MISSION REPORT

FOREST INVENTORY TRAINING COURSE

September 14 – 25, 2002[1]

FAO Kosovo Forest Inventory Project, Pristina 2002,
(OSRO/KOS/105/NOR)

INTERNATIONAL FOREST INVENTORY TRAINING CONSULTANT

Prof. Dr. Milan Hočevar, University of Ljubljana, Slovenia
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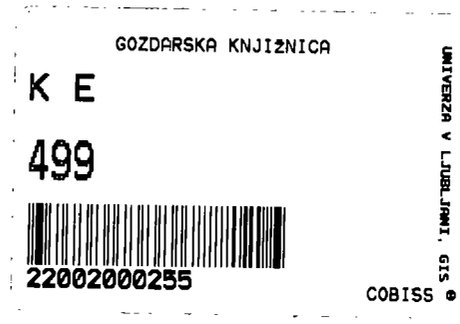
[1] Including two days of work at home station on 14 and 15 September 2002

GDK 61+52/53:56:(497.11)
K.b.: gozdna inventura, metoda dela, usposabljanje delavcev, Priština, Srbija
T.D.: 2.13



GENERAL

The Forest Inventory Training Course was organized in collaboration between the International Forest Inventory Expert Team Leader of the FAO Kosovo Forest Inventory Project, Ministry of Agriculture, Forestry and Rural Development, Kosovo Forestry Authorities, Regional Forest Inventory Experts and the undersigned.

The undersigned was responsible for providing lectures on the fundamentals of forest inventory, forest statistics and GIS and for demonstrating forest inventory methods and working techniques in the field. A considerable amount of effort was dedicated to the methods, which should assist in bridging the gap between the working techniques, traditional in the region, and requirements of the proposed National Forest Inventory concept.

The training course was organized for a limited number of forest technicians and engineers, coming from the majority and minority areas.

OBJECTIVES OF THE COURSE

The program embraced the following themes:

- Acquainting with national (regional) forest inventory systems (theoretical background, mission, the principles);
- Acquainting with the fundamentals of sampling theory for forest inventories;
- Acquainting with the fundamentals of forest mensuration and inventory systems;
- Acquainting with the fundamentals of forest-data assembling;
- Demonstrating remote sensing methods and tools on concrete cases;
- Acquainting with forest information systems;
- Lecturing and demonstrating forest inventory techniques and tools of forest mensuration in the field;
- Deepening knowledge on forest classification systems used in the region and reviewing the instructions for designed forest inventory concept along with the classification system.

UNDERTAKEN ACTIVITIES

14 and 15.September

- Training preparation (Slovenia)

Monday, 16 September

- Arrival to Pristina at 15.00, check-in the hotel Park;
- Meeting a project group and responsible staff ~~a counterpart~~ (Mr. T. Dale, A. Olsson);
- Discussion, planning the training program.

Tuesday, 17 September
Location: Pristina (in-door)
Participants: K-Albanians and Serbs (MiKFA room on Ministery in Pristina)
Program: Sessions, lectures
Morning:

- Introduction to national forest inventory systems;
- describing the existing NFI methods applied in CH, Germany, the USA, Slovenia, Kosovo;

Afternoon:

- Fundamentals of data-assembling in forestry

Wednesday, 18 September :
Location: Blinaja close to Pristina;
9 00 – 19 00, return to Pristina
Participants: K-Albanians
Program: Field exercises

- Demonstrating and practicing the proposed method
- Demonstrating the capabilities of GPS and training;
- Training the techniques of NFI on Cluster No. 268

evenly-aged oak forest
9 00 – 19 00, return to Pristina

Thursday, 19 September
Location: Vitina- Ljubište, degraded middle forest, Macedonian border
9 00 – 19 00, return to Pristina
Participants: K-Albanians
Program: Field exercises

- Training the techniques of NFI on Cluster No. 109 (Mogila)

Friday, 20 September
Location: Pristina- in-door
Participants: selected forest engineers of both groups - K-Albanians and K-Serbs
Program: Lectures
Morning:

- Fundamentals of Forest Geographic Systems (the case of Slovenia, Power Point Presentation)
- Fundamentals of interpretation of aerial and satellite images;
- Fundamentals of statistical sampling methods;
- Practicing: planning the inventory project: (e.g. the density of a sampling grid, estimating the sampling error);

Afternoon:
Location: Graceninsko jezero,NEAR Gracenin lake,
14 00 – 19 30, return to Pristina
Participants: K-Albanians
Program: Field Exercises

- Training the techniques of NFI on Cluster No. 407.

