree Seed Centre

BENEFITS OF FOREST RESOURCES

- Fencing Poles
- Construction poles
- Thatching grass
- Fuel wood
- Wild fruits/ food
- Crafts products
- Ecotourism
- Medicinal products

SWOT ANALYSIS

STRENGTHS **-skilled manpower** **-political stability** **-presidential tree planting initiative** **-Abundance of forest resources** **-fast growing economy**	**WEAKNESSES** **-misplacement of skilled manpower** **-poor work ethics** **-shortage of funds** **-staff migration** **-unfunctional policies** **-use of outdated data** **-shortage of resources**
OPPORTUNITIES -donor funding agencies -land availability	THREATS -global economic recession -natural disasters (drought, wild land fires/ floods, diseases etc) -Animal Damage

ACTION PLAN

SHORT TERM

- Development of Nation Wide Forest Distribution Map by 2016
- To develop National forest inventory methodology by 2016
- Development and implementation of Forest Act
- Promote extension outreach services through education and training

MEDIUM TERM

- To fully equip GIS lab
- Develop forest resources database
- To set harvesting quotas for veld products
- Development of management plans for community and government woodlots
- Implementation of Ecotourism in Forest Reserves
- Promote social/ community forest programmes
- Establishment of forest research centre

ACTION PLAN "Cont…"

LONG TERM

- To develop tree volume tables for common species
- To develop strategies and monitoring programmes for the conservation and protection of soils in areas with high risk of environmental degradation
- Source more donor funding for environmental conservation.

OBSERVATIONS OF THE TRAINING COURSE.

- The course objectives were appropriate according to the needs of our country/ organization as we are in the process of developing national forest monitoring system.
- The duration for hands on exercises was very limited as compared to benchmarking.
- More practical was needed on basic techniques and knowledge on forest remote sensing and forest inventory survey.
- The training introduced more advanced/ new techniques on forest planning and management.
- Our stay in Japan during this training course was enjoyable "fantastic" as we received good care and guidance from JICA expert, coordinator and staff.

Japanese people we very friendly and welcoming despite language barrier.

RECOMMENDATIONS

- JICA assistance in the development of tree volume tables for common species in Botswana.
- JICA assistance in the development of soil and water conservation strategies
- JICA assistance in the establishment of forest research center
- JICA assistance in the use of remote sensing in design and construction of road network

THANK YOU

DEPARTMENT OF FORESTRY AND RANGE RESOURCES (DFRR)
BOTSWANA

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Our pride, your destination

Action Plan FY 3

THE PROJECT FOR ENHANCING NATIONAL FOREST MONITORING SYSTEM FOR THE PROMOTION OF SUSTAINABLE NATURAL RESOUCE MANAGEMENT IN THE REPUBLIC OF BOTSWANA

LESSONS FROM JAPAN

1st -18th DECEMBER, 2015

GLORIA NEO KOMANYANE , JOSEPH LESENYA, THOMOLOGO MUTUKWA

Department of Forestry and Range Resources
Private Bag 00424
Gaborone, Botswana

Tel: +267 3954050
Fax: +267 3954051

1

INTRODUCTION

Department of Forestry and Range Resources Mandate :

To conserve, protect and sustainably manage the country's forest and rangeland resources.

To achieve mandate*:*

- *Collaboration with JICA on NFMS Project*

Prosopis juliflora

Barkea plurijuga

2

NFMS PROJECT BACKGROUND & PROGRESS

- Project duration was initially 3 years(July 2013 to June 2016),
- Extension of 18 months

Expected Outputs:

Nationwide forest distribution map is produced

Methodology for national forest inventory is established

Department is equipped with a forest GIS Database

A national forest monitoring plan is developed

3

PROJECT BACKGROUND & PROGRESS CONT…

PROGRESS

- 3rd version of forest distribution map is currently under review.
- Full scale inventory begun, second phase starts in February 2016.
- DFRR staff (approx 20) trained in data collection, inventory methodology and GIS & Remote sensing.
- Bench marking trips and short courses in Japan for about 13 DFRR staff engaged in the project sponsored fully by JICA

4

OBJECTIVES OF USAGE OF NFMS

- Sustainable utilisation and monitoring of forest resources
- Determine amount/quantity of forest and range resources for management purposes
- Forest information integration and dissemination

5

NFMS
BOTSWANA

LESSONS LEARNT

TOPIC	LESSONS LEARNT
National Forest Resources Database	• To establish data sets takes time i.e 15yrs. • Images also collected in data base. • Reduced carbon dioxide emission by 3.8% through afforestation. • Database information used for measuring biomass, CO_2 sequestration. • Forest registry system with information on each compartment and sub compartment. • Field survey every cycle of 5 years, with control survey. • High security of database with limited access (2 or 3 personnel), Prefectures cannot direct access data base. • Backup data preserved at a Remote location. • Government out sources for expertise from private companies e.g JAFTA

6

NFMS
BOTSWANA

LESSONS LEARNT

TOPIC	LESSONS LEARNT
Animal Damage Monitoring	• Database provide information used on ecosystem health analysis: Animal damage, Oak wilting etc • Countermeasures for Sika Deer damage available e.g. influencing feeding pattern of Sika Deer.

7

NFMS
BOTSWANA

LESSONS LEARNT

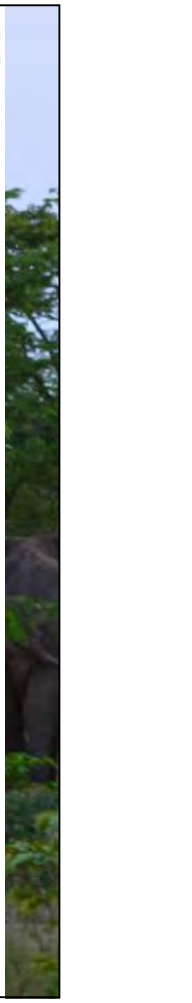
TOPIC	LESSONS LEARNT
Forest Vegetation of Japan (Tama Forest Garden)	• Research and preservation of desired and/ or endangered species e.g. Cherry blossoms. • Develop educational programmes. • Forestry and biodiversity museum: Flowers, insects, Sika deer, Equipment's and tools. • Tama Forest Science Garden a precious genetic resource.

8

NFMS BOTSWANA

LESSONS LEARNT

TOPIC	LESSONS LEARNT
Roles and examples of forest information system in Japan	• Comparison of forest in Japan and Botswana. • Planted forest in Japan is 41% / 66% ratio of forests area. • Forestry industry is driven by private owners; local community and individuals. • Forestry planning at individual, local. National level.



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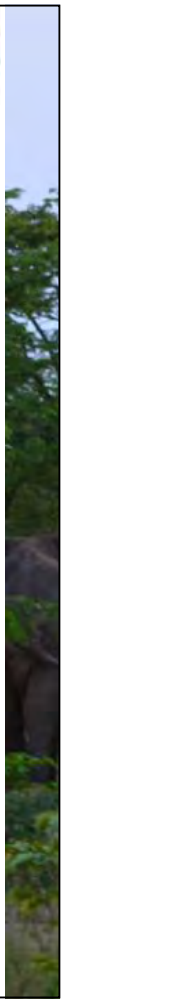
NFMS BOTSWANA

LESSONS LEARNT

TOPIC	LESSONS LEARNT
Black pine forest visit	• Mihonomatsubara – forest planted for disaster prevention. • Aesthetic value, held sacred • Black pine research by different organization. • Mount Fuji heritage site



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NFMS BOTSWANA

LESSONS LEARNT

TOPIC	LESSONS LEARNT
Forest GIS in Shizuoka Prefecture	• Japan uses timber for building • Forests managed for timber production, sustainable livelihoods. • Species distribution map • A registry of Forests resources' in Shizuoka prefecture.

