Forestry Department

Food and Agriculture Organization of the United Nations

BRIEF ON NATIONAL FOREST INVENTORY NFI

PHILIPPINES

Forest Resources Development Service

Rome, July 2007

MAR-SFM Working Paper 26/ 2007

Strengthening Monitoring, Assessment and Reporting (MAR) on Sustainable Forest Management (SFM)

FAO initiated activities to strengthen Monitoring, Assessment and Reporting on Sustainable Forest Management in January 2006 with the objective to facilitate development of harmonized forest related national monitoring, assessment and reporting (MAR) for contributing directly to the improvement of national sustainable forest management (SFM) regimes. It also aims to catalyze national discussions, analyses, policy actions and planning that promote national SFM regimes besides clarifying the contribution of forests to global environment and to human well-being. This initiative shares the ambition of the Collaborative Partnership on Forests (CPF) about simple, harmonised, efficient and action oriented MAR systems both at international and national levels and thus provides a response to some of the key recommendations made by the CPF task force on streamlining the reporting on forests with particular focus on national capacity building.

The MAR initiative has recently updated goals include country capacity building for better, consistent and regularly updated information to facilitate implementation of non-legally binding instrument (NLBI) on SFM, adopted at UNFF 6 (2007) that aims to,

- Strengthen political commitment and action at all levels to implement effectively sustainable management of all types of forests and to achieve the shared four global objectives ((a) reverse the loss of forest cover worldwide, (b) enhance forest-based economic, social and environmental benefits, (c) increase significantly the area of protected forests worldwide, and (d) reverse the decline in official development assistance for SFM;

- Enhance the contribution of forests to the achievement of the internationally agreed development goals, including the Millennium Development Goals, in particular with respect to poverty eradication and environmental sustainability; and

- Provide a framework for national action and international cooperation.

All countries can participate in this initiative, although the actual level and intensity of their involvement may vary among them. The initiative is organized under the Forest Resources Development Service (FOMR) of FAO Forestry Department. The contact persons are:

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Brief Note on MAR-SFM Working Paper Series (AP) on NFI- Brief

The NFI – Brief for a country attempts to provide a bird's eye view of the National Forest inventories (NFI). However, some countries conduct forest inventories at sub-national and or field management unit level. Therefore, this brief presents brief information on the forest inventories in a country at national level, sub-national level and or field management level depending on the available information.

It is useful to regularly update our understanding of elements and specifications of forest inventories because the information generated by forest inventories is simply manifestation of its span, design and methods to collect and analyse the primary information during its implementation. This is important because the NFI provides information on the state and trends of forest resources, their goods and services, and other related variables that support. It also defines the policy and trade decisions, science and field initiatives, national and international reporting, and direct and indirect contribution of forests to society like poverty alleviation. Regular updates are necessary because countries do change the set of elements, their specifications, designs and methods over period of time to address new emerging demands and to take advantage of new technologies.

The purpose of developing the NFI-briefs is, therefore, to document (working paper) the current and historical span of elements (variables or fields), their specifications, sampling designs and methods used in NFI. The document may serve as data source as well as reference material.

These briefs have been initially developed on the basis of the country submission to FAO. The initial draft of this report was sent to following national focal point for review and country validation before its finalisation.

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B. Compilation and Supervision

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General Information

The Philippines (Filipino: *Pilipinas*), officially the Republic of the Philippines, is an island nation located in Southeast Asia, with Manila as its capital city. The Philippine Archipelago comprises 7,107 islands in the western Pacific Ocean. The country reflects diverse indigenous Austronesian cultures from its many islands, as well as European and American influence from Spain, Latin America and the United States.

Map of the Country

(Sourcehttps://www.cia.gov/library/publications/the-world-factbook/geos/rp.html)

Figure 1: Map of Philippines

Land Area and Landuse

Table 4: Land area and landuse

FRA 2005 categories	Area in 000 ha		
	1999	**2000**	**2005**
Forest	10574	7949	7162
Other Wooded lands	2230	3292	3611
Other Land	17013	18576	19044

Inland Water bodies	183	183	183
Total	**30000**	**30000**	**30000**

(Source: FRA 2005)

Forests

Table 5: Area of forest under different types in 2003

Categories		**Area (000 ha)**
Forest		
	Broadleaved Forests	6,029
	Coniferous Forests	211
	Mixed Forests	83
	Plantation Forests	627
	Bamboo	172
	Mangroves	40
	Sub Total Forests	7,162
Other wooded lands		3,611
Other land		18,424
Inland Water		803
Total, Philippines		**30,000**

(Source: FRA 2005)

Brief History of Forest Inventories

The first forest inventory of the Philippines was conducted during 1965-1969 utilizing 1:15,000 scale aerial photographs. This scale of photographs allowed detained mapping of the different forest categories and segregation into several levels. This inventory did not include alienable and disposable lands.