Degraded coppice forest

Saturday, 21 September (participants:)
Location: North Mitrovica/Leposavic, degraded coppice stand in steeply-sloped terrain
8 00 – 19 00, return to Pristina
Participants: K-Serbs
Program: Field exercises

- Training the techniques of NFI on Cluster No. 692

Sunday, 22. Septembr (Pec)
Visit of high forests in the Rugova valley/Pec
8 00 – 19 30, return to Pristina

Monday, 23 September (, outdoor)
Location: North Mitrovica/Zubin potok, near the village of Lepovici, degraded dense middle-forest
8 00 – 19 00, return to Pristina
Participants: K-Serbs
Program: Field Exercises

- Training the techniques of NFI on Cluster No. 603

Tuesday, 24 September
Morning:
Location: near village Leposaviæ, pine plantation
8 00 – 19 00, return to Pristina
Participants: K_Serbs
Program: Field Exercises

- Training the techniques of NFI on Cluster No. 999

Afternoon session:

- Concluding the course
- Program: Discussing obtained results, briefing, bringing the course to an end.

Wednesday, 25 September (Pristina, outdoor)
Location: near the airport of Pristina, evenly aged pine plantation
9 00 – 13 00, return to Pristina
Participants: K-Albanians
Program: Field Exercises, summary, briefing

- Training the techniques of NFI in coniferous forest, discussing obtained results, briefing, bringing the course to an end.

Departure to Ljubljana/Slovenia: 15 45

Official language: Serbo-Croat, English
Location: Ministry of Agriculture, meeting room. Field Exercises in Blinaja (Lipljan), Pristina area, Uroševac/Vitina, Leposavic, Zubin Potok

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Participants in the Forest Inventory Training 16 - 25 September
Full course

Field workers in the project
Field work monitoring crews personnel
Selected forest engineers

Introductory session Tuesday 10 September and special session on sampling, GIS Friday 13 September

Adnan Basha, Forest Institute, Peja. Forest Engineer, silviculture
Fatos Mulla, Forest Institute, Peja. Non-Wood Forest Products (NWFPs)
Hysen Shabanaj, Kosovo Forest Authority, Forest Damages
Qazim Kukalaj, Kosovo Forest Authority, Director, Forest Inventory
Tahir Ahmeti, Kosovo Forest Authority, Inspector, Forest Inventory
Regional directors, Kosovo Forest Authority
Forest Engineers in minority areas

Project staff, contractors:

Ibrahim Muja, Forest Management/Photo interpretation
Alexander Lukic, GIS, statistics/sampling
Ergin Hajredini, Deputy Team Leader, trainer
Muharrem Bahor, Kosovo Forest Authority, Director Mitrovica region, trainer
Bekim Kajtazi, Illyrian Group, GIS/GPS Expert

Anders Olsson, FAO Kosovo Forest Institutions Development Project
Stein Tomter, FAO Kosovo Forest Inventory Project
Tormod Dale, FAO Kosovo Forest Inventory Project

PROBLEMS AND ACHIEVEMENTS:

Forestlands cover about 40% of Kosovo's land. In concert with Forest Law from 1987, management plans must be worked out for all forest enterprises in the Province. In accordance with the same law, forest enterprises are obliged to conduct forest planning and management in the area.

Contrariwise to the present situation, in which Kosovo's foresters conduct planning and management by themselves, inventorying, planning and managing was some years ago conducted by the State Forest Enterprise "Srbijasume" from Belgrade which was charged for working out plans for all forests in Kosovo. Such an organization limited the contribution of Kosovo's foresters to minimum; in most cases they were needed only in data-gathering, while the bulk of the work, such as data-processing, preparing plans and plans-elaborating, was worked out by the enterprise itself, outside the Province of Kosovo.