11

NFMS BOTSWANA

LESSONS LEARNT

TOPIC	LESSONS LEARNT
Forest Health Check	• Participatory (community based) forest investigation • Basic health check method • Simple, cheap equipment e.g Shakuzou, fishing poles • Protective clothing e.g Helmet

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NFMS BOTSWANA

LESSONS LEARNT

TOPIC	LESSONS LEARNT
Utilisation of ground laser Latest forest investigation technology	• Use of compact Laser to acquire forest stands information e.g DBH, height, density. • Laser used to improve accuracy in forests inventory. • New invention specifically for forestry data collection. • Owl laser is cheap but cannot be used in rainy conditions or where there is lot of herbaceous layer or broad leaved trees • SICK laser sensor can be used for broad leaved trees and is relatively cheap • UAV utilization in Forests monitoring

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NFMS BOTSWANA

LESSONS LEARNT

TOPIC	LESSONS LEARNT
SAR basics **SAR Image Interpretation**	• Desktop GIS • Other functions within Arc GIS • SAR images, interpretation basics and application of the technology in forestry (above ground biomass, deforestation monitoring, land cover classification)

14

SWOT Analysis on Botswana's situation on NFMS

Strengths

- External assistance from JICA including training
- Political will and stability
- Conservation through acts and policies
- Trained personnel (Professionals & technicians)
- Training of staff at different districts - NFMS
- Young and active workforce
- Community engagement (Trusts, NGOs etc)

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Weaknesses

- Slow and sluggish uptake due to bureaucratic red tape
- Shortage of resources e.g. Transport
- Less experience on NFMS.
- Poor enforcement of legislation
- Natural forests only(no planted forests),concentrated in small part of country.
- International agreements hindering management (e.g CITES, control in # of elephants)
- Valuation of forest resources not done
- Poor implementation of projects
- Lack of baseline data

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Opportunities

- Funding from donors e.g JICA, UNDP, NEF, FCB.
- Obligations to international agreements e.g UNCCD
- More focus on forestry and conservation
- Training – expertise
- Continuous support from Government

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Threats

- High staff turnover
- Global warming/ environmental regime change (drought, wildland fires)
- Future economic outlook (if negative)
- Wildlife and fire damage (loss of species diversity)
- Sustainability problem due to lack of funding/ political will
- 84% of Botswana-desert area
- Public perception - low value of forests

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ACTION PLAN

Short term (before end of project)

- NFMS functional
- Security of database
- Staff trained (in all districts)
- Procurement of equipment
- Vegetation Distribution map
- Conduct inventory (5 year cycle)
- Valuation of forest resources

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ACTION PLAN CONT…

Medium term (5 years)

- Forest Information System in place
- Species distribution maps (districts)
- Forest Damage Monitoring (Elephants and wildland fire)
- Revive forestry plantations
- Engage community i.e Chobe Enclave, Mababe, Tshwaragano Trust on management of forests
- Public education plan (to sensitize the public about value of forests)
- Updating of data/map

20

ACTION PLAN CONT…

Long term (10 years)

- Updated vegetation distribution map available with ability to overlay various shape files to map other situations e.g species
- Implementation of forest act and regulations
- Continuous monitoring of inventory transects/plots
- Forest registry (natural forests and plantations).

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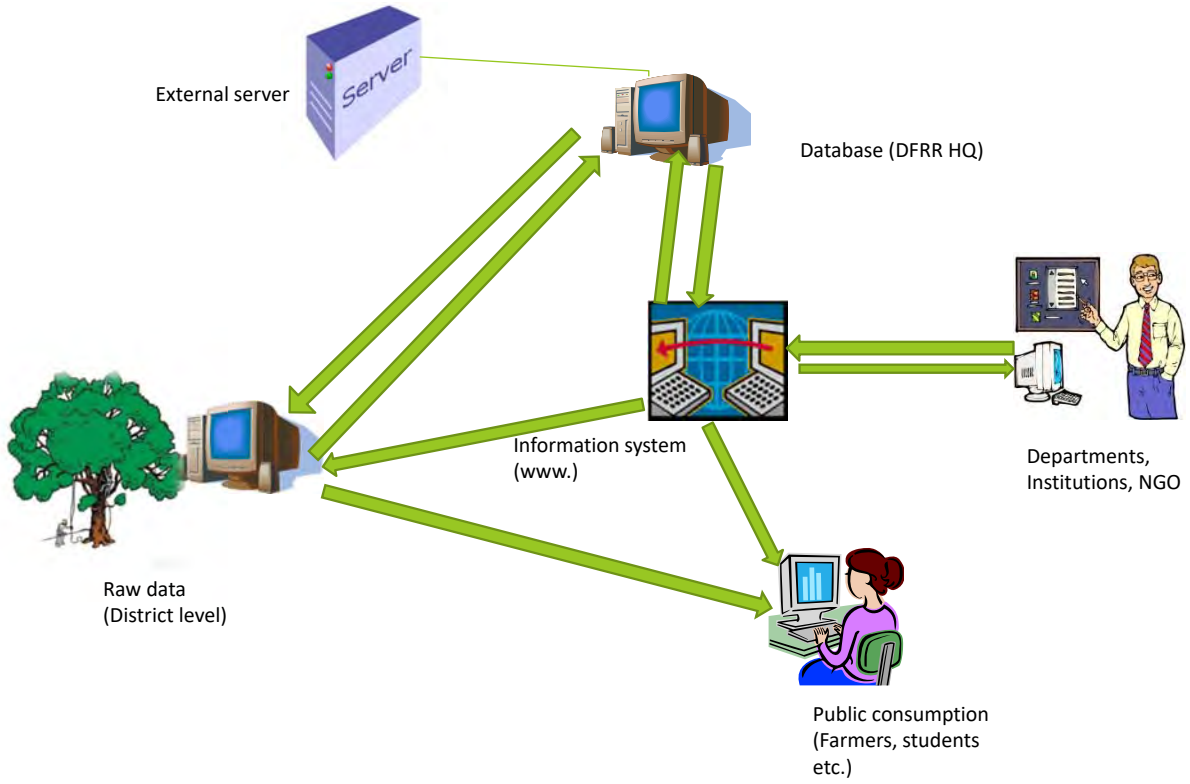
NFMS INFORMATION SHARING STRUCTURE



