



# Proceedings from the training Survey Design and Data Management Using Open Foris Collect for NFI and Carbon Stock Assessment in Bangladesh



**Bangladesh Forest Department**  
**02 – 06 November 2015**



The Forest Department of Bangladesh leads actions to improve forest management and conservation, adopting forward thinking, innovative approaches in its management of approximately 1.55 million hectares of land across the country.

In 2015, the Forest Department began a process to establish a National Forest Inventory and Satellite Land Monitoring System for improved forest and natural resource management. The process supports national objectives related to climate change mitigation and provides information in support of the UN-REDD programme aimed at Reducing Emissions from Deforestation and Forest Degradation (REDD+). The process also addresses domestic information needs and supports national policy processes related to forests and the multitude of interconnected human and environmental systems that forests support.

The activities implemented under the Bangladesh Forest Inventory process are collaboration between several national and international institutions and stakeholders. National partners from multiple government departments and agencies assist in providing a nationally coordinated approach to land management. International partners, including the United States Agency for International Development (USAID) and the Food and Agriculture Organization of the United Nations (FAO) are supporting the development of technical and financial resources that will assist in institutionalizing the process.

The results will allow the Forest Department to provide regular, updated information about the status of trees and forests for a multitude of purposes including for assessment of role of trees for firewood, medicines, timber, and climate change mitigation.

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**Disclaimer**

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## Executive Summary

FAO Bangladesh organized a training course on “Survey Design and Data Management Using Open Foris Collect for NFI and Carbon Stock Assessment in Bangladesh” held at Bangladesh Forest Department, Dhaka under the Targeted Support Activity of UN-REDD programme (output 1.2. of SNA) between 2-6 June 2015. The activity was held with the support and collaboration of Bangladesh Forest Department, drawing participants from its various departments including RIMS. A professor from Khulna University and one Divisional Forest Officer partially participated in the training.

The training focussed on capacity building related to the development of field forms via the Open Foris platform. Open Foris is a set of free and open-source software tools, developed by FAO and its collaborative partners, that facilitate flexible and efficient data collection, analysis and reporting processes to assist forest inventory projects. The activity will support FAOs current forest monitoring activities being implemented through the Bangladesh Forest Department.

In total 9 people participated to the training (45% women and 55% men), of them, seven were from the forest department, one from Khulna University and one from FAO. Participants had the opportunity to participate in the hands on programme that addressed technical competencies required to improve field data collection through the use of specifically designed field forms and mobile applications run on android tablet devices. Functionality related to error and logic checks, as well as the importation of pre-defined species lists were trialled.

The forms were tested on mobile tablet devices during a day-long field exercise to inventory plots established as part of the 2005 national inventory. Despite the difficulty to identify the location of the previous plots, field measurements were collected using the Open Foris Collect Mobile application. During this process, the efficiencies of mobile data collection applications were demonstrated and discussed in relation to traditional paper based surveys.

A follow up evaluation indicated that 100% of participants were satisfied with the event and reported the content was relevant to their daily work. The evaluation indicates participants will use the knowledge and materials received during the training in the future implementation of their activities.

Through this process it is hoped that the use of new technologies and methods, such as those available through the Open Foris platform, will improve Bangladesh Forest Department’s new national forest inventory by developing more reliable, consistent data related to forests and trees outside of forests

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## **2. Introduction**

The appropriate use of field inventory and remote sensing data for national forest assessment is crucial to provide accurate and robust information about the status and evolution of the national forest resources. In order to establish, strengthen and maintain an effective national forest monitoring system, the implementation of an adequate archiving and database management system is crucial. It includes: (1) the documentation by ensuring easy access to the stored information, (2) a historical and safe memory of the collected data and (3) a starting point for new teams or new team members that will have to work on the same topic.

The first national forest inventory for Bangladesh was implemented in the year 2005 with the support from FAO. The inventory was conducted using a systematic sampling design, based on measurement of 299 plots distributed across the entire country. Based on the existing national forest assessment data and additional accessible field inventory and model data, the aim of this training is to provide support on data management and analysis, quality control and assurance.