A consequence of such an organization is the fact that the Province of Kosovo is presently lacking staff, experienced in forest inventories and planning. Another obstacle, hindering faster development of inventorying, planning and management is the reality, that most data is being kept by the enterprise Srbijasume. However, although these plans were designed in a rather modern way and would surely be of use as a source of information, they are in most cases expired and inaccessible to Kosovo's foresters.

The implementation of the proposed NFI concept will in any case be a demanding task. This is due to the fact that the proposed NFI concept - designed within the project - meets high standards in most working phases and represents an achievement as such. Another obstacle is the lack of tradition in forest practicing, theoretical knowledge and practical experiences. Therefore, by taking account of the proposed time schedule and budget - which both have been set - the implementation of the concept would be more reliable if the concept was simplified. The most important recommendations are:

- Pre-stratifying forestlands into two groups, namely low (coppice, low forest) and high forests and applying at least two different grid-densities. Both of them should reflect the economic potentials of forests. In addition, the number of clusters in degraded and coppice-like forests should also be significantly reduced.
- Calipering range should be increased. Measurements should be taken only in trees with the Diameter at Breast Height at least 10 cm (DBH>10.0 cm ; measurement in R=10 mm circle) Measurements of young-growth (the heights of trees between 10 - 130 cm) and trees, with the height H>130 cm and DBH<10 cm should be simplified.
- Stand descriptions (such as the Origin of stands, Treatment class and Stand structure type) should be harmonized with the nomenclature, traditionally used in Kosovo.
- In the case that practicing in the field will show that the entire cluster cannot be measured in one day, the amount of secondary sample plots should be reduced in Cluster No. 2 and 3 respectively. Early tests, conducted within the mission, proved, that measurements cannct be carried out in one day.
- Field crews should be chosen, equipped with instruments and trained as soon as possible. Final examinations, pointing out who could work in the field, should be performed in the training trails. Chosen crews should receive a Certificate, proving their knowledge and experience.

EMERGING ISSUES

1. Forest thematic maps are inevitable prerequisites for planning and management at the national level and for implementing forest inventories in the most rational way (see: stratification) . Despite many existing data-sources such as excellent orthophotos and satellite images, such maps are not yet available to the Kosovo's foresters practice. Therefore, a project dealing with their

production should be launched immediately. It could be produced with methods, similar to the Corine, Land Cover project (EU project).

2. Forest management maps (until recently scaled to 1:25000), should be scaled to 1:10.000 and 1:5.000 respectively. In addition to the forest management maps, forest practice should begin working on designing and building a Forest Information System to be used at the operational scale.

2. The proposed concept of National forest inventory must be applied to the current needs of Kosovo's forest practice and forestry. Field measurements should encapsulate only the substance needed within the next decade. Additionally, the method should make possible to finish field measurements of a cluster in one day.

3. A special concern should be dedicated to the quality of field data. The task can be achieved by training in the field and by enhanced field control during inventorying (approx. 5 % of clusters).

CONCLUSION AND RECOMMENDATIONS

- Modifying NFI methods;
- Conducting test-measurements in one model cluster (timing) with one well trained field-crew and determining field-work norms;
- Final definition of the method allowing the completion of one cluster in one day;
- Selecting and training field crews. Every field crew should conclude its training in the training-trail.
- Beginning with inventorying in fall 2002, with one field crew in the Albanian and Serbian part of Kosovo respectively;
- Designing software along with checking during the winter season (2002/2003);
- Conducting an inventory in the whole area in 2003
- Designing a forest map along with delineated forest types;
- Performing calculations and analyzing the results of inventorying (The province of Kosovo, strata);
- Archiving data;
- Organizing a workshop and presenting gained results of inventorying along with their potential use in other fields (agriculture, landscape planning);
- Transmitting knowledge on forest inventorying, planning management (analyzing the results, GIS-based planning, decision-making).


Kosovo
Serbia
Montenegro
ALBANIA
MACEDONIA
Priština
Kosovska Mitrovica
Peć
Prizren
Đakovica (Djakovica)
Uroševac
Gnjilane
Skopje
Niš
International Border
Province Border
Primary Road
Railroad
0 40 km
0 20 mi
Romania
Serbia
Bulgaria
Albania
Macedonia
Italy
Greece
©1999 maps.com

ANNEX

Dear Mr. Hocevar,

Please be informed that your assignment in Pristina, Kosovo is hereby confirmed.