In late 1977, in addition to the above, the then Natural Resource Management Center introduced satellite imagery (Landsat) as an additional source of data for conducting forest inventory and mapping. This mapping activity was conducted in cooperation with the General Electric Company of the United States. Thirty Landsat computer compatible tapes taken between 1972 to 1976 were digitally processed, and geographical distribution of the different forest types in the country was identified. This exercise did not have the official status of a nationwide forest inventory. It, however, tended to confirm the unofficial trends indicated in the 1965-69 inventory.

In the years 1978-1988, the second nationwide forest resources inventory was conducted. The project was assisted by the German government, and was officially known as RP-German

Forest Resources Inventory Project (**FRI**). The FRI project covered 75% of all areas falling within the legal definition of “forest lands”. This project utilized aerial photographs and satellite imagery. It also included field sampling in economically important forest strata.

Field sampling in the 1978-1988 study expanded the scope of the earlier 1965-69 inventory to include ground truthing of all tree regeneration, rattan, bamboo and erect palms. The objective of this sampling was to help determine on a regional basis (i) the future timber supply, (ii) available minor forest resources and (iii) the suitability of Dipterocarp forest stands for Timber Stand Improvement treatments.

The FRI project adopted most of the basic forest types used in the first inventory. However, the estimation based on aerial photographs was eliminated because this methodology was considered unreliable. In common with the first national forest inventory, the FRI project focused only on the "forest lands". It did not deal with the alienable and disposable lands.

In 2002, the Forest Management Bureau (FMB) within the Department of Environment and Natural Resources (DENR) has collaborated with the Food and Agriculture Organization of the United Nations (FAO) to generate information on the distribution of forest and trees resources outside forest based on tree species composition, ownership and management status, size of land holdings, commercial volume and growing stocks, among others.

Data collection commenced in November 2002 and terminated in July 2004. The field crews submitted to FMB field reports covering 367 tracts. Of this, 6 tracts totally fell in the sea (non-inland water), 4 tracts partially fell in the sea, and 5 tracts fell in inland water.

The scope of the forest inventories is broadening over time. The inventory under FAO project (2002) covered not only the legally classified forestland, but also the alienable and disposable lands and/or private lands. Further, data collection went beyond the traditional measurement of the biophysical characteristics of the trees, thus documented the stock and flow of wood and non-wood forest products and services. Another significant milestone of the FRA project was the inclusion of the social, economic, and ecological attributes of the forest as one of its variables. Data such as ownership and use, and management of forest resources were generated, which were not considered in the earlier National Forest Inventory projects. These data were gathered through interviews of local forest users and other selected key informants. The bio-physical variables, on the other hand, were gathered through actual measurement and direct observation.

Final but not the last significant point was that the data entry and data processing were centralized and data was also stored electronically. The field data collected by the field crews were submitted to- and aggregated at FMB. Submitted field data were then electronically stored using both the NFI-Philippines database application software and the NFI-data database developed by FAO and FMB. Data analysis and data interpretation were carried out after the field data were collected, electronically stored and processed.

Table 6: History of Assessments

Publication Year[1]	Title[2]	Institution[3]	Ground Inv. Year(s)[4]	Remote Sensing		Estimation Level [7]	Country Coverage (Full/Partial, %)[8]	Thematic cover**
				Data Year(s)[5]	Scale of Interpretation [6]			
1965								
1978	Nationwide forest inventory: The Philippine experience.							
1998	1997 Philippine Forestry Statistics	Forest Management Bureau, Philippines, FAO-RAP, FAO-FORM	1999			National	Full	NF, PL, OWL, WSP, NWGS, CV
1998	Natural Forest Resource of the Philippines	Forest Management Bureau, Philippines, FAO-RAP, FAO-FORM	October 1999			National	Full	FAC, TV, CV, NWGS
1998	List of Existing Industrial Tree Plantation Lease Agreements (ITPLA) and Industrial Forest Plantation Management Agreement (IFMA)	Forest Management Bureau, Philippines, FAO-RAP, FAO-FORM	October 1999			National	Full	PL
1990	Master Plan for Forestry Development	Forest Management Bureau, Philippines, FAO-RAP, FAO-FORM	1999			National	Full	NF, PL, PA, BD, NWGS
2002								

****Legend**: **NF**=Natural Forest; **PL**=Plantations; **OWL**=Other Wooded land; **FAC**=Forest Area Change; **TV**=Total Volume; **TB**=Total Biomass; **CV**=Commercial Value; **PA**=Protected Areas; **BD**=Biodiversity; **FO**=Forest Ownership; **WSP**=Wood Supply Potential; **NWGS**=Non-wood Goods and services; **TOF**=Trees outside of forest; **FF**=Forest Fires