22

Re a leboga

Arigatou Gozaimasu

23

Appendix-11

Interpretation Table

<table>
<tr><td colspan="4">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-23</td><td colspan="2">Interpreter: M.Muzila</td></tr>
<tr><td rowspan="6">Class/Landcover</td><td rowspan="6">Forest</td><td colspan="2">Dry forest</td></tr>
<tr><td colspan="2">Density: (High) Mid Low</td></tr>
<tr><td colspan="2">Tree Height: 1m – 8m</td></tr>
<tr><td colspan="2">Tree Species: T.Pruniodes, C. Mopane, Z. Macronate, X. Americana, G. Bicola</td></tr>
<tr><td colspan="2">Canopy cover: 80%</td></tr>
<tr><td colspan="2">Soil Color: Brown</td></tr>
<tr><td colspan="4">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>419624</td><td colspan="2">District: Central</td></tr>
<tr><td>Northing (Y)</td><td>7643874</td><td colspan="2">Site Description(Location): Thalamabedi</td></tr>
<tr><td colspan="4">Comment</td></tr>
<tr><td colspan="4">Photograph (Photo ID: JICA6408_GTS_20141009_2504)</td></tr>
<tr><td colspan="3">Image
  </td><td>[Description]
Acquired date: 2014-08-23
Photo by: M. Muzila
Direction: degrees</td></tr>
<tr><td colspan="4">Satellite Image (Sensor: Landsat 8)</td></tr>
<tr><td colspan="2">Original Image: (Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Greenish Yellow
Texture: smooth</td></tr>
<tr><td colspan="2">NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.479699</td></tr>
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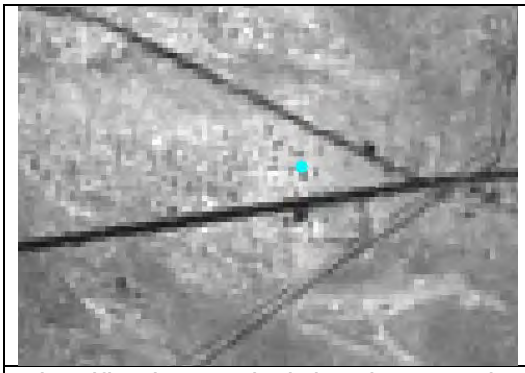
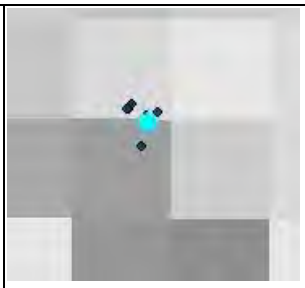
<table>
<tr><td>  </td><td>  </td><td></td></tr>
<tr><td>Classification Analysis(Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band combination:432
Color: Reddish Brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The color image of the composite image (Band 4, 3 and 2) shows reddish brown color which indicates that the area has vegetation. The reddish brown color shows the density of vegetation is dense indicating that this is forest.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-24</td><td>Interpreter: M.Muzila</td></tr>
<tr><td rowspan="8">Class/Landcover</td><td rowspan="8">Forest</td><td>Dry forest</td></tr>
<tr><td>Density: (High) Mid Low</td></tr>
<tr><td>Tree Height: 1m – 11.2m</td></tr>
<tr><td>Tree Species: T.Serecia, C. Collinum, P. Nelsii</td></tr>
<tr><td>Canopy cover: 70%</td></tr>
<tr><td>Soil Color: Grey</td></tr>
<tr><td>Geology: Soil</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>289938</td><td>District: Central</td></tr>
<tr><td>Northing (Y)</td><td>7860809</td><td>Site Description(Location): N. Nata</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_2507)</td></tr>
<tr><td colspan="2">Image
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Acquired date: 2014-08-24
Photo by: M. Muzila
Direction: degrees</td></tr>
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 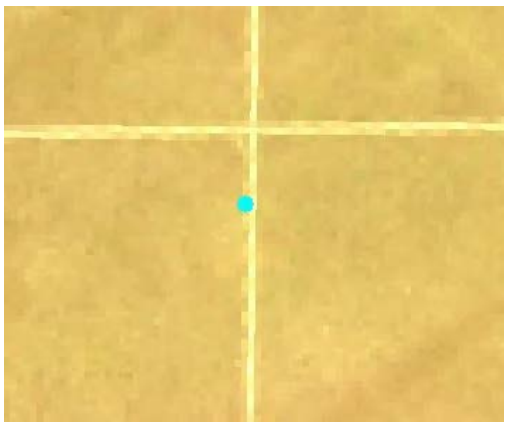 </td><td>Scale: 2000
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Texture: smooth</td></tr>
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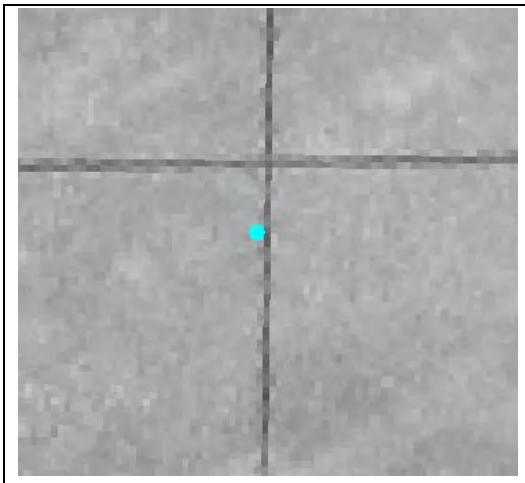
<tr><td>  </td><td>  </td><td></td></tr>
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 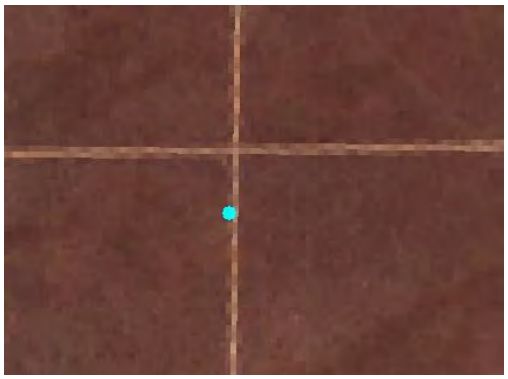 </td><td>Scale: 2000
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Band combination:432
Color: Reddish Brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The color image shows reddish color which indicates that the area has vegetation. The reddish color shows the density vegetation is less and very sparse indicating that this is shrub lang.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-13</td><td>Interpreter: B. Matlhodi</td></tr>
<tr><td>Class/Landcover</td><td>Woodland</td><td>Dry Woodland</td></tr>
<tr><td rowspan="7"></td><td rowspan="7"></td><td>Density: High (Mid) Low</td></tr>
<tr><td>Tree Height: 2m – 5.6m</td></tr>
<tr><td>Tree Species: G. Flavarescence, T. Serecia</td></tr>
<tr><td>Canopy cover: 15%</td></tr>
<tr><td>Soil Color: Greyish brown</td></tr>
<tr><td>Geology: Soil</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>326075</td><td>District: Kweneng</td></tr>
<tr><td>Northing (Y)</td><td>7315890</td><td>Site Description(Location): S.E Letlhakeng</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_0297)</td></tr>
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  </td><td>[Description]
Acquired date: 2014-08-13
Photo by: G. Lavoie
Direction: 88 degrees</td></tr>
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 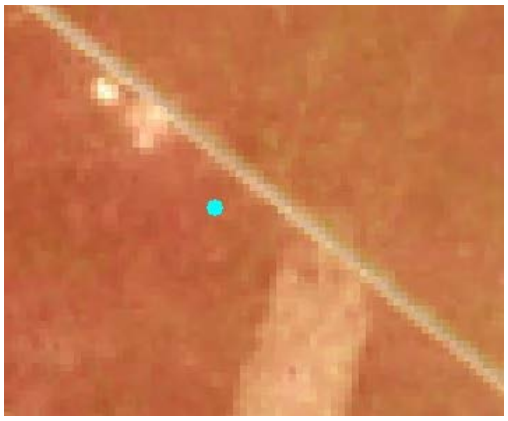 </td><td>Scale: 2000
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Band Combination:654
Color: Reddish
Texture: smooth</td></tr>
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Numeric value of NDVI: 0.276693</td></tr>
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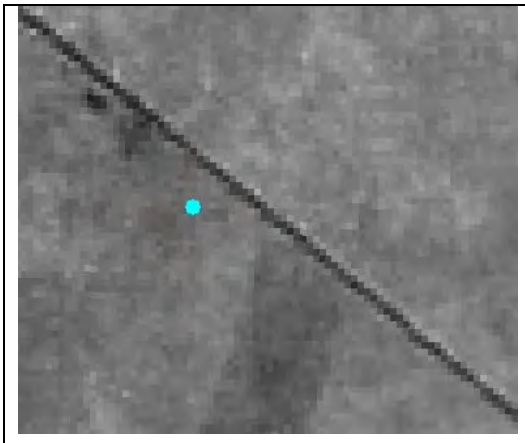
<tr><td>  </td><td>  </td><td></td></tr>
<tr><td>Classification Analysis(Scale: 25000)
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  </td><td>[Description]
Band combination:432
Color: Reddish brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image (band 4, 3 and 2) shows reddish broiwn color which indicates that the area has vegetation. The reddish brown color shows the density of the vegetation is less indicating that this is woodland.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-21</td><td>Interpreter: T>Mutukwa</td></tr>
<tr><td>Class/Landcover</td><td>Woodland</td><td>Dry Woodland</td></tr>
<tr><td rowspan="7"></td><td rowspan="7"></td><td>Density: High (Mid) Low</td></tr>
<tr><td>Tree Height: 1m – 5.8m</td></tr>
<tr><td>Tree Species: A. Mallifera, G. Flava</td></tr>
<tr><td>Canopy cover: 40%</td></tr>
<tr><td>Soil Color: Brown</td></tr>
<tr><td>Geology: Soil</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>399844</td><td>District: Central</td></tr>
<tr><td>Northing (Y)</td><td>7409852</td><td>Site Description(Location): N. Mokgenene</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_2429)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-08-21
Photo by: M. Muzila
Direction: 88 degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor: Landsat 8)</td></tr>
<tr><td>Original Image: (Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Greenish yellow
Texture: smooth</td></tr>
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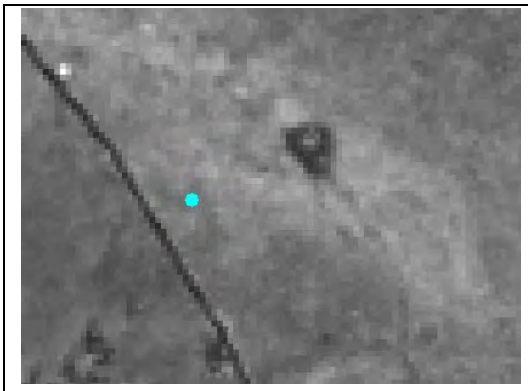
<tr><td>  </td><td>  </td><td></td></tr>
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 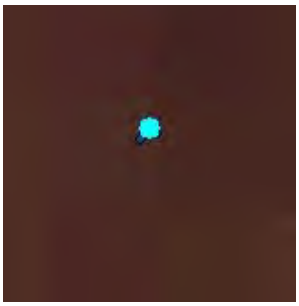 </td><td>[Description]
Band combination:432
Color: Brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image (band 4, 3 and 2) shows brownish color which indicates that the area has vegetation. The greenish yellow color from the composite image (band 6, 4 and 2) shows the density of the vegetation is less dense indicating that this is woodland.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-12</td><td>Interpreter: G.Lavoie</td></tr>
<tr><td rowspan="7">Class/Landcover</td><td rowspan="7">Rangeland with vegetation</td><td>Savanna</td></tr>
<tr><td>Density: High Mid (Low)</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species: Grass</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color: Brown</td></tr>
<tr><td>Geology: Sady</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>705923</td><td>District: Kweneng</td></tr>
<tr><td>Northing (Y)</td><td>7389703</td><td>Site Description(Location): South Tsetseng</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_0711)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-08-12
Photo by: G.Lavoie
Direction: 93 degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor: Landsat 8)</td></tr>
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 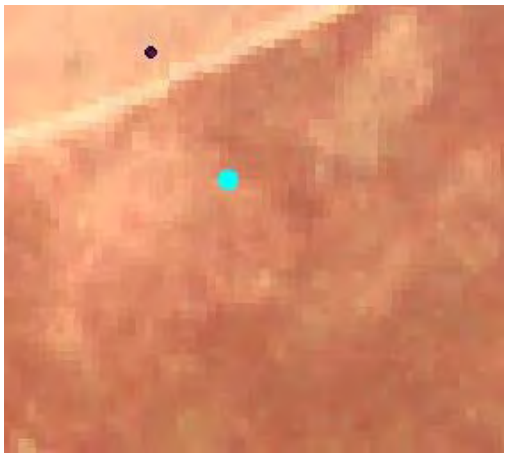 </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Reddish
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.204618</td></tr>
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Classification Analysis(Scale: 25000) 	Scale: 2000 	[Description] Band combination:432 Color: Brown Texture: smooth
Summary: The composite color image (Band 4, 3 and 2) shows brown color which indicates that the area has vegetation. The brown color shows the density of the vegetation is less and very sparse indicating that this is shrub land.		

