Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT

COUNTRY REPORTS

UKRAINE

FRA2005/224
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The Forest Resources Assessment Programme

Sustainably managed forests have multiple environmental and socio-economic functions important at the global, national and local scales, and play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources - not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies - is crucial to support decision-making for policies and programmes in forestry and sustainable development at all levels.

FAO, at the request of its member countries, regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. This country report forms part of the Global Forest Resources Assessment 2005 (FRA 2005), which is the most comprehensive assessment to date. More than 800 people have been involved, including 172 national correspondents and their colleagues, an Advisory Group, international experts, FAO staff, consultants and volunteers. Information has been collated from 229 countries and territories for three points in time: 1990, 2000 and 2005.

The reporting framework for FRA 2005 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes more than 40 variables related to the extent, condition, uses and values of forest resources. More information on the FRA 2005 process and the results - including all the country reports - is available on the FRA 2005 Web site (www.fao.org/forestry/fra2005).

The Global Forest Resources Assessment process is coordinated by the Forestry Department at FAO headquarters in Rome. The contact person for matters related to FRA 2005 is:

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Abbreviations

FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Statistical Databases of the FAO
FRA	Global Forest Resources Assessment carried out by the FAO
FRA 2000	Global Forest Resources Assessment, 2000
FRA 2005	Global Forest Resources Assessment, renewed version, 2005
H	High quality
M	Medium quality
AG	Above-Ground
SCF	State Committee of Forestry of the Ukraine
N/A	Not Applicable
NDA	No Data Available
DBH	Diameter at Breast Height
NC	National Correspondent
NAUU	National Agrarian University of the Ukraine

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1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2005 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use.
Other wooded land	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds *in situ*; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Other land	All land that is not classified as "Forest" or "Other wooded land".
Other land with tree cover (Subordinated to "Other land")	Land classified as "Other land", spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forest Code of the Ukraine	H	Forest	1994	
Land Code of the Ukraine	H	Other land area	2002	
Manual for Management of the State Forest Cadastre and Primary Inventory of Forests	H	Forest	1995	
State Land Cadastre for 1988-2002	H	Other land area	1988-2002	
State Forest Cadastre for 1988-2002	H	Forest	1988-2002	
FAOSTAT	H	Total country area, Land area, Inland water bodies	1990, 2000	

1.2.2 Classification and definitions

National class	Definition
Forest	The unity of land, vegetation (where trees and bushes are dominant), animals, microorganisms and other components of nature, the developments of which are biologically inter-related and which influence surrounding environment
Forest Fund	All forests on the territory of the Ukraine are parts of the state Forest Fund. The FF includes shelterbelts, protective plantations along railways and motorways, canals, hydro-technical constructions and water bodies. The FF also includes land parcels not covered with forest vegetation but reserved for forest management needs
Vegetation which is not included in the FF	All types of vegetation within populated areas, which are not included in the forest category; individual trees and groups of trees, bushy vegetation on agricultural lands, lands of private households, lands adjacent to private households, summer cottages and gardens

Forest land	Areas covered or not covered by forest vegetation (trees and bushes), areas which have to be afforested (clear cut areas, burned areas, sparse stands and bare land), forest roads, openings, fire-breaks, un-closed plantations and nurseries
Non-forest land	Areas occupied by buildings which are used for forest management needs, electric power transmission lines, pipelines and underground communication cables
Land covered by forest vegetation	Land areas covered by forest vegetation which are occupied by young stands with the density of 0.4 (around 40% canopy cover) and higher and stands of other age groups with the density of 0.3 (around 30% canopy cover) and higher
Land not covered by forest vegetation	Land areas not covered by forest vegetation but reserved for forest restoration (sparse vegetation, burned areas, dead stands, clear cut areas, glades and bare lands)

The minimum area that is being accounted for as a forest is 0.1 hectares

1.2.3 Original data

FRA 2005 categories	National categories
Forest	Forest land except shelterbelts, protective forest plantations along railways, motorways and canals and except bushes
Other Wooded Land (OWL)	Bushes and scrubland
Other Land with Tree Cover (OLWTC)	Territories covered by woody plants but excluded from the 'forest' category (except bushes), areas with perennial tree cover and urban parks

Classes	Area (1000 ha)		
	1988	1996	2002
Forest	9213	9458	9536
Other wooded land	26	36	NDA
Other land	48697	48442	NDA
...of which with tree cover [1)]	934	916	NDA
Inland water bodies	2419	2419	NDA
TOTAL	60355	60355	NDA

1.3 Analysis and processing of national data

1.3.1 Calibration

The FAOSTAT figure for Inland water is used for the reporting to make the total country area tally with the official total country area (FAOSTAT). Other land (1990, 2000 and 2005) is calculated as Total country area less: Forest, Other wooded land and Inland water bodies.

1.3.2 Estimation and forecasting

The Estimation for 1990 is made by linear interpolation (1988 and 1996). Forecasting Other wooded land and Other land with tree cover for 2000 is made by linear extrapolation (1988-1996), the forest area is interpolated using forest area 1996-2002. Forest area 2005 is linearly extrapolated using forest area (1996-2002). Based on expert estimates, the forecasted values for Other wooded land and Other land with tree cover in 2005 are equal to those in 2000.

