

Uganda - National Biomass Study, 2016-2019.

**National Forest Authority, Ministry of Water and Environment, District Forest
Services**

Report generated on: September 27, 2022

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Identification

SURVEY ID NUMBER

UGA_2016-2019_NBS_v01_EN_M_v01_A_OCS

TITLE

National Biomass Study, 2016-2019.

COUNTRY

Name	Country code
Uganda	UGA

STUDY TYPE

Forest survey

SERIES INFORMATION

Three previous phases of the NBS for woody biomass assessment took place in 1989-90 in 7 peri-urban areas, 1990-2002 and 2003-2006 at national level mostly outside protected areas. (see Chapter 1.2 of document "UGANDA NATIONAL FOREST INVENTORY (NFI)"). Also, the Exploratory Inventory (EI) 1990-1995 (not comparable in scope and coverage) was mostly on Central Forest Reserves (protected areas) and was used together with the NBS to compound the National Forest Inventory (NFI) estimates.

ABSTRACT

National Biomass Survey (NBS) - was designed in 1989 to quantify biomass stock across the landscape in all woody formations including bush and agricultural residues with the purpose to evaluate the biomass energy contributes of Uganda's total delivered energy. After the REDD+ programme engagement, Uganda used the biomass information from NBS for climate change studies. NBS reports provide very reliable statistics on biomass resources down to Sub- County level.

KIND OF DATA

Sample survey data [ssd]

UNIT OF ANALYSIS

Plants

Scope

NOTES

BIOMASS: quantify biomass stock across the landscape in all woody formations including bush and agricultural residues

TOPICS

Topic
Forest production and carbon stocks

KEYWORDS

Keyword
Forests
Carbon
Tree biomass
Tree Volume
Deadwood
Land use
Canopy cover

Tree biodiversity
Forest Production
Land cover
Forest fire evidence

Coverage

GEOGRAPHIC COVERAGE

National Coverage.

UNIVERSE

Trees = 3 cm DBH. Deadwood pieces = 10 cm diameter

Producers and sponsors

PRIMARY INVESTIGATORS

Name	Affiliation
National Forest Authority	NFA
Ministry of Water and Environment	
District Forest Services	

PRODUCERS

Name	Role
Ministry of Water and Environment	Coordination
District Forest Services	Support in Field Operation
Food and Agriculture Organization	Technical Support

FUNDING AGENCY/SPONSOR

Name	Abbreviation	Role
Forest Carbon Partnership Facility	FCPF	
Austria Development Agency	ADC	
Food and Agriculture Organization	FAO	Implementation Agency

Sampling

SAMPLING PROCEDURE

Systematic cluster grid of 5 km by 5 km, stratified by three population intensities of less than 50 people per km, between 50 and 100 people per km and above 100 people per km. Sampling included protected areas. Out of a cluster (PSU) of nine plots (SSU, their plot centers separated 300 m producing a cluster cross shape and 0.25 ha - 50 x 50 m - of area) on each grid intersection a minimum of three plots are measured. A total of 439 square plots in a sampled area of 110 hectares. Given the unequal geographical representativity of the samples, it is difficult to assign a sampling intensity. The plot selection is made during the planning phase by the field Inventory Supervisor, the Field team leaders are allowed to make alternative selections only if a preselected plot(s) is inaccessible. Selection priority is given to the plot numbers 1, 2 and 3 at the centre although any other plot may be measured as replacement of any of the three key plots. Interest in getting information on certain vegetation types may influence plot selection. Each square plot is subdivided into five strips measuring 10 by 50 metres, running in the east-west direction. Tree measurements are done systematically from one strip to another, and tree numbering is based on the location of the tree in the strip. This is intended to make tree re-

identification easier during subsequent visits. NBS has a nested plot approach whereby the minimum measurable DBH in the first strip is 3cm. In the rest of the plot, the DBH threshold is trees of 5cm and above.

DEVIATIONS FROM THE SAMPLE DESIGN

The within-cluster plot selection protocol makes a proper probabilistic selection of plots as sampling units impossible. Hence taking cluster as the minimum sampling unit while using an uneven inclusion probability approach is recommendable in the analysis. The unit of analysis, however, was a cluster - weighted by total plot within cluster area.

RESPONSE RATE

Response rates are close to 100% due to the within-cluster plot selection protocol (whereby 3 plots out of the possible 9 per cluster, are selected - if one pre-selected plot is inaccessible the crew leader will choose another one).

WEIGHTING

Sample weights were determined according to area expansion factors (in regards to a reference 0.5 ha. total area per SSU). Hence they are given as:

Weight w of trees and deadwood pieces included in whole plot: $0.25 \text{ ha} / 0.25 \text{ ha} = 1$

Weight w of strip 1 for trees $3 \leq \text{DBH} < 5 \text{ cm}$: $0.25 \text{ ha} / 0.05 \text{ ha} = 5$

Reweightings if cluster is statistical unit of analysis: $w * 9$ plots per cluster/no. plots enumerated in cluster

Data Collection

DATES OF DATA COLLECTION

Start	End	Cycle
2016-01	2019-07	5

DATA COLLECTION MODE

Other [oth]

DATA COLLECTION NOTES

Data collected by measuring and observing variables in the field and entering data in a tablet with specific software (OpenForis)

Data Processing

DATA EDITING

Several data quality control procedures took place: 1) 10% of plots in the field were rechecked by peer teams (Number of trees not correctly identified, Number of trees that are supposed to be in a plot but were omitted, Number of trees that were not supposed to be in a plot but were included, DBH error measurements in percent error from the correct measurement, Height error measurement percent error from the correct measurement, Incorrect recording of plot coordinates, Incorrect recording of land use\cover). 2) minimum and maximum limits to DBH and height values (which are mandatory) are built in the mobile device forms and software (Open Foris Collect) to capture data, which automatically validates. Data Cleaning ex-post collection has been done by analyzing the species names, heights, DBH, number of trees per hectare. Only errors have been removed but not the outliers. Dates data entries according to validation rules. 3) a daily manual supervision of the data enumerated takes place by the field crew leader

Data Appraisal

ESTIMATES OF SAMPLING ERROR

Tree heights were measured with hypsometers using the tangent method, which has been observed in other studies to possibly overestimate tree heights, particularly when the distance to the tree was less than its height. This situation is fairly common in a forest inventory, since the forest often masks the vision of individual trees, so crews can only measure from very near the trees.

Access policy

CONTACTS

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CITATION REQUIREMENTS

(c) UGANDA NFI 2016

Or

NFI Report: UGANDA NATIONAL FOREST INVENTORY (NFI), THE NATIONAL FORESTRY AUTHORITY
MINISTRY OF WATER AND ENVIRONMENT 2019.

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Metadata production

DDI DOCUMENT ID

DDI_UGA_2016-2019_NBS_v01_EN_M_v01_A_OCS_FAO

PRODUCERS

Name	Abbreviation	Affiliation	Role
Office of Chief Statistician	OCS	Food and Agriculture Organization	Metadata adapted for FAM
Antonello Salis		Food and Agriculture Organization	Metadata producer

DATE OF METADATA PRODUCTION

2019-10-31

DDI DOCUMENT VERSION

UGA_2016-2019_NBS_v01_EN_M_v01_A_OCS_v01

Data Description

Data file	Cases	Variables
UGA_2016_2019_NBS	214654	20