## **3. Objectives**

- Support the development of a data management system to strengthen the national forest monitoring in Bangladesh;
- Provide training on survey design and data management using Open Foris Collect for the NFI;
- Develop an integrated approach to the management and analysis of forest data using calculation and data management tools.

## **4. Summary of Presentations**

The five day's training workshop was undertaken following the agenda presented in Appendix 1. In total nine participants (6 male, 3 female) attended the event. Seven were from the Forest Department (FD), one from FAO/FD and one from Khulna University (see Appendix 2).

The event was inaugurated by Mr. Md. Yunus Ali, Chief Conservator of Forests, Forest Department and Mr. Matieu Henry, Chief Technical Advisor, NFI/SLMS project.

The training was composed of three components: (1) Introduction and background to the Open Foris Initiative, (2) Developing filed forms using Open Foris Collect Desktop, (3) Data entry and practical field use of Open Foris Collect Mobile. Below is a brief description of the content of each session.

### **4.1 Introduction and background to the Open Foris Initiative**

Open Foris is a set of free and open-source software tools that facilitates flexible and efficient data collection, analysis and reporting.

The initiative is a collaborative effort of numerous public and private institutions, initiated and funded by Finland and hosted by the Food and Agriculture Organization of the United Nations. Government, research institutions and NGOs use these tools for a wide range of monitoring purposes such as: Forest Inventories, Climate Change reporting, Socio-economic surveys, Biodiversity assessment, Land Use, Land Use Change and Forestry measurement, Deforestation monitoring with remote sensing, Detecting desertification and trees outside of forest.



The Open Foris platform consists of five tools to assist various stages of forest monitoring. The tools include Collect, Collect Mobile, Collect Earth, Calc and the Geopatial Toolkit. The scope of this training is confined to Open Foris Collect and Collect Mobile, but more information of the other elements is available at <http://www.openforis.org/>.

## 4.2 Development of field forms using Collect Desktop

Collect Desktop is the starting point for building data collection forms. It provides a fast, easy, flexible way to set up a survey with a user-friendly interface. Collect handles multiple data types and complex validation rules, all in a multilanguage environment. It operates via a local host server on your personal computer and therefore does not require internet connection to run. The main features of Collect Desktop include:

- Easy-to-use interface for designing complex surveys
- Server / desktop
- Survey designer
  - From scratch/using template
  - Validation rules
  - Multiple layouts
- Data entry interface generated automatically
- Workflow: entry, cleansing, analysis

Collect Desktop offers four options: Data management, Survey designer, Users accounts and Configuration.

- **Survey designer:** the starting point for setting up and manage your survey. Select Survey designer to Create, Import, Export, Edit, Publish or Delete surveys.
- **Data management:** once a survey has been created select Data management to start entering data and manage data workflow. Stored surveys can be accessed and records can be managed and edited.
- **Users accounts:** create a personal user profile (password protected) specifying role in the workflow: Data Entry, Data Cleansing, Data Analysis, Administrator.
- **Settings:** customize upload path, record index path and graphical elements of collect

### Creating a survey

A survey is created through the Server Designer Interface. Through this process, users can develop the field form's schema. It is at this stage that the user defines every item (entity) and related attributes that should be measured. Before starting to work on the Schema it is necessary to have a very clear idea of the logical structure of the survey and a detailed list of the variables to be measure during field work (and in general during the survey) and also decide on the optimal way of measuring each variable.

The software allows the importation of the predefined lists to increase efficiency when dealing with large attribute lists. This action can be completed by importing a 'code list' or 'species list' in csv format.

During this session, which lasted three days, participants leaned basic functionality required to develop a schema, define entity, apply attributes and import code and species lists.

## 4.3 Data entry and practical field use of Open Foris Collect Mobile

### Data management interface

Data can be entered via desktop into the Data Management interface. Available via the main window, the Data Management section is where records may be edited and managed. Once records are entered into

Collect, this section presents a log of errors and warnings encountered during data entry as well as information on when records were created or modified and their status in the data cleansing process. In addition, it is also possible to visualize which user entered a specific record.