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-09-18</td><td>Interpreter: K. Matshware</td></tr>
<tr><td rowspan="6">Class/Landcover</td><td rowspan="6">Rangeland with vegetation</td><td>Shrub/Bush</td></tr>
<tr><td>Density: High Mid (Low)</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species: Grass</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color: Brown</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>647774</td><td rowspan="2">District: Ngamiland
Site Description(Location): South Sehithwa</td></tr>
<tr><td>Northing (Y)</td><td>7685536</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_2683)</td></tr>
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  </td><td>[Description]
Acquired date: 2014-09-18
Photo by: M.Muzila
Direction: 93 degrees</td></tr>
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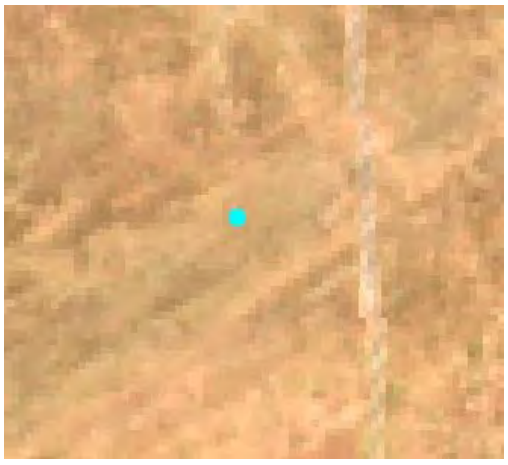
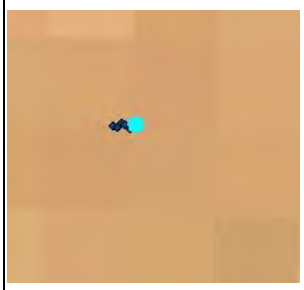
  </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Pale Yellow
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.275250</td></tr>
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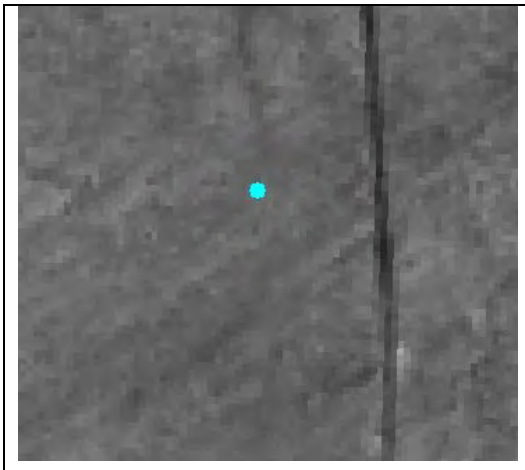
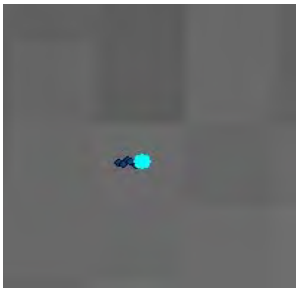
<tr><td>  </td><td>  </td><td></td></tr>
<tr><td>Classification Analysis(Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band combination:432
Color: Brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image (Band 4, 3 and 2) shows brown color which indicates that the area has vegetation. The brown color shows the density of the vegetation is less and very sparse indicating that this is shrub land.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-05</td><td>Interpreter: T.P. Gogola</td></tr>
<tr><td rowspan="6">Class/Landcover</td><td rowspan="6">Rangeland with vegetation</td><td>Savanna</td></tr>
<tr><td>Density: High Mid Low</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species: Grass</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color: Brown</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>279800</td><td rowspan="2">District: Southern
Site Description(Location): East Sekhutlane</td></tr>
<tr><td>Northing (Y)</td><td>7167794</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_0123)</td></tr>
<tr><td colspan="2">Image
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Acquired date: 2014-08-05
Photo by: M.Muzila
Direction: 238 degrees</td></tr>
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 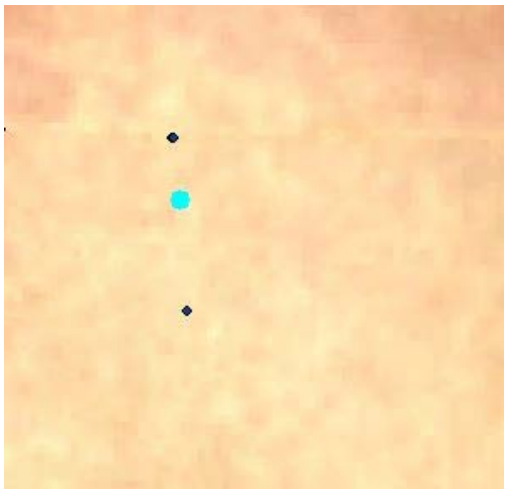 </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Brown
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.182667</td></tr>
</table>