	Area 1000 hectares				
	1988	1990	*1996*	2000	2005
Forest	*9213*	9274	*9458*	9510	9575
Other wooded land	*26*	29	*36*	41	41
Other land	*48696*	48632	*48441*	48384	48161
...of which with tree cover [1)]	*934*	930	*916*	907	907
Inland water bodies[2)]	*2435*	2435	*2435*	2435	2435
TOTAL country area	*60370*	60370	*60370*	60370	60370

[1)] Area of "Other land with tree cover" is included in the area reported under "Other land" and should therefore be excluded when calculating the total area for the country.
[2)] FAOSTAT figure.

1.4 Reclassification into FRA 2005 classes

Not applied.

1.5 Data for National reporting table T1

FRA 2005 Categories	Area (1000 hectares)		
	1990	**2000**	**2005**
Forest	9274	9510	9575
Other wooded land	29	41	41
Other land	48632	48384	48319
...of which with tree cover [1)]	930	907	907
Inland water bodies[2)]	2435	2435	2435
TOTAL	60370	60370	60370

1) Area of "Other land with tree cover" is included in the area reported under "Other land" and should therefore be excluded when calculating the total area for the country.
2) FAOSTAT data.

1.6 Comments to National reporting table T1

2 Table T2 – Ownership of Forest and Other wooded land

2.1 FRA 2005 Categories and definitions

Category	Definition
Private ownership	Land owned by individuals, families, private co-operatives, corporations, industries, religious and educational institutions, pension or investment funds, and other private institutions.
Public ownership	Land owned by the State (national, state and regional governments) or government-owned institutions or corporations or other public bodies including cities, municipalities, villages and communes.
Other ownership	Land that is not classified either as "Public ownership" or as "Private ownership".

2.2 National data

2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Land Code of the Ukraine	H	Other land area	2002	
Forest Code of the Ukraine	H	Forest	1994	
State Forest Cadastre for 1988-2002	H	Forest	1988-2002	
State Land Cadastre for 1988-2002	H	Other land area	1988-2002	

2.2.2 Classification and definitions

Comply with FRA 2005 definitions.

2.2.3 Original data

Forest area and Other wooded land area imported from T1.

2.3 Analysis and processing of national data

2.3.1 Calibration

Not applied.

2.3.2 Estimation and forecasting

Not applied.

2.4 Reclassification into FRA 2005 classes

100% of the land is under public ownership

2.5 Data for National reporting table T2

FRA 2005 Categories	Area (1000 hectares)			
	Forest		Other wooded land	
	1990	2000	1990	2000
Private ownership	0	0	0	0
Public ownership	9274	9510	29	41
Other ownership	0	0	0	0
TOTAL	**9274**	**9510**	**29**	**41**

2.6 Comments to National reporting table T2

According to the Land Code of the Ukraine (2002), lands of the FF can be the subjects of state, community and private ownership. Land parcels of the FF, which are less than five hectares in area and which are parts of peasant, farm and other enterprises, can be transferred to the ownership of private persons or legal bodies. At present the area of privately owned forest is insignificant.

3 Table T3 – Designated function of Forest and Other wooded land

3.1 FRA 2005 Categories and definitions

Types of designation

Category	Definition
Primary function	A designated function is considered to be primary when it is significantly more important than other functions. This includes areas that are legally or voluntarily set aside for specific purposes.
Total area with function	Total area where a specific function has been designated, regardless whether it is primary or not.

Designation categories

Category / Designated function	Definition
Production	Forest / Other wooded land designated for production and extraction of forest goods, including both wood and non-wood forest products.
Protection of soil and water	Forest / Other wooded land designated for protection of soil and water.
Conservation of biodiversity	Forest / Other wooded land designated for conservation of biological diversity.
Social services	Forest / Other wooded land designated for the provision of social services.
Multiple purpose	Forest / Other wooded land designated to any combination of: production of goods, protection of soil and water, conservation of biodiversity and provision of social services and where none of these alone can be considered as being significantly more important than the others.
No or unknown function	Forest / Other wooded land for which a specific function has not been designated or where designated function is unknown.