1] Publication Year - Year in which the assessment was published. **[2] Title** - Title of the assessment; **[3] Institution -** Institution(s) responsible for the Assessment; **[4] Ground Inventory Year(s) -** Year or Interval of years during which the field inventory has been carried out; **[5] Remote Sensing Data Year(s) -** Year(s) of the Remote Sensing Images ;**[6] Remote Sensing Scale of Interpretation -** Scale of Remote Sensing Images (e.g. 1:250,000) **[7] Estimation Level -** Whether the Asse ssment was at National, Sub-national, District, Management Unit, etc. level; **[8] Country Coverage (Full / Partial, %) -** Amount of country area covered by the assessment (e.g. full, partial). If partial, indicated by % of tot al area.

National Forest Inventory Design

Remote Sensing

The remote sensing imageries were used in the latest national forest inventory in 2002 (Figure 2). Maps generated from this exercise were available at a scale of 1:50,000. The maps were used in developing the sample design of the NFI (Figure 3) and contributed in defining, especially in stratification, cluster, hotspots, and locating sampling and measurement units for the NFI survey. The accuracy of remote sensing was enhanced through ground truthing or field verifications. A total of 2,600 field samples were established that lead to high accuracy levels even in estimation of stem volume (standard error of about +/- 3%).

Grid and Plot Design

The sampling design was systematic and without stratification. The selection of the sample sites was done on the basis of the longitude/latitude grid. A grid of tracts measuring 1 km x 1 km were established at each 15 minutes latitude and longitude. The coordinates of the Southwest corner of the tracts corresponded to the intersection of the lat/long lines.

The inventory component used a very low intensity of sampling than normal sampling intensity for developing management plans. Initially 395 tracts were initially selected at the national level (sampling intensity 0.0026%). The hand held GPS and reading of the stored Lat-Long data from the GPS were used to reach and identify the desired location (especially the starting points of Tracts and Plots).

Table 4. Plot location and orientation

Plot	Location of the starting point of the plot, within the 500 m inner square	Orientation	Bearing
Plot 1	South-West corner	South-North	0 / 360 degrees
Plot 2	North-West corner	West-East	90 degrees
Plot 3	North-East corner	North-South	180 degrees
Plot 4	South-East corner	East-West	270 degrees