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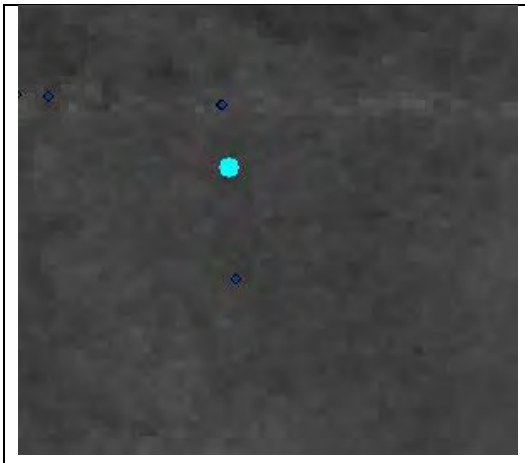
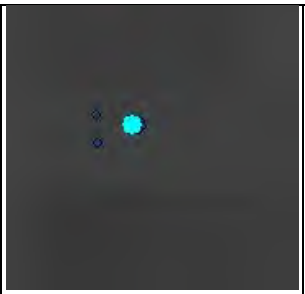
<tr><td>  </td><td>  </td><td></td></tr>
<tr><td>Classification Analysis(Scale: 25000)
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  </td><td>[Description]
Band combination:432
Color: light brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image (Band 4, 3 and 2) shows light brown color which indicates that the area has vegetation. The light brown color shows that there is less vegetation and with a low NDVI value of 0.182667, this indicates the area is covered mostly by grass hence savanna.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-09-24</td><td>Interpreter: G.Lavoie</td></tr>
<tr><td rowspan="6">Class/Landcover</td><td rowspan="6">Rangeland with vegetation</td><td>Savanna</td></tr>
<tr><td>Density: High Mid Low</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species: Grass</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color: Black</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>187489</td><td rowspan="2">Geology: Clay
District: Ngamiland</td></tr>
<tr><td>Northing (Y)</td><td>7896411</td><td>Site Description(Location): NE Khwai</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_3117)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-09-24
Photo by: M.Muzila
Direction: 262 degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor: Landsat 8)</td></tr>
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 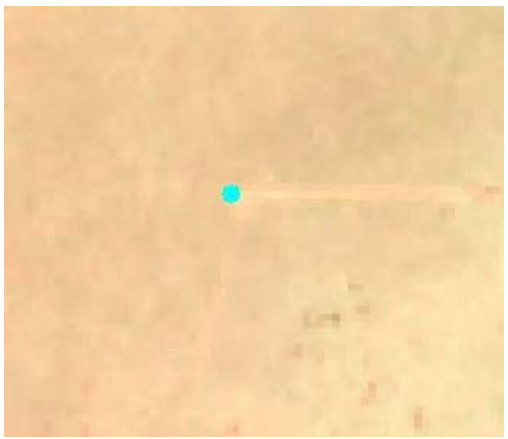 </td><td>Scale: 2000
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Band Combination:654
Color: Brown
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.228882</td></tr>
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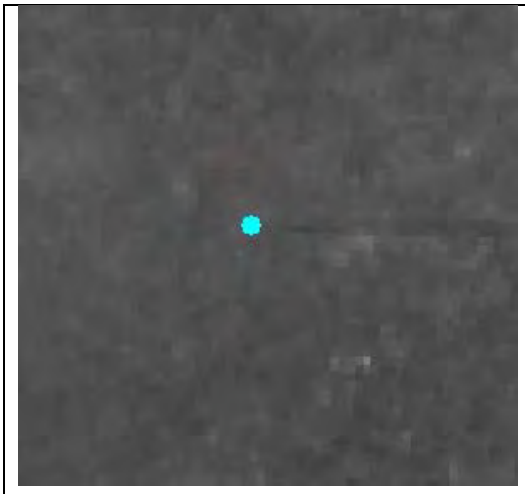
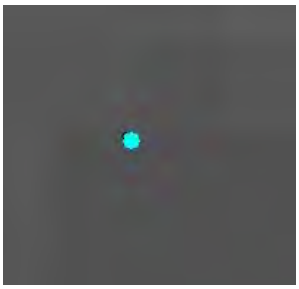
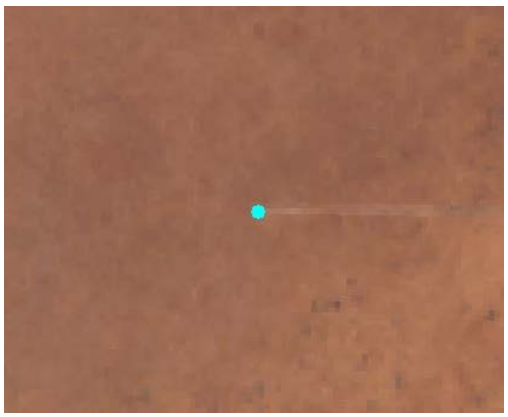
<tr><td>  </td><td>  </td><td></td></tr>
<tr><td>Classification Analysis(Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band combination:432
Color: light brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image (Band 4, 3 and 2) shows light brown color which indicates that the area has vegetation. The light brown color shows that there is less vegetation and with a low NDVI value of 0.228882, this indicates the area is covered mostly by grass hence savanna..</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-09-20</td><td>Interpreter: K. Matshware</td></tr>
<tr><td rowspan="6">Class/Landcover</td><td rowspan="6">Rangeland with vegetation</td><td>Marsh</td></tr>
<tr><td>Density: High Mid Low</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species: Grass</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color: Black</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>635460</td><td rowspan="2">District: Kgalagadi
Site Description(Location): Ikoga</td></tr>
<tr><td>Northing (Y)</td><td>7913998</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_2789)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-09-20
Photo by: M.Muzila
Direction:181 degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor: Landsat 8)</td></tr>
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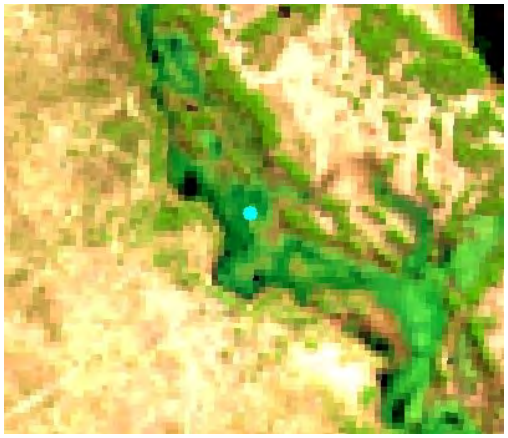
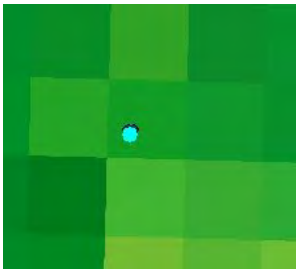
  </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Green
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.557564</td></tr>
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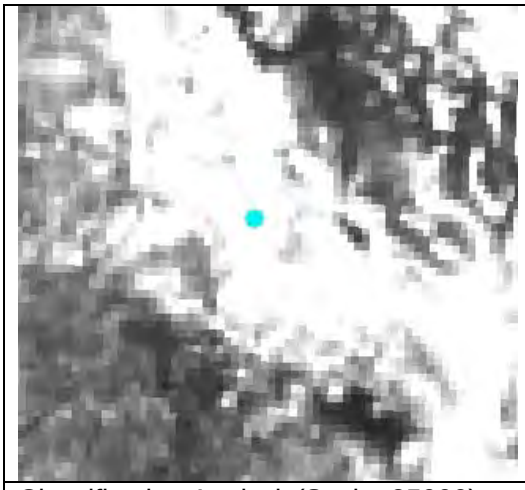
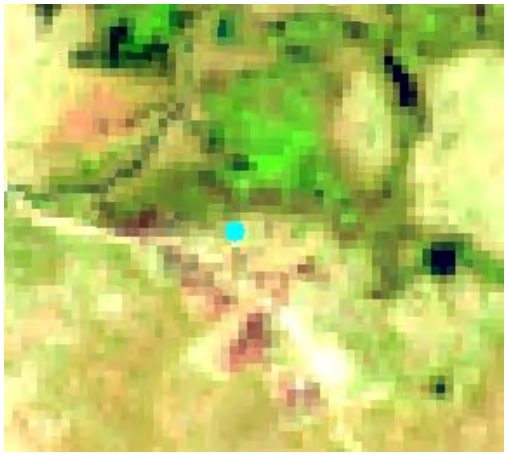
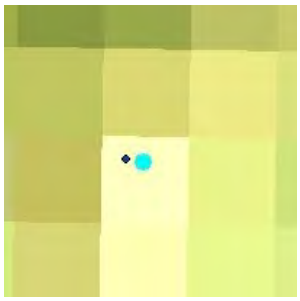
<tr><td>  </td><td>  </td><td></td></tr>
<tr><td>Classification Analysis(Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band combination:432
Color: light green
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image (band 6, 5 and 4) shows green color which indicates that the area has vegetation. The green color shows the vegetation is healthy since it is covered mostly by water and this indicates that this is marsh.</td></tr>
</table>