3.2 National data

3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Forest Code of the Ukraine	H	Forest	1994	
State Forest Cadastre for 1988-2002	H	Forest	1988-1996	
Rules of the division of forests into groups, their designation to protection categories and delimitation of especially protective land areas of the FF	B	Forest	1995	

3.2.2 Classification and definitions

National class	Definition
Forests of the second group	Forests with ecological and exploitative functions managed under the limited use regime with the aim to maintain their protective functions as well as continuous and inexhaustible use
Forests of the first group including:	
Forests primarily fulfilling water protective functions	Protective forest belts along rivers and around lakes, dams and other water bodies. Forest belts protecting spawning areas of commercially valuable fish species
Forests primarily fulfilling protective functions	Forests preventing soil erosion, protective forest belts along rail- and motorways, especially valuable forest massifs, protective forest belts of state importance, forests of steppe and forest-steppe zones and mountainous regions with highly important environment protection function
Forests with special functions	Forests within specifically protected territories (nature reserves -'zapovedniki', national parks, natural monuments, reserved areas, regional landscape parks), forests of scientific or historical importance and sub-alpine communities of

	woody plants
Forests fulfilling sanitary-hygienic and recreational functions	Forests near population centers, green belts around population centers and industrial enterprises, forests of the first and second belts within sanitary watershed zones and forests within sanitary protection districts of recreational territories

3.2.3 Original data

FRA 2005 categories	Area 1000 hectares	
Primary function	**1988**	**1996**
Production	4423	4533
Protection of soil and water	2764	2878
Conservation of Biodiversity	276	248
Social services	1750	1799
Total forest	9213	9458
Total area with function		
Production	6488	6000

3.3 Analysis and processing of national data

3.3.1 Calibration

Not applied

3.3.2 Estimation and forecasting

For 1990, linear Interpolation of (1988-1996) was applied. The percentage of primary function in 1996 was applied to forest area in 2000 and 2005. The total area with function production was extrapolated using 1988-1996.

FRA 2005 categories	Area 1000 hectares				
Primary function	***1988***	**1990**	***1996***	**2000**	**2005**
Production	*4423*	4451	*4533*	4558	4589
Protection of soil and water	*2764*	2793	*2878*	2894	2914
Conservation of Biodiversity	*276*	269	*248*	249	251
Social services	*1750*	1762	*1799*	1809	1821
Total forest	*9213*	9275	*9458*	9510	9575
Total area with function					
Production	*6488*	6366	*6000*	5756	5451

3.4 Reclassification into FRA 2005 classes

Total area with function:
Production: Forests of the first and second group allocated for production
Protection of soil and water: Total forest area
Conservation of biodiversity: The area reflecting the percentages of total forest areas designated for conservation - 13%, 14% and 15%
Social services: Forests of the first group (around one half of the total forest area).

3.5 Data for National reporting table T3

FRA 2005 Categories / Designated function	Area (1000 hectares)					
	Primary function			Total area with function		
	1990	2000	2005	1990	2000	2005
Forest						
Production	4451	4558	4589	6366	5756	5451
Protection of soil and water	2793	2894	2914	9275	9510	9575
Conservation of biodiversity	269	249	251	1206	1331	1436
Social services	1762	1809	1821	4638	4755	4788
Multiple purpose	0	0	0	not appl.	not appl.	not appl.
No or unknown function	0	0	0	not appl.	not appl.	not appl.
Total - Forest	**9275**	**9510**	**9575**	**not appl.**	**not appl.**	**not appl.**
Other wooded land						
Production	0	0	0	0	0	0
Protection of soil and water	20	31	31	29	41	41
Conservation of biodiversity	1	1	1	1	1	1
Social services	8	9	9	8	9	9
Multiple purpose	0	0	0	not appl.	not appl.	not appl.
No or unknown function	0	0	0	not appl.	not appl.	not appl.
Total – Other wooded land	**29**	**41**	**41**	**not appl.**	**not appl.**	**not appl.**

3.6 Comments to National reporting table T3

4 Table T4 – Characteristics of Forest and Other wooded land

4.1 FRA 2005 Categories and definitions

Category	Definition
Primary	Forest / Other wooded land of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Modified natural	Forest / Other wooded land of naturally regenerated native species where there are clearly visible indications of human activities.
Semi-natural	Forest / Other wooded land of native species, established through planting, seeding or assisted natural regeneration.
Productive plantation	Forest / Other wooded land of introduced species, and in some cases native species, established through planting or seeding mainly for production of wood or non wood goods.
Protective plantation	Forest / Other wooded land of native or introduced species, established through planting or seeding mainly for provision of services.

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
State Forest Cadastre for 1988-2002	H	Forest	1988-1996	

4.2.2 Classification and definitions

The FRA 2005 definitions were applied

4.2.3 Original data

	1996 (1000 ha)	
	State forest cadaster	Ukraine
Introduced species	166,7	350,1
Introduced species suitable for exploitation	47,9	82,8

1988 (1000 ha)	
State forest cadaster	Ukraine
150,3	
48,6	

4.3 Analysis and processing of national data

4.3.1 Calibration

Not applied

4.3.2 Estimation and forecasting

Please see Section 4.4

4.4 Reclassification into FRA 2005 classes

Introduced species	1996 (1000 ha)		1988 (1000 ha)	
	State forest cadaster	Ukraine	State forest cadaster	Ukraine
Total	166,7 47,6%	350,1	150,3 47,6%	315,8

Productive plantations include plantations of introduced species suitable for exploitation

Total	47,9 57,8%	82,8	48,6 57,8%	84,1

Protective plantations: Total area of plantations minus productive plantations

1996: 350,1 - 82,8 = 267,3 thousand ha

1988: 315,8 - 84,1 = 231,7 thousand ha

Estimation and forecasting:

	Interval (1996-1988)	1988	1996	Diff.	Diff. Per year	Diff. Per year x 2 years	Esti-mation 1990	Diff. Per year x 12 years	Esti-mation 2000	Diff. Per year x 17 years	Forecast 2005
Prod. plantations	8	84,1	82,8	-1,3	-0,1625	-0,325	**84**	-1,95	**82**	-2,7625	**81**
Prot. plantations	8	231,7	267,3	35,6	4,45	8,9	**241**	53,4	**285**	75,7	**307**

The area of primary forest has been assumed unchanged (59 000 ha according to FRA 2000)

Modified natural forests/other wooded land: half of the total forest area minus primary forest area (expert estimates)

Semi-natural forest area has been estimated as: Total forest area minus the area of all other categories

4.5 Data for National reporting table T4

FRA 2005 Categories	**Area (1000 hectares)**					
	Forest			**Other wooded land**		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Primary	59	59	59	0	0	0
Modified natural	4578	4696	4729	14.5	20.5	20.5
Semi-natural	4312	4388	4399	14.5	20.5	20.5
Productive plantation	84	82	81	0	0	0
Protective plantation	241	285	307	0	0	0
TOTAL	9274	9510	9575	29	41	41

4.6 Comments to National reporting table T4

5 Table T5 – Growing stock

5.1 FRA 2005 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of Y cm, and may also include branches to a minimum diameter of W cm.
Commercial growing stock	The part of the growing stock of species that are considered as commercial or potentially commercial under current market conditions, and with a diameter at breast height of Z cm or more.

5.2 National data

5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
State Forest Cadastre for 1988-2002	H	Growing stock	1988-1996	

5.2.2 Classification and definitions

National class	Definition
Growing stock	Volume over bark of all living trees more than 2 cm in diameter at breast height. Includes the stem from ground level
Commercial growing stock	The part of the growing stock that can be exploited commercially

5.2.3 Original data

National data	Growing stock (million m^3)	
	1988	1996
Forest growing stock	1320	1696
Forest commercial growing stock	895	1110

5.3 Analysis and processing of national data

5.3.1 Calibration

Not applied.

5.3.2 Estimation and forecasting

Linear interpolation and extrapolation.

5.4 Reclassification into FRA 2005 classes

5.5 Data for National reporting table T5

FRA 2005 Categories	Volume (million cubic meters over bark)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Growing stock	1414	1884	2119	1	1	1
Commercial growing stock	949	1218	1352	0	0	0

Specification of country threshold values	Unit	Value	Complementary information
1. Minimum diameter at breast height of trees included in Growing stock (X)	cm	2	
2. Minimum diameter at the top end of stem (Y) for calculation of Growing stock	cm	2	
3. Minimum diameter of branches included in Growing stock (W)	cm		Branches are not included in growing stock
4. Minimum diameter at breast height of trees in Commercial growing stock (Z)	cm	8	
5. Volume refers to "Above ground" (AG) or "Above stump" (AS)	AG / AS	AG	
6. Have any of the above thresholds (points 1 to 4) changed since 1990	Yes/No	No	
7. If yes, then attach a separate note giving details of the change	Attachment		

5.6 Comments to National reporting table T5

6 Table T6 – Biomass stock

6.1 FRA 2005 Categories and definitions

Category	Definition
Above-ground biomass	All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage.
Below-ground biomass	All living biomass of live roots. Fine roots of less than 2mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Dead wood biomass	All non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
State Forest Cadastre for 1988-2002	H	Biomass stock	1988, 1996, 2002	
Phytomass of the Ukrainian forests. Lakida, P.I. Ternopol, 2003	M	Biomass stock	2002	
The productivity and structure of phytomass in the artificially established stands of Common Spruce in the Ukrainian Carpathians. Kolosok, O.M. Kiev, NAUU, 2002	M	Biomass stock	2002	
Value estimation of some of the components of birch phytomass. Matushevitch, L.M. *Science Messenger, NAUU.* 1998	M	Biomass stock	1998	
Reference materials for the inventory of the Ukrainian and Moldavian forests. Kiev, 1987	M		1987	
The investigation of the phytomass dynamics of artificially established pine stands of the Ukrainian Polesie. Petrenko, M.M. and Lakida, P.I. *Science Messenger, NAUU.* 2000	M		2000	

6.2.2 Classification and definitions

FRA 2005 definitions were applied
The threshold values for thin roots, standing deadwood and wood lying on the surface are given in Table 6.1.
National coefficients for biomass density, BEF and Root-Shoot Ratio were used.