During this exercise, the group was split in two and the field forms tested via a desk top exercise.

### **Collect Mobile**

Collect Mobile is a fast, intuitive and flexible data collection tool for field-based surveys. Collect Mobile operates as an Android app and is freely available via Google Play. The app allows the completion of complex data structures, such as biophysical, socio-economic or biodiversity surveys. Its many features include:

- On-the-fly validation to improve data quality
- Handling of large lists of species or other attributes
- Geo-location through embedded GPS
- Integration with Collect for data management, analysis and export to commonly used formats
- Processes inputs and calculates attributes for quality control in the field

The use of Collect Mobile via electronic android devices can improve reliability and consistency of field data by applying warnings and logic check to reduce data entry errors. Similarly, constraints may be applied to specific variables where a numeric range is known – for example, if there are only four plots per tract, the number ‘5’ can not be entered in the ‘Plot Number’ field.

Importantly, as Collect Mobile operates as an application of any mobile, android device, no internet connectivity is required to run it. Field data may be transferred to the central server once internet/wifi service becomes available, thereby eliminating the cumbersome process of post process data entry.

During this session, participants traveled to the Sreepur, Dhaka Division, to test the forms at Tract No. 179 from the 2005 NFA. As part of this process, participants attempted to locate the plot marker so as to remeasure the biophysical variables, however the marker could not be located so measurements were conducted randomly.

## **5. Recommendations for next steps**

Failure to locate the 2005 NFA field plot can be attributed to limitations in the collection and archiving procedures used at that time. In the ten years since, advancements in technology related to GPS accuracy, availability of mapping resources including google earth, and efficiencies gained in the development of applications such Open Foris will significantly strengthen the ability of FD to establish and remeasure permanent forest inventory sample plots in the future.

The exercises carried out in this training were delivered at an intermediate level. Successful implementation of Open Foris Collect (Desktop and Mobile) will require further training, targeted at a smaller group of two to three participants. This exercise should ideally be initiated once the biophysical variables and/or socio-economic survey have been finalised and a detailed workflow has been prepared. Until this time, the wider group may practice developing OF forms based on previous inventories and call on assistance from the FAO project office I the forest departments. In this way, the learning outcomes and continuity of training may be reinforced.

## Appendix 1. Agenda

Session # and title	Description	
<b>DAY 1</b>		
<b>1.</b>	<b>Open foris introduction</b>	Overview of all of the tools (OF Collect, OF Collect Mobile, OF Calc, OF Geospatial Toolkit), main characteristics and interrelations: from data collection and cleansing to data processing, calculation, analysis and generation of results.
	<b>Open foris Collect</b>	Key features
	<b>Installation</b>	Standalone vs. server and Updating Collect
<b>2.</b>	<b>Overview of Collect main components</b>	Survey Designer, Data Management, Backup /Restore, Data Cleansing, Users, Settings
	<b>Survey Designer</b>	Designing a new survey: <ol style="list-style-type: none"> <li>1. Survey</li> <li>2. Code Lists (definition, creation, importing, exporting, editing)</li> <li>3. Species List (definition, creation, importing, exporting, editing)</li> <li>4. Sampling Design (definition, importing, additional fields)</li> <li>5. Schema               <ul style="list-style-type: none"> <li>▪ Tabs, Entities and Attributes                   <ul style="list-style-type: none"> <li>- Entity and Attribute types</li> <li>- Entity and Attribute parameters</li> <li>- Introduction to complex features: Validation rules (simple and cross-validation), Logical checks, Warning and Errors</li> </ul> </li> </ul> </li> </ol>
<b>DAY 2</b>		
<b>3.</b>	<b>Review of Survey Designer</b>	Review of Survey Designer principles, components and features
	<b>Training material</b>	Overview of training material: manual, demo surveys
<b>4.</b>	<b>Exercise I</b>	Designing a demo survey from scratch, definition of Schema (entities and attributes) and definition of parameters and logical checks.
<b>DAY 3</b>		
<b>5.</b>	<b>Data Entry</b>	<ul style="list-style-type: none"> <li>- Survey Preview</li> <li>- Data entry form layout</li> <li>- Adding Records</li> <li>- Best practices for data entry</li> </ul>
<b>6.</b>	<b>Data management</b>	<ul style="list-style-type: none"> <li>- Records overview</li> <li>- Adding, Editing, Deleting records</li> <li>- Advanced functions               <ul style="list-style-type: none"> <li>- Data import, export</li> <li>- Validation report</li> <li>- Records phases</li> </ul> </li> </ul>