Travel authorization: Medvode/Pristina/Medvode will be approved soonest.

Terms of Employment will be sent through FAO Rep. in Pristina.

Best regards

Karen Kjos
Personnel Officer, MSS/AFDS

TERMS OF REFERENCE

Mr. Milan HOCEVAR
INTERNATIONAL FOREST INVENTORY TRAINING CONSULTANT

Pristina, 16 to 25 September 2002[2]

FOREST INVENTORY PROJECT
OSRO/KOS/105/NOR

Under the general supervision of the Chief, TCEO, the technical supervision of the Chief, FORM, the direct supervision of the Project Manager in Kosovo. the consultant will be responsible to undertake forest inventory training according to the following tentative program:

Pristina

Monday, 16 September
Arrival, check-in, meeting project group and counterpart Discussion, planning of training program

Tuesday, 17 September (joint sessions K-Albanians and Serbs, indoor)
Morning: General introduction National Forest Inventory
Afternoon: Basics of Data gathering in Forestry

Wednesday, 18 September
Field Exercises related to Basics of Data Gathering in Forestry

Thursday, 19 September
Morning: Forest Mensuration and Inventory (indoor)
Afternoon: Field exercises related to Forest Mensuration and Inventory

[2] Including two days of work at home station on 14 and 15 September 2002

Friday, 20 September (for selected Forest Engineers, jointly K-Albanian. Serbs)
Morning: Sampling theory of Forest Inventory.
Afternoon: Forest Information Systems (case Slovenia)

Wednesday, 25 September
Results, discussion. Course wrap-up.

North Mitrovica

Saturday, 21 September
Field Exercises related to Basics of Data Gathering in Forestry

Monday, 23 September
Morning: Forest Mensuration and Inventory (indoor)
Afternoon: Field exercises related to Forest Mensuration and Inventory

Tuesday, 24 September
Morning session: Field Exercises related to Forest Mensuration and Inventory
Afternoon session: Results, discussion. Course wrap-up.

Morning sessions: 09:00 - 12:00, Afternoon session: 01:00 - 05:00

The consultant will carry out other related tasks at the request of the FAO Project Manager.

Reporting: Mission reports should be done according to FAO reporting procedures.

At the end of the mission, the Consultant will prepare a technical report describing activities undertaken, problems and achievements, lessons learned, emerging issues, conclusions and recommendations. A summary should be included.

Reports should be written in Rich Text Format (RTF) and submitted as an e-mail attachment. This report should be submitted to the Project Manager and TCEO no later than one week after the completion of the consultancy.

Qualifications: The consultant will have a university advance degree in forestry. He/She will have at least 10 years forest inventory training experience.

Fluency in oral and written English is essential. Knowledge of Albanian and/or Serbian is an advantage.

Duration: 12 day inclusive (two days for training preparation)

Duty Station: Pristina, Kosovo, with extensive travel in the country.

FAO Emergency Coordination Office in Prishtina
c/o WFP Office in Prishtina
Ex-Building "Kosovodrvo" Prishtina
Satellite phone: + + 871 761 943 269
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Fax: + + 381 38 549 131
Email: fao.kosovo.for@wfp.org