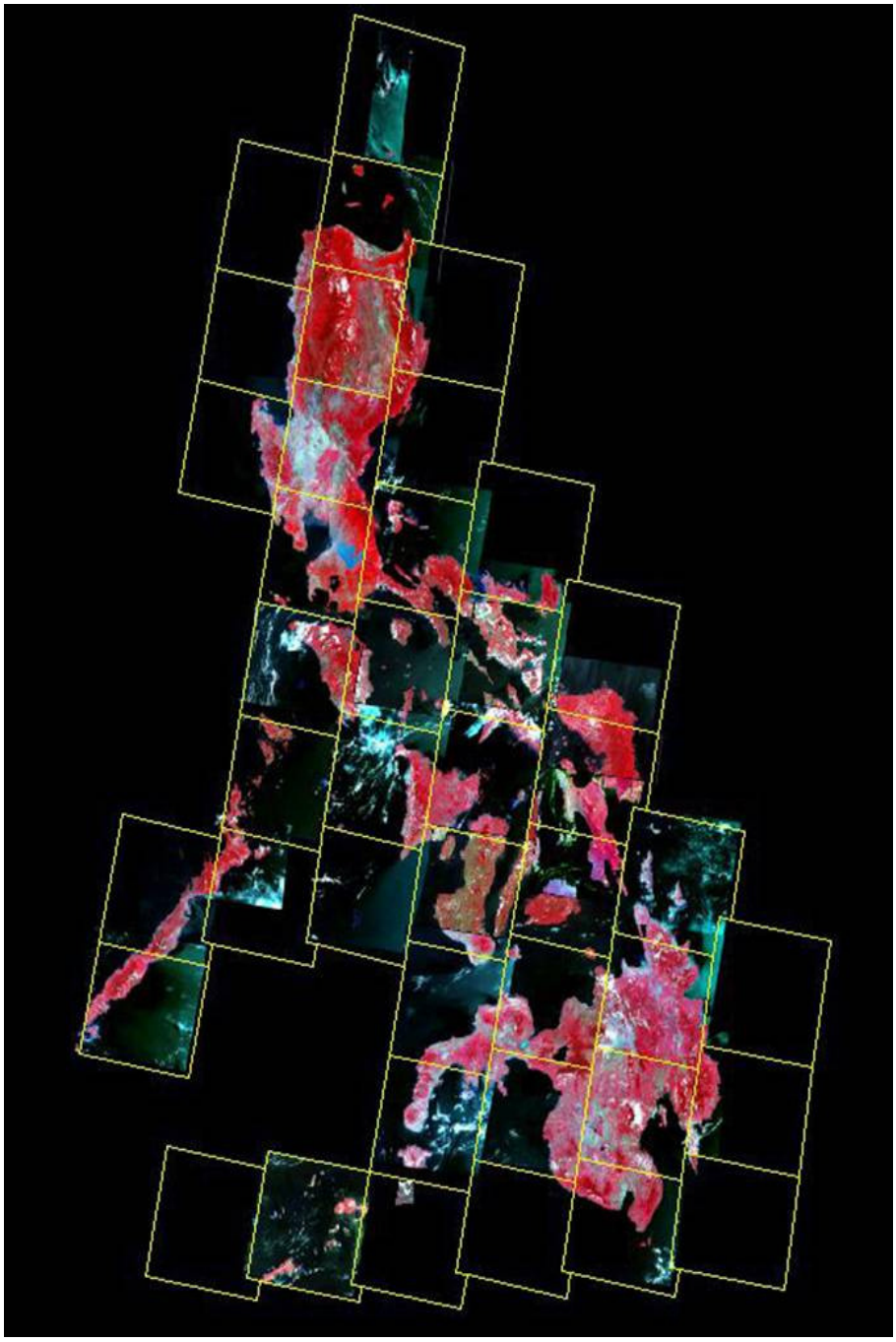

Figure 2. Span of Remote Sensing Imageries used in 2002.

The sampling design was systematic sampling. The sampling unit was designated as "Tract". Each tract "tract" (1 km x 1 km) was a cluster of 4 measurement field plots, which in turn was 250 meter long and 20 meter wide covering an area of 0.5 ha. The plots started at each corner of an inner 500 m square and were numbered clockwise from 1 to 4 as shown in Figure 4. Table 5 provides their orientation for collecting data. The sample plots measured 20m x 250m and were organised in a perpendicular manner following the 4 cardinal directions, and are 250 m apart from each other. (Table 5).

Table 5. Shape and size of Tracts, Plot and Sub-plots

Unit	Shape	Size and (area)	Number
Tract	Square	1000 m x 1000 m (1km^2)	1
Plot	Rectangle	250 m x 20 m (5000 m^2)	4/tract
Subplots	Circular	Radius r = 3,99 m (50 m^2)	3/plot
Land use/forest type section (LUS)	Variable	Variable	Variable