<table>
<tr><td colspan="4">General Description</td></tr>
<tr><td colspan="2">Date:2014-09-23</td><td colspan="2">Interpreter: G.Lavoie</td></tr>
<tr><td rowspan="7">Class/Landcover</td><td rowspan="7">Rangeland with vegetation</td><td colspan="2">Marsh</td></tr>
<tr><td colspan="2">Density: High Mid Low</td></tr>
<tr><td colspan="2">Tree Height:</td></tr>
<tr><td colspan="2">Tree Species: Grass</td></tr>
<tr><td colspan="2">Canopy cover:</td></tr>
<tr><td colspan="2">Soil Color: Black</td></tr>
<tr><td colspan="2">Geology: Clay</td></tr>
<tr><td colspan="4">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>815355</td><td colspan="2">District: Ngamiland</td></tr>
<tr><td>Northing (Y)</td><td>7876537</td><td colspan="2">Site Description(Location): Mababe</td></tr>
<tr><td colspan="4">Comment</td></tr>
<tr><td colspan="4">Photograph (Photo ID: JICA6408_GTS_20141009_3070)</td></tr>
<tr><td colspan="3">Image
  </td><td>[Description]
Acquired date: 2014-09-23
Photo by: M.Muzila
Direction: 350 degrees</td></tr>
<tr><td colspan="4">Satellite Image (Sensor: Landsat 8)</td></tr>
<tr><td colspan="2">Original Image: (Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Green
Texture: smooth</td></tr>
<tr><td colspan="2">NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.459598</td></tr>
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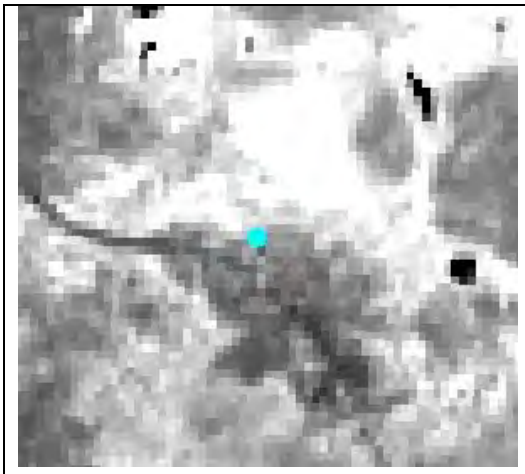
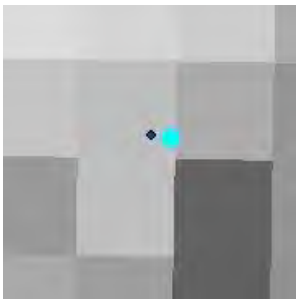
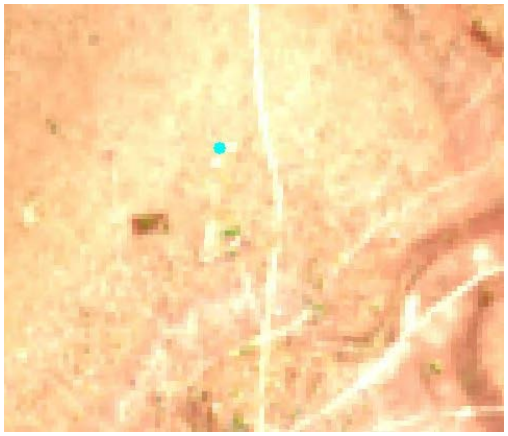
<tr><td>  </td><td>  </td><td></td></tr>
<tr><td>Classification Analysis(Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band combination:432
Color: light brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image (band6, 5 and 4) shows green color which indicates that the area has vegetation. The green color shows the vegetation is healthy and this is because the vegetation is in water. This indicates that it is marsh.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-13</td><td>Interpreter: T.P. Gogola</td></tr>
<tr><td rowspan="7">Class/Landcover</td><td rowspan="7">Rangeland without vegetation</td><td>Built up area</td></tr>
<tr><td>Density: High Mid Low</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species:</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color: Light brown</td></tr>
<tr><td>Geology: Sand</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>299455</td><td>District: Kweneng</td></tr>
<tr><td>Northing (Y)</td><td>7335456</td><td>Site Description(Location): Letlhakeng</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_1837)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-08-13
Photo by: T.P. Gogola
Direction: degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor: Landsat 8)</td></tr>
<tr><td>Original Image: (Scale: 25000)
  </td><td>Scale: 2000
</td><td>[Description]
Band Combination:654
Color: Pale
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.188336</td></tr>
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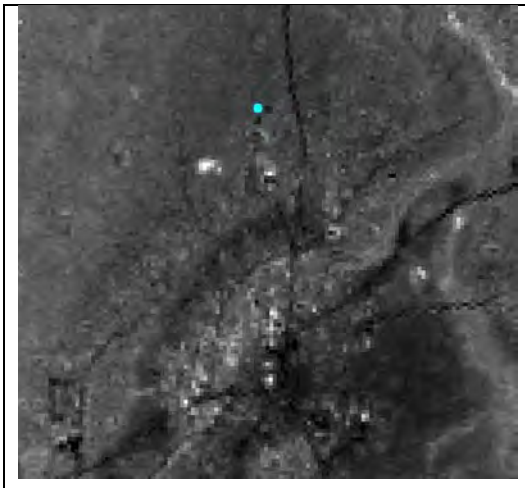
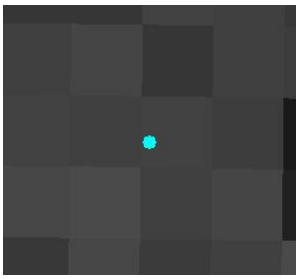
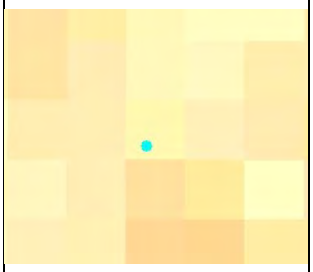
		