	<b>Exercise II</b>	Entering data in Survey defined in Exercise I
<b>DAY 4</b>		
<b>7.</b>	<b>Backup / Restore</b>	Backup / Restore functionalities
	<b>Data Cleansing</b>	Batch data update
<b>8.</b>	<b>Users account Settings</b>	Adding, deleting, Users' roles management Customizations and layout
<b>DAY 5</b>		
<b>9.</b>	<b>Exercise II</b>	Working with a large survey: from field manual to Survey definition. Structure analysis, Export Summary. (NFI_Bangladesh2005)
<b>10.</b>	<b>Training Content review</b>	Q/A

## Appendix 2. Participant List

Name	Department	Designation
Raihana Siddiqui	Forest Department	DCF
Jahir Akon	Forest Department	DCF
Hossain Mohammad Nishad	Forest Department	DFO
Mahmood Hossain	Khulna University	Professor
Shamima Begum shewli	Forest Department	Research Officer
Md Sayed Ali	Forest Department	DFO
Afroza Begum	Forest Department	Research Officer
Md.Baktiar Nur Siddiqui	Forest Department	Divisional Forest Officer
Mariam Akter	FAO	Forestry Projects Officer

## Appendix 3. Evaluation

Five participants completed the online evaluation. The results are provided below:

<b>How often do you participate in training related to forest monitoring?</b>		
First time	3	60%
1-3 every year	1	20%
More than 3 per year	1	20%
Regularly (approximately one per month)	0	0%
<b>I would describe my self as:</b>		
A professor	0	0%
A student	0	0%
Forest Department staff	5	100%
Government staff (outside Forest Department)	0	0%
NGO staff	0	0%
Private consultant	0	0%

<b>My professional background relates most closely to:</b>		
Forester	4	80%
GIS/RS	3	60%
Statistics	0	0%
Social survey/assessment	0	0%
Economics	0	0%
Natural Resource Management	4	80%
Ecology	1	20%
<b>My years of relevant experience is:</b>		
1-2 years –	1	20%
3-5 years –	1	20%
5-7 years –	1	20%
8-10 years –	0	0%
More than 10 years –	2	40%
<b>The training was relevant to my daily work</b>		
Strongly agree –	2	40%
Agree –	3	60%
Neutral –	0	0%
Disagree –	0	0%
Strongly disagree –	0	0%
<b>The training met my expectations in terms of the content and learning outcomes</b>		
Strongly agree –	2	40%
Agree –	3	60%
Neutral –	0	0%
Disagree –	0	0%
Strongly disagree –	0	0%
<b>The training met my expectations in terms of the content and learning outcomes</b>		
Strongly agree –	2	40%
Agree –	3	60%
Neutral –	0	0%
Disagree –	0	0%
Strongly disagree –	0	0%
<b>The resource person presented information in a way that i could understand and was easy to follow</b>		
Strongly agree –	5	100%
Agree –	0	0%
Neutral –	0	0%
Disagree –	0	0%
Strongly disagree –	0	0%
<b>I feel confident to be able to carry out the tasks described in the training without supervision.</b>		
Strongly agree –	2	40%

Agree –	3	60%
Neutral –	0	0%
Disagree –	0	0%
Strongly disagree –	0	0%