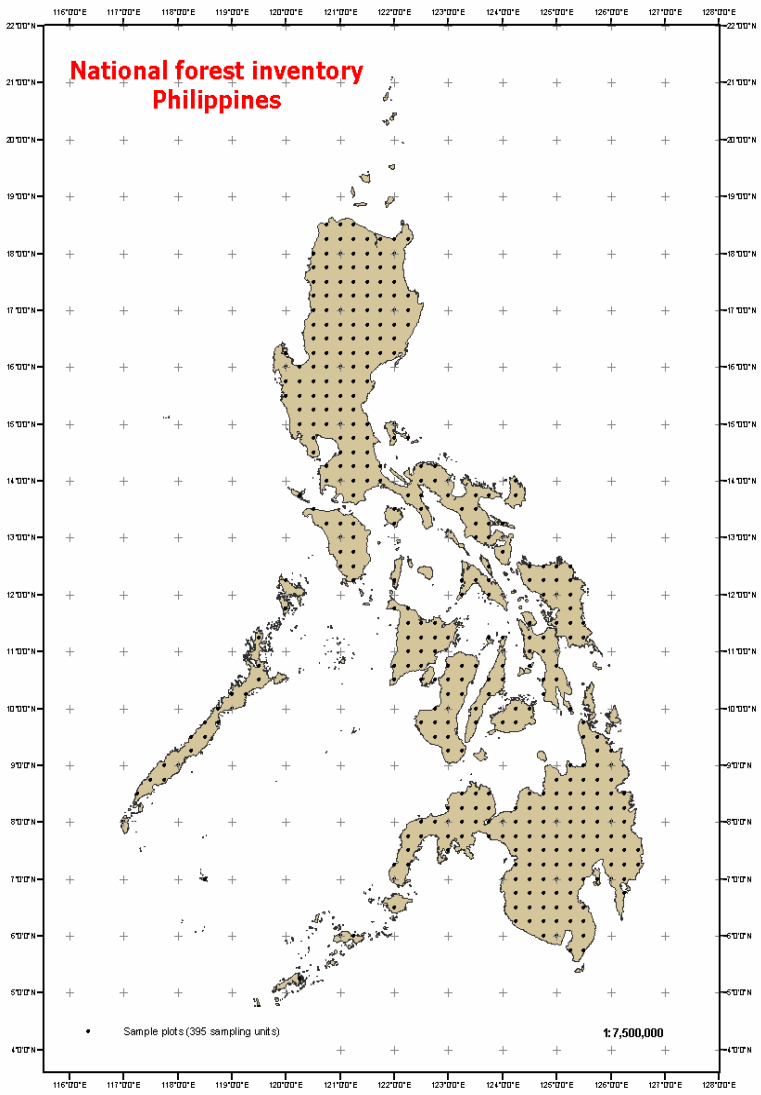

Figure 3. National Forest Inventory locations

The boundaries of different landuses observed in a Land use section was marked on the map. Most of the data related to forest characteristics, management and resource uses were collected in the LUS. If a LUS is classified as forest, then trees with diameter at breast height (dbh) ≥ 20 cm were measured and recorded. If a LUS is not classified (crown cover is less than 10% or height is less than 5 meters or the area of a patch is less than 0.5 ha) as forest then by its definition it will have lesser number of trees per hectare than in a section marked as forests, for example in case of landuse classified as Other Wooded lands, Other

land and Inland Water in a country. All trees (being less in number) in this section with dbh ≥10 cm were measured and recorded. In such cases (non-forest) nested plot was not established.