Classification Analysis(Scale: 25000) 	Scale: 2000 	[Description] Band combination:432 Color: Brown Texture: smooth
Summary: The color image shows pale yellow color and this indicates the area has less vegetation. They are road features which indicates that this is a settlement hence a built up area.		

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-31</td><td>Interpreter: G. Lavoie</td></tr>
<tr><td rowspan="8">Class/Landcover</td><td rowspan="8">Woodland</td><td>Dry Woodland</td></tr>
<tr><td>Density: High Mid Low</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species:</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color: Light Brown</td></tr>
<tr><td>Geology: Sand</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>446296</td><td>District: Central</td></tr>
<tr><td>Northing (Y)</td><td>7374137</td><td>Site Description(Location): Dibete</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_2354)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-08-31
Photo by: G.Lavoie
Direction:83 degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor: Landsat 8)</td></tr>
<tr><td>Original Image: (Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Pale yellow
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.198449</td></tr>
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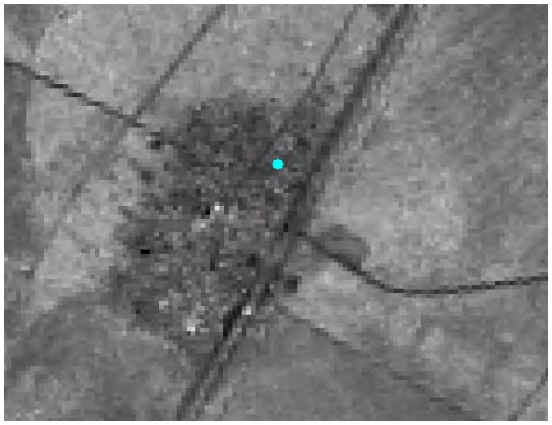
<tr><td>  </td><td>  </td><td></td></tr>
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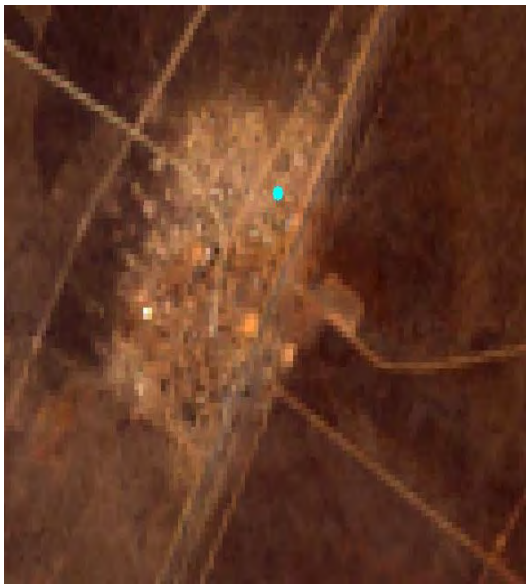
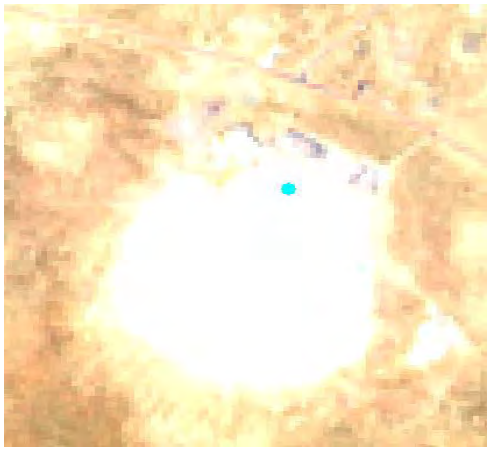
  </td><td>Scale: 2000
  </td><td>[Description]
Band combination:432
Color: light brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image (band 6, 5 and 4) shows pale yellow color which indicates that the area has no vegetation. The shape of the feature in the image shows this is a settlements hence a built up area.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-12</td><td>Interpreter: T.P. Gogola</td></tr>
<tr><td rowspan="8">Class/Landcover</td><td rowspan="8">Rangeland without vegetation</td><td>Pan</td></tr>
<tr><td>Density: High Mid Low</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species:</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color:</td></tr>
<tr><td>Geology:</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>683472</td><td>District: Kgalagadi</td></tr>
<tr><td>Northing (Y)</td><td>7378084</td><td>Site Description(Location): South Kang</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_1785)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-08-12
Photo by: T.P. Gogola
Direction: degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor:</td></tr>
<tr><td>Original Image: (Scale: 25000)
  </td><td>Scale: 2000</td><td>[Description]
Band Combination:654
Color: white
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.089689</td></tr>
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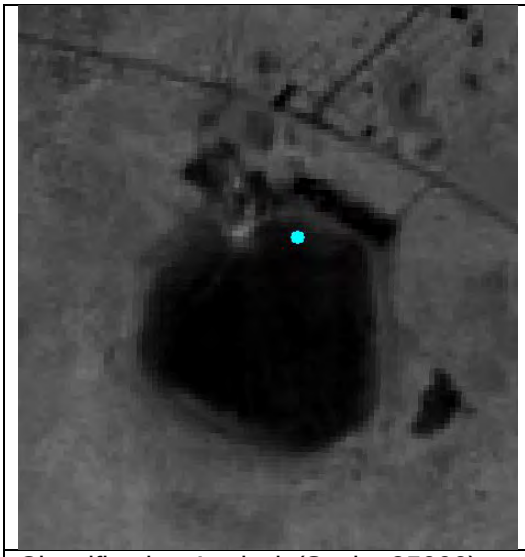
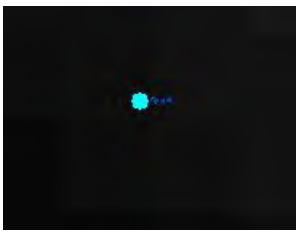
<tr><td>  </td><td>  </td><td></td></tr>
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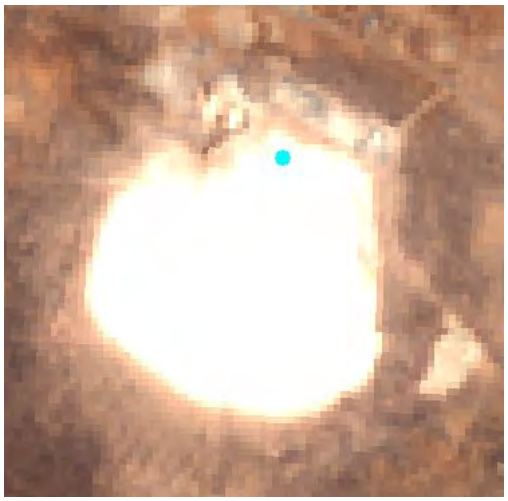
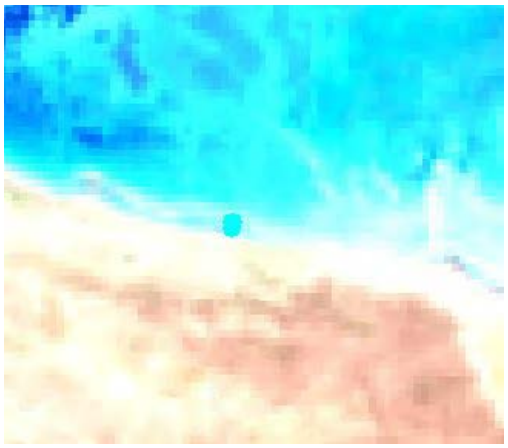
  </td><td>Scale: 2000
</td><td>[Description]
Band combination:432
Color: White
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The composite color image shows white color which indicates that the area is not vegetation. The white color indicates that this is a pan.</td></tr>
</table>