6.2.3 Original data

Tree species	Growing stock volume, million m^3 2000
Pinus Pine	717
Quercus Oak	395
Picea Spruce	235
Fagus Beech	214
Alnus Alder	76
Betula Birch	75
Abies Fir	43
Carpinus Hornbeam	31
Fraxinus Ash	29
Robinia Acacia	25
Remaining	44
Total	**1884**

6.3 Analysis and processing of national data

		2000				Million tonnes		
Species	**GS (mill. m3 o.b.)**	**Wood dens**	**BEF**	**R/S Ratio**	**D/L Ratio**	**AGB**	**BGB**	**DWB**
Pine	717	0.41	1.18	0.21	0.14	346.8846	72.84577	58.76225
Oak	395	0.52	1.28	0.25	0.14	262.912	65.728	46.0096
Spruce	235	0.35	1.22	0.22	0.14	100.345	22.0759	17.13893
Beech	214	0.53	1.32	0.24	0.14	149.7144	35.93146	25.99042
Alder	76	0.52	1.28	0.34	0.14	50.5856	17.1991	9.489859
Birch	75	0.51	1.3	0.24	0.14	49.725	11.934	8.63226
Fir	43	0.36	1.18	0.24	0.14	18.2664	4.383936	3.171047
Hornbeam	31	0.56	1.3	0.32	0.14	22.568	7.22176	4.170566
Ash	29	0.61	1.3	0.32	0.14	22.997	7.35904	4.249846
Acacia	25	0.52	1.28	0.31	0.14	16.64	5.1584	3.051776
Remaining	44	0.45	1.3	0.3	0.14	25.74	7.722	4.68468
TOTAL	**1884.00**					1066.378	257.5594	185.3512

6.3.1 Calibration

Not applied

6.3.2 Estimation and forecasting

Calculation of general conversion factors between biomass and growing stock

AGB / GS o.b.	0.5660
BGB / GS o.b	0.1367
DWB / GS o.b.	0.0984

Growing stock figures from T5

FRA 2005 Categories	Volume (million cubic meters over bark)		
	Forest		
	1990	**2000**	**2005**
Growing stock	1414	1884	2119

6.4 Reclassification into FRA 2005 classes

Not applied

6.5 Data for National reporting table T6

FRA 2005 Categories	Biomass (million metric tonnes oven-dry weight)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Above-ground biomass	800.3	1066.4	1199.4	NDA	NDA	NDA
Below-ground biomass	193.3	257.6	289.7	NDA	NDA	NDA
Dead wood biomass	139.1	185.4	208.5	NDA	NDA	NDA
TOTAL	1132.8	1509.3	1697.5	**NDA**	**NDA**	**NDA**

7 Table T7 – Carbon stock

7.1 FRA 2005 Categories and definitions

Category	Definition
Carbon in above-ground biomass	Carbon in all living biomass above the soil, including stem, stump, branches, bark, seeds, and foliage.
Carbon in below-ground biomass	Carbon in all living biomass of live roots. Fine roots of less than 2 mm diameter are excluded, because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood biomass	Carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in litter	Carbon in all non-living biomass with a diameter less than a minimum diameter chose by the country for lying dead (for example 10 cm), in various states of decomposition above the mineral or organic soil. This includes the litter, fumic, and humic layers.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series.

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
The productivity and phytomass and carbon deposits of the artificially established oak stands of Podolie. Self-review. Laschenko, A.G. Kiev, NAUU, 2004	M	Carbon stock	2004	
Carbon stock in the Russian forests and swamps. Alekseeva, V.A. and Berdcy, R.A. Krasnoyarsk, 1994	M	Carbon stock	1994	

7.2.2 Classification and definitions

The FRA 2005 definitions were applied

7.2.3 Original data

Data imported form T6.

7.3 Analysis and processing of national data

The calculation was done by multiplying the standard values suggested by IPCC-GPG for the carbon content in biomass of growing trees (50%) by the biomass stock, above-ground and below-ground

Multiply biomass stock from T6 by 0.5 gives

	Carbon stock (million tonnes)		
	1990	**2000**	**2005**
Carbon in above-ground biomass	400.2	533.2	599.7
Carbon in below-ground biomass	96.7	128.8	144.8
Carbon in dead wood biomass	69.6	92.7	104.2

7.3.1 Calibration

Not applied

7.3.2 Estimation and forecasting

7.4 Reclassification into FRA 2005 classes

Not applied

7.5 Data for National reporting table T7

FRA 2005 Categories	Carbon (Million metric tonnes)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Carbon in above-ground biomass	400.2	533.2	599.7	NDA	NDA	NDA
Carbon in below-ground biomass	96.7	128.8	144.8	NDA	NDA	NDA
Sub-total: Carbon in living biomass	**496.9**	**662.0**	**744.5**	**NDA**	**NDA**	**NDA**
Carbon in dead wood	69.6	92.7	104.2	NDA	NDA	NDA
Carbon in litter	NDA	NDA	NDA	NDA	NDA	NDA
Sub-total: Carbon in dead wood and litter	**69.6**	**92.7**	**104.2**	**NDA**	**NDA**	**NDA**
Soil carbon to a depth of _____ cm	NDA	NDA	NDA	NDA	NDA	NDA
TOTAL CARBON	**566.5**	**754.7**	**848.7**	**NDA**	**NDA**	**NDA**

7.6 Comments to National reporting table T7

8 Table T8 – Disturbances affecting health and vitality

8.1 FRA 2005 Categories and definitions

Category	Definition
Disturbance by fire	Disturbance caused by wildfire, independently whether it broke out inside or outside the forest/OWL.
Disturbance by insects	Disturbance caused by insect pests that are detrimental to tree health.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as a bacteria, fungi, phytoplasma or virus.
Other disturbance	Disturbance caused by other factors than fire, insects or diseases.