Forest Inventory Project Phase II

Instructions for Field Work

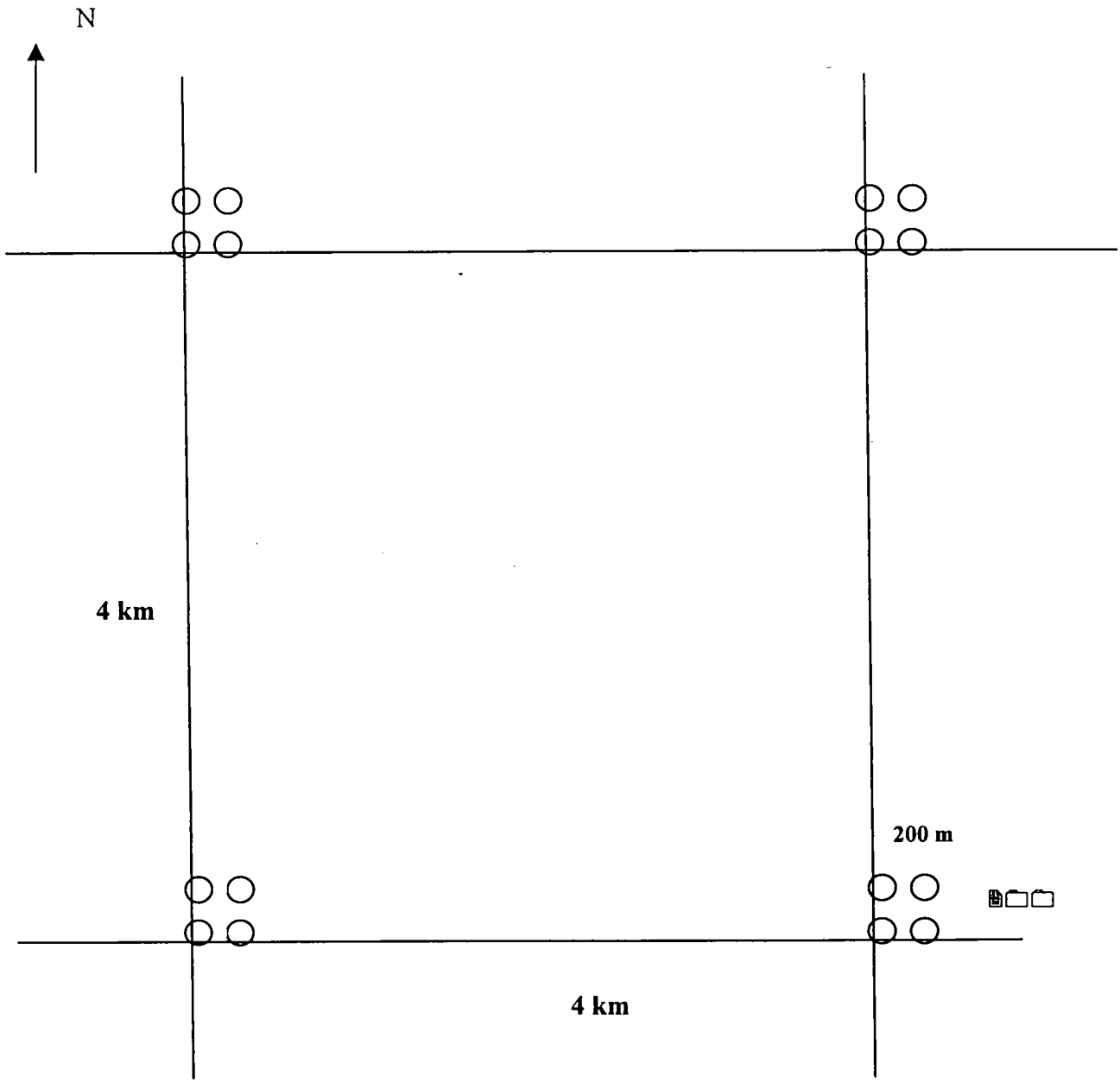
Draft 27.09.2002

Introduction

The FAO Forest Inventory Project will conduct a regional forest inventory of Kosovo. The inventory work will be carried out in 2002 and 2003, and it will include data on both wood and non-wood products, intended for national and international reporting requirements. The main objective is to promote a sustainable forest management by assessing the total forest resources and the annual sustainable harvest level.

The inventory will be carried out as a systematic field sampling inventory. Orthophotos, satellite images and existing maps will be used for an initial classification of the plots. The aim of the initial classification is to identify the forested plots, requiring field measurements, and to produce maps facilitating the navigation to the plots. Another result would be a preliminary land use classification and a rough classification of forest and other wooded land into a limited number of classes.