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-08-24</td><td>Interpreter: G. Lavoie</td></tr>
<tr><td>Class/Landcover</td><td rowspan="8">Rangeland without vegetation</td><td>Pan</td></tr>
<tr><td></td><td>Density: High Mid Low</td></tr>
<tr><td></td><td>Tree Height:</td></tr>
<tr><td></td><td>Tree Species:</td></tr>
<tr><td></td><td>Canopy cover:</td></tr>
<tr><td></td><td>Soil Color:</td></tr>
<tr><td></td><td>Geology:</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>683472</td><td>District: Kgalagadi</td></tr>
<tr><td>Northing (Y)</td><td>7378084</td><td>Site Description(Location): South Kang</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_1785)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-08-24
Photo by: G.Lavoie
Direction:270 degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor: Landsat 8)</td></tr>
<tr><td>Original Image: (Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: light blue
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: 0.163066</td></tr>
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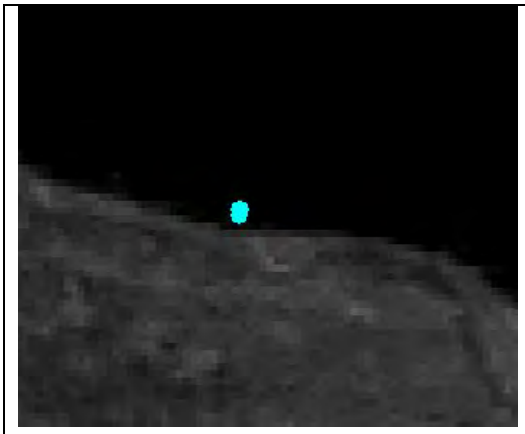
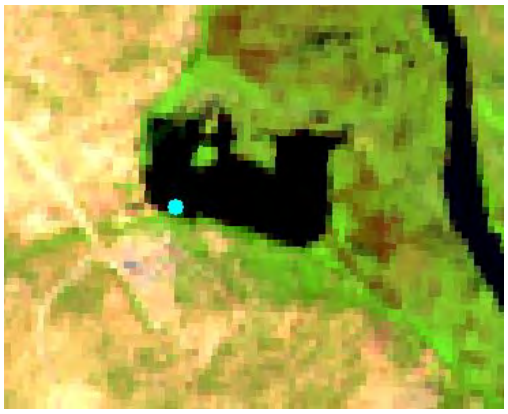
		
Classification Analysis(Scale: 25000) 	Scale: 2000 	[Description] Band combination:432 Color: White Texture: smooth
Summary: The color image shows light blue color which indicates that the area is not vegetation. The light blue color indicates that the pan has some traces of water.		

<table>
<tr><td colspan="3">General Description</td></tr>
<tr><td colspan="2">Date:2014-09-20</td><td>Interpreter: K. Matshware</td></tr>
<tr><td rowspan="8">Class/Landcover</td><td rowspan="8">Waterbody</td><td>Waterbody</td></tr>
<tr><td>Density: High Mid Low</td></tr>
<tr><td>Tree Height:</td></tr>
<tr><td>Tree Species:</td></tr>
<tr><td>Canopy cover:</td></tr>
<tr><td>Soil Color:</td></tr>
<tr><td>Geology:</td></tr>
<tr><td colspan="3">Reference site location</td></tr>
<tr><td>Easting (X)</td><td>590326</td><td>District: Ngamiland</td></tr>
<tr><td>Northing (Y)</td><td>7965931</td><td>Site Description(Location): SW Shakawe</td></tr>
<tr><td colspan="3">Comment</td></tr>
<tr><td colspan="3">Photograph (Photo ID: JICA6408_GTS_20141009_2805)</td></tr>
<tr><td colspan="2">Image
  </td><td>[Description]
Acquired date: 2014-09-20
Photo by: K. Matshware
Direction: degrees</td></tr>
<tr><td colspan="3">Satellite Image (Sensor: Landsat 8)</td></tr>
<tr><td>Original Image: (Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band Combination:654
Color: Black
Texture: smooth</td></tr>
<tr><td>NDVI: (Scale: 25000)</td><td>Scale: 2000</td><td>Description]
Numeric value of NDVI: -0.755556</td></tr>
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<table>
<tr><td>  </td><td>  </td><td></td></tr>
<tr><td>Classification Analysis(Scale: 25000)
  </td><td>Scale: 2000
  </td><td>[Description]
Band combination:432
Color: Brown
Texture: smooth</td></tr>
<tr><td colspan="3">Summary:
The color image shows black color which indicates that the area is covered water. The black color indicates that the water is turbid.</td></tr>
</table>