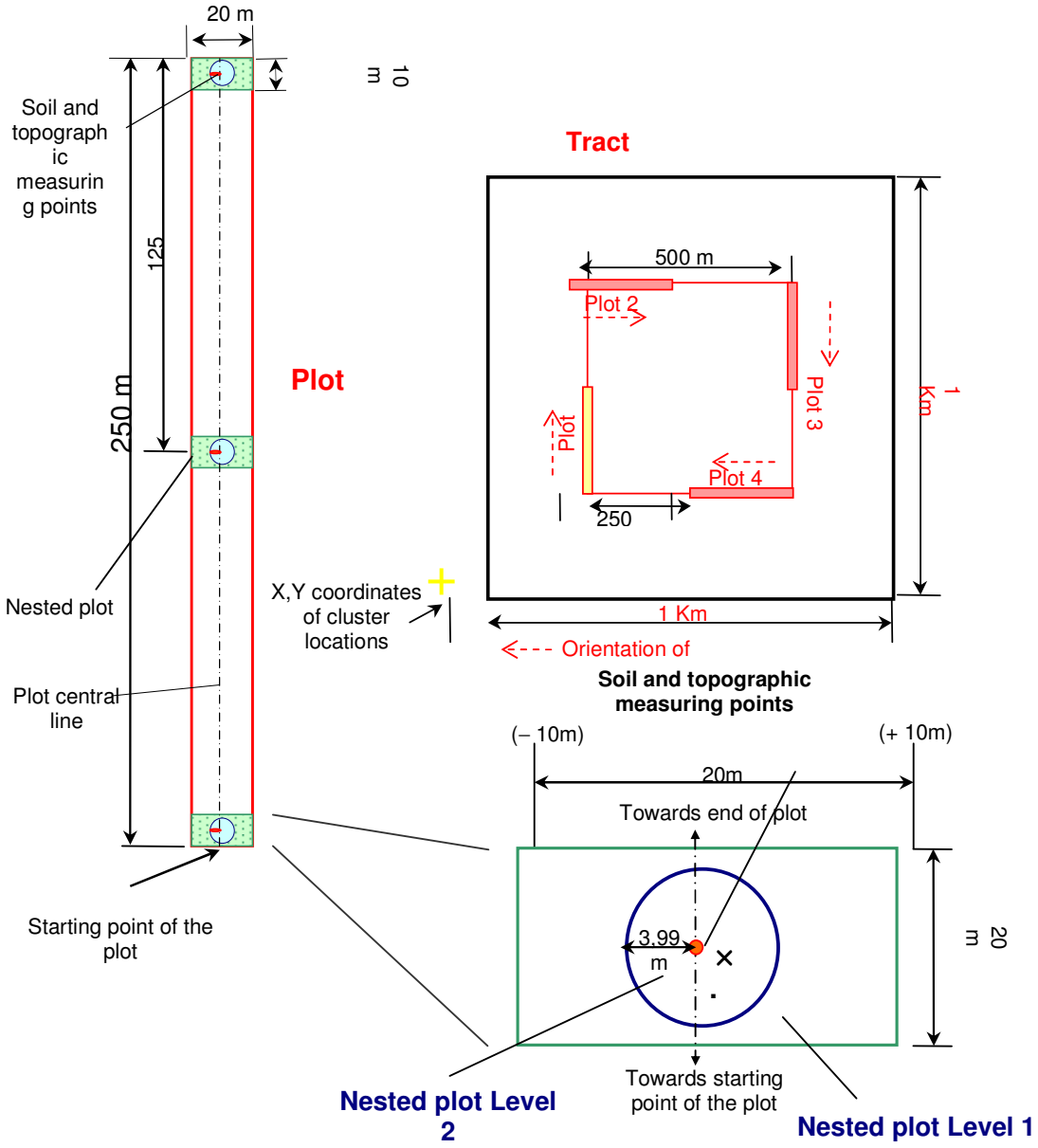

Figure 4: Diagrammatic presentation of plot and subplot

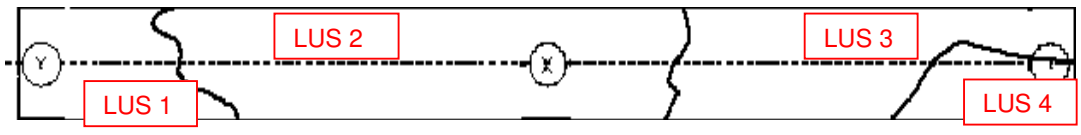

Figure 5. The Subplot or Land Use section (LUS)

However, when the land-use in the section of a sample plot is identified as forests then "nested plots" (NP) were laid out at two levels each with three 3 locations. The 1st location was centred at 5 m, the 2nd at 125 m, and the 3rd at 245 m from the starting point of the plot. The NPs consisted of two levels. The 1st level NP comprised of a sample area of 200 m^2 (20 m x 10 m) for measurement of trees with dbh between 10 to 20 cm. The 2nd level comprised a sample area of 50 m^2 for recording tree regenerations, soil information and topography. Following provides brief information on the design of the nested plot.

- Rectangular Subplot - Nested Plot at Level 1 (NPL1)

The plot 10m x 20m size was established within a LU class demarcated with forest use on the plot map. The center of 3 NPL1 was located at 5m, 125m and 245m along plot axis, respectively. Trees with dbh ≥10 cm but <20 cm were measured in the rectangular subplot.

- Circular Subplot (Nested Plot Level 2)

The circular plot was of radius 3.99m, and was established only in LU class "Forest". The centre of 3NPL2 was located at 5m, 125m and 245m along plot axis. Data on regeneration and small diameter trees (saplings ≥1.3 m height and trees < 10 cm dbh) were collected in the circular subplot. These were counted by species. Edaphic variables such as aspect, slope, relief, soil texture, soil drainage, and thickness of organic matter were also measured. Further, data on other non-wood forest products (other than bamboo, rattan and erect palms) were measured, too.

Measurement Process

The field manual (www.fao.org/forestry/nfa) provides complete details of the method and process of field measurements used in the last inventory . Following sections present a brief description of the same.

Permanent sample plots are were established on the ground generally at the exact location specified for each plot. The plot starting point was located on the ground with the help of a GPS receiver. A tolerance of 5 m radius, which is the maximum estimated position error (EPE) of the GPS, was allowed. When arriving at the starting point of the 1st plot, a marker (galvanized iron pipe measuring 0.5 m in length x 5 cm in diameter) was inserted on the ground. The marker was placed exactly on the starting point of the plot. However, if an obstacle hampered the operation, the marker was placed as close as possible to the plot starting point. The distance and direction of the plot starting point from the marker were measured and recorded. Further, at least three reference points surrounding the marker were also identified and recorded.

The data collection is started at the plot starting point and continued in predefined direction (see Table 3). The measurements were taken up to 10 meters on both sides of the central line of the plot.

Data was collected at different levels (plots and subplots). At plot level, large trees and stumps (DBH ≥ 10 cm) were measured at plot level. The trees located at the border of the plot were considered as being inside the plot if at least half of the stem diameter at breast height was inside the plot. At sub-plot level, topographic and edaphic (soil) data, small diameter trees and tree regeneration data was collected (see Table 3). Data on forest

products and services was collected through interviews with local people or from people accompanying the field crew in the field for each land use class present in the plot.

In addition to collecting information on vegetation information on people and socio-economic variables was collected. Two major user groups were interviewed (external key informants; and forest and tree users (considered as individuals or focus groups)). The "external key informants" are external individuals with particular knowledge about the area, the forest and the people.