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Statistical bulletin about forest fires in the Ukraine. State Committee of Statistics of the Ukraine. Kiev, 2002	H	The area of forest fires	1988-2002	
Statistical bulletin about violations of forest legislation and conducted forest protection work in the Ukraine. State Committee of Statistics of the Ukraine. Kiev, 2002	H		1988-2002	

8.2.2 Classification and definitions

FRA 2005 definitions were applied

8.2.3 Original data

8.3 Analysis and processing of national data

8.3.1 Estimation and forecasting

8.4 Reclassification into FRA 2005 classes

	1988	1989	1990	1991	1992	Total for 5 years	Average annual value	1998	1999	2000	2001	2002	Total for 5 years	Average annual value
	1000 hectares													
Disturbance by fire	0,8	1,3	2,4	1,7	4,1	10,3	**2**	4,4	5,5	1,6	3,8	5	20,3	**4**
Disturbance by insects	95,2	105,6	37,3	87,9	90,3	416,3	**83**	107,5	92,4	99,3	118,8	226,1	644,1	**129**
Disturbance by diseases	123,4	130,5	127,3	124	121,9	626,9	**125**	120,8	124,5	119,2	123,1	108,5	596,1	**119**
Other disturbance										224,2			224,2	**45**

8.5 Data for National reporting table T8

FRA-2005 Categories	Average annual area affected (1000 hectares)			
	Forests		Other wooded land	
	1990	2000	1990	2000
Disturbance by fire	2	4	NDA	NDA
Disturbance by insects	83	129	NDA	NDA
Disturbance by diseases	125	119	NDA	NDA
Other disturbance		45		

8.6 Comments to National reporting table T8

Those forest areas are given, where combating measures are essential;
The information about other disturbances (windfall, storm damage) is only given for State forest cadastre.

9 Table T9 – Diversity of tree species

9.1 FRA 2005 Categories and definitions

Category	Definition
Number of native tree species	The total number of native tree species that have been identified within the country.
Number of critically endangered tree species	The number of native tree species that are classified as "Critically endangered" in the IUCN red list.
Number of endangered tree species	The number of native tree species that are classified as "Endangered" in the IUCN red list.
Number of vulnerable tree species	The number of native tree species that are classified as "Vulnerable" in the IUCN red list.

9.2 National data

9.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Red Data Book of the Ukraine	H	Number of endangered and vulnerable species	1996	
IUCN	H	Critically endangered, Endangered, Vulnerable	2000	

9.2.2 Classification and definitions

9.2.3 Original data

9.3 Data for National reporting table T9

FRA 2005 Categories	Number of species (year 2000)
Native tree species	85
Critically endangered tree species	0
Endangered tree species	0
Vulnerable tree species	1

9.4 Comments to National reporting table T9

The number of native tree species is based on expert estimates
Betula oycoviensis is listed as Vulnerable.

Species listed in the national Red Data book of the Ukraine are

Threatened by extinction:

1	Larix polonica Racib.
2	Quercus austriaca Willd.
3	Betula klokovii Zaverucha
4	Fraxinus ornus L.

Vulnerable:

1	Pinus stankewiczii.
2	Juniperus excelsa Bieb.

3	Juniperus foetidissima Willd.
4	Tilia dasystyla Stev.
5	Pistacia mutica Fisch. et Mey.
6	Arbutus andrachne L.

Rare:

1	Taxus baccata L.
2	Pinus cembra L.
3	Betula borysthenica Klok.
4	Betula obscura A.Kotula

10 Table T10 – Growing stock composition

10.1 FRA 2005 Categories and definitions

List of species names (scientific and common names) of the ten most common species.

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
State Forest Cadastre for 1988-2002	H		1988, 1996	

10.2.2 Original data

10.3 Analysis and processing of national data

10.3.1 Calibration

10.3.2 Estimation and forecasting

	Interval (1996-1988)	1988	1996	Diffe-rence	Diffe-rence per year	Diffe-renmce per year x 2 years	Esti-mation 1990	Diffe-rence per year x 12 years	Esti-mation 2000
Pine	8	502	645	143	17,875	35,75	**538**	214,5	**717**
Oak	8	277	355	78	9,75	19,5	**297**	117	**395**
Spruce	8	164	211	47	5,875	11,75	**176**	70,5	**235**
Beech	8	149	192	43	5,375	10,75	**159**	64,5	**214**
Alder	8	54	69	15	1,875	3,75	**58**	22,5	**76**
Birch	8	53	68	15	1,875	3,75	**57**	22,5	**75**
Fir	8	30	39	9	1,125	2,25	**32**	13,5	**43**
Hornbeam	8	25	29	4	0,5	1	**26**	6	**31**
Ash	8	20	26	6	0,75	1,5	**21**	9	**29**
Acacia	8	15	22	7	0,875	1,75	**17**	10,5	**25**
Remaining	8	31	40	9	1,125	2,25	**33**	13,5	**44**
Total		**1320**	**1696**	**376**	**47**	**94**	**1414**	**564**	**1884**