Table 5. Trees and stumps measured per level

Level	**Measured trees/stumps**		**Measurements**
	Forest	**Other land uses**	
Plot	Dbh ≥ 20 cm	Dbh ≥ 10cm	Species, location, diameters, total height, health, quality
Subplot (SP)	Tree height ≥ 1.30 m and Dbh < 10 cm	None	Total number by species

Variables

The NFI attempted to collect information on about 65 variables, if available. The field manual provided detail specification and units for measurement of each of the variable. (www.fao.org/forestry/nfa).

Table 6. Variable in NFI

1	Accessibility
2	Agro-ecological zone
3	Altitude
4	Application of forestry incentives
5	Awareness of forestry incentives
6	Awareness of legislation
7	Causative agents
8	Change reason
9	Child labour
10	Commercial height
11	Common/local species name
12	Compliance with legislation
13	Conflicts
14	Demand trend
15	Designation / Protection status
16	Diameter at Breast Height
17	Distance to nearest all-weather road
18	Distance to nearest Food Market
19	Distance to nearest Input Market
20	Distance to nearest seasonal road
21	Distance to nearest Settlement
22	Disturbances
23	End-use
24	Environmental problems
25	Fire occurrence
26	Frequency

27	Gender balance
28	Global Ecological Zone (GEZ)
29	Harvester/User
30	Harvester/User Rank
31	Health condition
32	Length of branch
33	Logging technology
34	Management agreement
35	Management plan
36	Mean Diameter of branch
37	Organic matter
38	Organization level
39	Orientation - Aspect
40	Ownership
41	Population main activity
42	Proximity to infrastructure
43	Relief
44	Scientific species name
45	Secondary activity of Population
46	Settlement history of Population
47	Shrub coverage
48	Shrub height
49	Silviculture
50	Slope
51	Soil drainage
52	Soil texture
53	Species ranking
54	Stand structure
55	Stem quality
56	Stump - Species
57	Stump height
58	Supply trend
59	Timber exploitation
60	Total height
61	Tree Canopy cover
62	Tree origin
63	Trend
64	User rights
65	Year since cut

The variables were defined taking into account the need to produce different outputs in the pre-defined forest, and tree attributes such as land use/land cover area, volume, biomass and carbon, resources management and protection status, biodiversity, and uses of resources. This set of variables consists of internationally harmonised variables and a group of country specific variables that complement each other and allow monitoring and reporting at both national and international level

Content and Methodology of data collection in NFI

Geo-Physical

	N	SN	FMU	Methodology
Geo-Coordinates	**X**			Survey/ Maps
Altitude	**X**			Survey/Maps
Topography	**X**			Survey/Maps
Orientation (or Aspect)	**X**			Survey/Maps
Slope	**X**			Survey/Maps
Soil	**X**			Records/Soil Sample analysis
Geological structure	**X**			Survey/Maps
Rainfall	**X**			Survey/Maps

Bio-Physical

	N	SN	FMU	Methodology
Number of trees	**X**			Inventory / Survey
Diameter of trees	**X**			Inventory / Survey
Height of trees	**X**			Inventory / Survey
Length of stem	**X**			Inventory / Survey
Stump height	**X**			Inventory / Survey
Age class (for plantation and/or natural Branches regeneration)				
Branches				
Twigs				
Bark				
Leaves				

Forest extent

	N	SN	FMU	Methodology
Forest land area	**X**			Pilot/ Study areas/ Survey
Area of forest canopy/crown cover	**X**			Pilot/ Study areas/ Survey/Records
Area under forest management	**X**			Pilot/ Study areas/ Survey/Records
Area under formal forest management plan	**X**			Pilot/ Study areas/ Survey/Records
Area under sustainable forest management				
Forest area with certification	**X**			Survey/Records
Area under public owned forest	**X**			Survey/Records
Area under private owned forest	**X**			Survey/Records

Forest characteristics (Naturalness) and forest type

	N	SN	FMU	Methodology
Primary forest	**X**			Survey/Map
Modified natural forest	**X**			Survey/Map
Semi-natural forest	**X**			Survey/Map
Productive plantation	**X**			Survey/Map
Protective plantation	**X**			Survey/Map
Coniferous	**X**			Survey/Map/Remote Sensing
Broadleaved	**X**			Survey/Map/Remote Sensing
Mixed forest				
Forest area by dominant species (bamboo, mangroves, rubber)	**X**			Survey/Map/Remote Sensing
Forest area by ecological zone	**X**			Survey/Map/Remote Sensing

Use (designated functions) of forests

	N	SN	FMU	Methodology
Area of forest under production	**X**			Survey/Reports/Plans
Area of forest for protection of soil and water	**X**			Survey/Reports/Plans
Area of forest for conservation of biodiversity	**X**			Survey/Reports/Plans
Area of forest for social services	**X**			Survey/Reports/Plans
Area of forest for multiple purpose	**X**			Survey/Reports/Plans
Forest area available for wood supply	**X**			Survey/Reports/Plans
Forest area within protected areas	**X**			Survey/Reports/Plans