10.4 Data for National reporting table T10

FRA 2005 Categories / Species name (Scientific name and common name)		**Growing Stock in Forests (million cubic meters)**	
Scientific name	**Common name**	**1990**	**2000**
Pinus	Pine	538	717
Quercus	Oak	297	395
Picea	Spruce	176	235
Fagus	Beech	159	214
Alnus	Alder	58	76
Betula	Birch	57	75
Abies	Fir	32	43
Carpinus	Hornbeam	26	31
Fraxinus	Ash	21	29
Robinia	Acacia	17	25
Remaining		33	44
Total		**1414**	**1884**

10.5 Comments to National reporting table T10

11 Table T11 – Wood removal

11.1 FRA 2005 Categories and definitions

Category	Definition
Industrial wood removal	The wood removed (volume of roundwood over bark) for production of goods and services other than energy production (woodfuel).
Woodfuel removal	The wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

11.2 National data

11.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Statistical bulleting about the production and output of wood and other forest resources	H	Wood volume	1988-2002	
State Program 'Forests of the Ukraine', until 2015	H	Wood volume	2002	

11.2.2 Classification and definitions

Comply with FRA 2005 definitions

11.2.3 Original data

Produced in the Ukraine, under bark, 1000 m^3														
Category	**1988**	**1989**	**1990**	**1991**	**1992**	**Total for 5 years**	**Average annual value**	**1998**	**1999**	**2000**	**2001**	**2002**	**Total for 5 years**	**Average annual value**
Industrial roundwood	8535	8552	8670	7070	7120	39947	7989	6681	6456	7202	7774	8284	36397	7279
Woodfuel	5013	5131	4941	4242	4020	23347	4669	3868	3853	4060	4248	4543	20572	4114
TOTAL for Country	13548	13683	13611	11312	11140	63294	12659	10549	10309	11262	12022	12827	56969	11394

Category	**Average annual value**	**Coefficient (bark)**	**1990**	**Removal as a percentage of harvested volume (95%)**
Industrial roundwood	7989	1,13	9028	**8577**
Woodfuel	4669	1,13	5276	**5013**
TOTAL for Country	12659		14304	**13590**

Category	**Average annual value**	**Coefficient (bark)**	**2000**	**Removal as a percentage of harvested volume (95%)**
Industrial roundwood	7279	1,13	8226	**7814**
Woodfuel	4114	1,13	4649	**4417**
TOTAL for Country	**11394**		**12875**	**12231**

Прогноз

Category	**Forecast 2005 Under bark**	**Forecast 2005 Over bark (1,13)**	**Forecast of the removal (95% of harvested wood) 2005**
Industrial roundwood	6200	7006	**6660**
Woodfuel	7600	8588	**8160**
TOTAL for Country	**13800**	**15594**	**14820**

11.3 Analysis and processing of national data

11.3.1 Estimation and forecasting

Please see Section 11.2.3

11.4 Reclassification into FRA 2005 classes

Not applied

11.5 Data for National reporting table T11

FRA 2005 Categories	**Volume in 1000 cubic meters of roundwood over bark**					
	Forest			**Other wooded land**		
	1990	**2000**	**2005**	**1990**	**2000**	**2005**
Industrial roundwood	8577	7814	6660	0	0	0
Woodfuel	5013	4417	8160	0	0	0
TOTAL for Country	**13590**	**12231**	**14820**	**0**	**0**	**0**

11.6 Comments to National reporting table T11

12 Table T12 – Value of wood removal

12.1 FRA 2005 Categories and definitions

Category	Definition
Value of industrial wood removal	Value of the wood removed for production of goods and services other than energy production (woodfuel).
Value of woodfuel removal	Value of the wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use.

12.2 National data

12.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Statistical yearbook of the Ukraine	H		2000	

12.2.2 Classification and definitions

12.2.3 Original data

12.3 Analysis and processing of national data

12.3.1 Estimation and forecasting

12.4 Reclassification into FRA 2005 classes

12.5 Data for National reporting table T12

FRA 2005 Categories	Value of roundwood removal (1000 USD)					
	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Industrial roundwood	NDA	NDA	NDA	NDA	NDA	NDA
Woodfuel	NDA	NDA	NDA	NDA	NDA	NDA
TOTAL for Country	**NDA**	**140452**	**NDA**	**NDA**	**NDA**	**NDA**

12.6 Comments to National reporting table T12

13 Table T13 – Non-wood forest product removal

13.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

13.2 National data

13.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
Statistical reporting about the management of hunting farms	M		1998-2002	