Social Services

	N	SN	FMU	Methodology
Area of forest managed for recreation	**X**			Survey/Records/Maps
Area of forest managed for tourism	**X**			Survey/Records/Maps
Area of forest used for education	**X**			Survey/Records/Maps
Area of forest managed for conservation of cultural/spiritual site	**X**			Survey/Records/Maps

Mapping of forest distribution

	N	SN	FMU	Methodology
Distribution of forests	**X**			Survey/Maps/Remote Sensing
Forest Characteristics	**X**			Survey/Maps/Remote Sensing
Land use	**X**			Survey/Maps/Remote Sensing
Administrative/political/legal boundaries	**X**			Survey/Maps/Remote Sensing
Designated functions of forests	**X**			Survey/Maps/Remote Sensing
Other wooded land	**X**			Survey/Maps/Remote Sensing
Other land with tree cover	**X**			Survey/Maps/Remote Sensing
Other land	**X**			Survey/Maps/Remote Sensing

Status of the forest and disturbances affecting forest health and vitality

	N	SN	FMU	Methodology
Disturbance by insects	**X**			Survey/National expert estimation/Record
Disturbance by diseases	**X**			Survey/National expert estimation/Record
Disturbance by other biotic agents	**X**			Survey/National expert estimation/Record
Disturbance by fire	**X**			Survey/National expert estimation/Record
Disturbance caused by other abiotic factors	**X**			Survey/National expert estimation/Record

Biodiversity

	N	SN	FMU	Methodology
Tree species	**X**			Survey/Map/Local knowledge
Shrub species	**X**			Survey/Map/Local knowledge
Herbs species	**X**			Survey/Map/Local knowledge
Endangered species	**X**			Survey/Map/Local knowledge
Critically endangered species	**X**			Survey/Map/Local knowledge
Vulnerable species	**X**			Survey/Map/Local knowledge
Native species	**X**			Survey/Map/Local knowledge
Endemic species	**X**			Survey/Map/Local knowledge
Introduced species	**X**			Survey/Map/Local knowledge

Beneficiaries of forest goods and services

	N	SN	FMU	Methodology
By locality of user (e.g. indigenous/local/national)?	**X**			Record
By good/service (e.g. timber, fuelwood, NWFP, bamboo/rattan, water, etc) used by them	**X**			Record
By economic class of the beneficiaries (high, medium, low income)	**X**			
By level of dependency on forest (as percentage of total employment)	**X**			
By physical accessibility to the	**X**			

forest (distance from forest)

Economic value

	N	SN	FMU	Methodology
Removal of timber	**X**			Economic Survey/Expert estimation/Statistical analysis
Removal of fuelwood	**X**			Economic Survey/Expert estimation/Statistical analysis
Removal of other wood products	**X**			Economic Survey/Expert estimation/Statistical analysis
Removal of wood products derived from forest under sustainable management	**X**			Economic Survey/Expert estimation/Statistical analysis
Removal of wood products derived from forest plantations	**X**			Economic Survey/Expert estimation/Statistical analysis
Removal of non wood forest products	**X**			Economic Survey/Expert estimation/Statistical analysis
Annual allowable cuts/yields	**X**			Economic Survey/Expert estimation/Statistical analysis
Social services	**X**			Economic Survey/Expert estimation/Statistical analysis
Environmental services	**X**			Economic Survey/Expert estimation/Statistical analysis
Employment	**X**			Economic Survey/Expert estimation/Statistical analysis
Support to livelihood of communities	**X**			Economic Survey/Expert estimation/Statistical analysis
Market price/cost of wood in forest	**X**			Economic Survey/Expert estimation/Statistical analysis
Market price/cost of non wood forest products	**X**			Economic Survey/Expert estimation/Statistical analysis
Estimate of value of social services	**X**			Economic Survey/Expert estimation/Statistical analysis
Estimate of value of environmental services	**X**			Economic Survey/Expert estimation/Statistical analysis
Estimate of value of employment	**X**			Economic Survey/Expert estimation/Statistical analysis
Estimate of the contribution of forest sector to national economy	**X**			Economic Survey/Expert estimation/Statistical analysis

Policy, legal and institutions (PLI) framework

	N	SN	FMU	Methodology
Forest policy	**X**			Survey/Reports/Documents
Forest legislation	**X**			Survey/Reports/Documents
Forest administration	**X**			Survey/Reports/Documents
Forest education and research	**X**			Survey/Reports/Documents
Annual outlay, expenditure, investment in forestry sector	**X**			Survey/Reports/Documents

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