13.2.2 Classification and definitions

13.2.3 Original data

13.3 Analysis and processing of national data

13.3.1 Estimation and forecasting

	1988	1989	1990	1991	1992	Total for 5 years	Average annual value	1998	1999	2000	2001	2002	Total for 5 years	Average annual value
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
9. Living animals	1520	2400	2544	1820	1480	9764	**1953**	2547	1212	863	2427	1000	8049	**1610**
10. Hides, skins and trophies	401	415	399	279	362	1856	**371**	384	363	391	376	365	1879	**376**
12. Bush meat	337	442	455	420	424	2078	**416**	138	132	129	136	150	685	**137**

13.4 Reclassification into FRA 2005 classes

1 Christmas tree = 10 kg

13.5 Data for National reporting table T13

FRA 2005 Categories	Scale factor	Unit	NWFP removal		
			1990	2000	2005
Plant products / raw material					
1. Food		Tonnes	981	303	936
2. Fodder		Tonnes	2801	5372	3963
3. Raw material for medicine and aromatic products		Tonnes	277	39	157
4. Raw material for colorants and dyes		Tonnes	NDA	NDA	NDA
5. Raw material for utensils, handicrafts & construction		Tonnes		1.7	
6. Ornamental plants		Tonnes			
7. Exudates		Tonnes	1432	1128	1257
8. Other plant products		Tonnes	NDA	25 600	23 000
Animal products / raw material					
9. Living animals		animals	1953	1610	1200
10. Hides, skins and trophies		skins	371000	2 400	400000
11. Wild honey and bee-wax			NDA	NDA	NDA
12. Bush meat		tonnes	416	101	550
13. Raw material for medicine			NDA	NDA	NDA
14. Raw material for colorants			NDA	NDA	NDA
15. Other edible animal products			NDA	NDA	NDA
16. Other non-edible animal products			NDA	NDA	NDA

13.6 Comments to National reporting table T13

The values are given for forest and OWL together;
Regarding #9 – captured for relocation;
Regarding #12 – refer to the hoofed animals

14 Table T14 – Value of non-wood forest product removal

14.1 FRA 2005 Categories and definitions

The following categories of non-wood forest products have been defined:

Category
Plant products / raw material
1. Food
2. Fodder
3. Raw material for medicine and aromatic products
4. Raw material for colorants and dyes
5. Raw material for utensils, handicrafts & construction
6. Ornamental plants
7. Exudates
8. Other plant products
Animal products / raw material
9. Living animals
10. Hides, skins and trophies
11. Wild honey and bee-wax
12. Bush meat
13. Raw material for medicine
14. Raw material for colorants
15. Other edible animal products
16. Other non-edible animal products

14.2 National data

14.2.1 Data sources

References to sources of information	**Quality (H/M/L)**	**Variable(s)**	**Year(s)**	**Additional comments**
Statistical reporting	M			

14.2.2 Classification and definitions

14.2.3 Original data

14.3 Analysis and processing of national data

14.3.1 Estimation and forecasting

14.4 Reclassification into FRA 2005 classes

14.5 Data for National reporting table T14

FRA 2005 Categories	Value of the of NWFP removed (1000 USD)		
	1990	**2000**	**2005**
Plant products / raw material			
1. Food	NDA	NDA	NDA
2. Fodder	NDA	NDA	NDA
3. Raw material for medicine and aromatic products	NDA	NDA	NDA
4. Raw material for colorants and dyes	NDA	NDA	NDA
5. Raw material for utensils, handicrafts & construction	NDA	NDA	NDA
6. Ornamental plants	NDA	NDA	NDA
7. Exudates	NDA	NDA	NDA
8. Other plant products	NDA	NDA	NDA
Animal products / raw material			
9. Living animals	12	70	100
10. Hides, skins and trophies	NDA	1.37	160
11. Wild honey and bee-wax	NDA	NDA	NDA
12. Bush meat	NDA	126	120
13. Raw material for medicine	NDA	NDA	NDA
14. Raw material for colorants	NDA	NDA	NDA
15. Other edible animal products	NDA	NDA	NDA
16. Other non-edible animal products	NDA	NDA	NDA
TOTAL	**285**	**330**	**380**

14.6 Comments to National reporting table T14

The figures reported above do not correspond to the amounts reported in Table T13 and should be considered an under-estimate of the true value of non-wood forest products in the country.

15 Table T15 – Employment in forestry

15.1 FRA 2005 Categories and definitions

Category	Definition
Primary production of goods	Employment in activities related to primary production of goods, like industrial roundwood, woodfuel and non-wood forest products.
Provision of services	Employment in activities directly related to services from forests and woodlands.
Unspecified forestry activities	Employment in unspecified forestry activities.

15.2 National data

15.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Statistical Yearbook of the Ukraine, 2000	M	The number of employed people	2000	

15.2.2 Classification and definitions

15.2.3 Original data

15.3 Analysis and processing of national data

15.3.1 Estimation and forecasting

15.4 Reclassification into FRA 2005 classes

15.5 Data for National reporting table T15

FRA 2005 Categories	Employment (1000 person-years)	
	1990	2000
Primary production of goods	NDA	NDA
Provision of services	NDA	NDA
Unspecified forestry activities	62	105
TOTAL	**62**	**105**

15.6 Comments to National reporting table T15