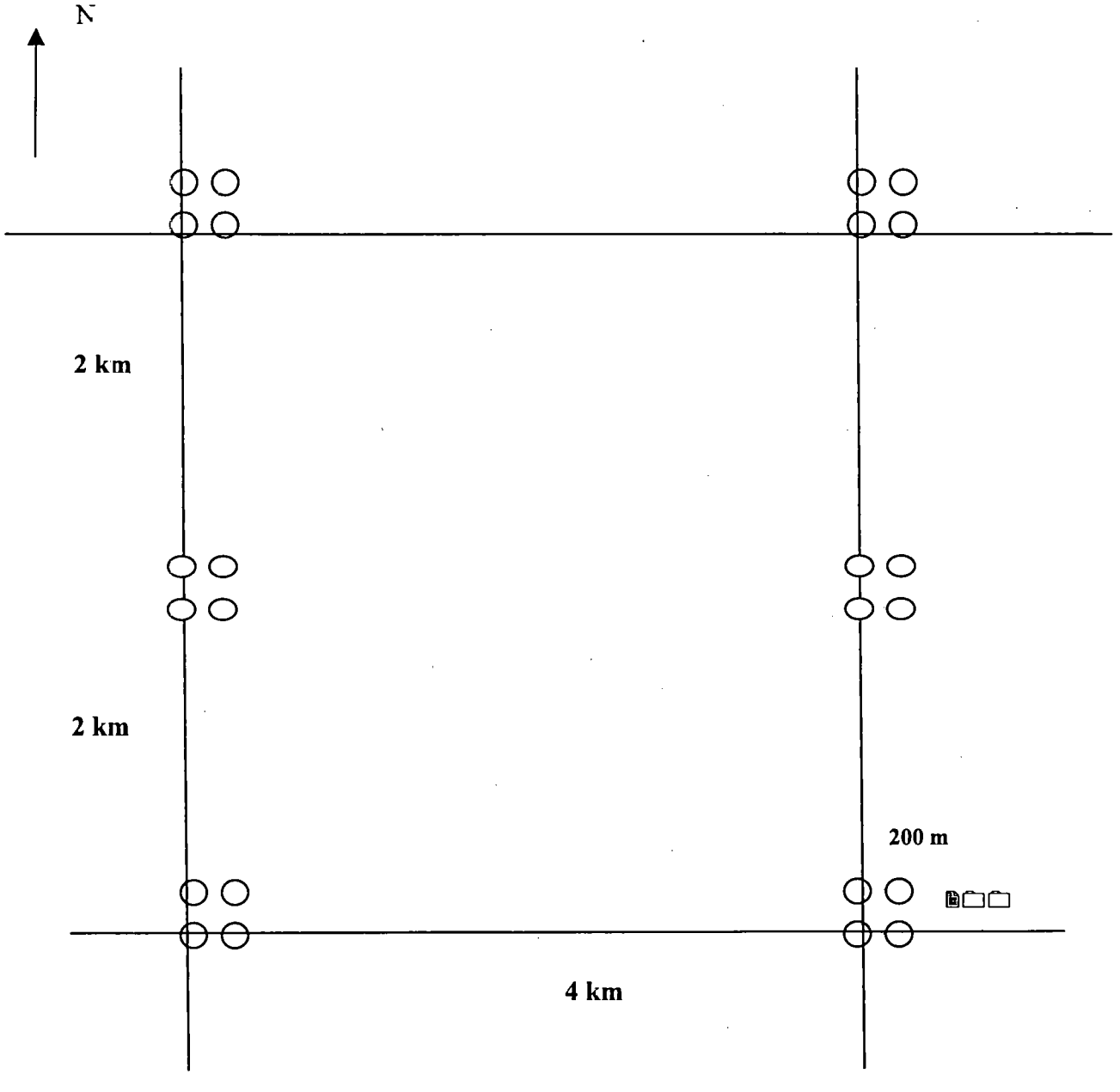
Sample plot layout



Each line intersection on the 4x4 km grid indicates the centre of the south-western plot of each cluster (consisting of 4 circular sample plots).

Sample plot layout for Deçan / Decani, Gjakovë / Djakovica, Dragash / Dragash, Istog / Istok, Klinë / Klina, Pejë / Pec, Shtërpcë / Strpce, Prizren / Prizren, Ferizaj / Urosevac and Kaçanic / Kacanik:

Because of a higher proportion of high forest in these municipalities, it has been decided to increase the density of sample plots in order to improve the accuracy of the inventory. The grid of sample plot clusters will be 2x4 km instead of 4x4 km in the other municipalities. Thus, each sample plot will represent an area only half the size as for the other districts.

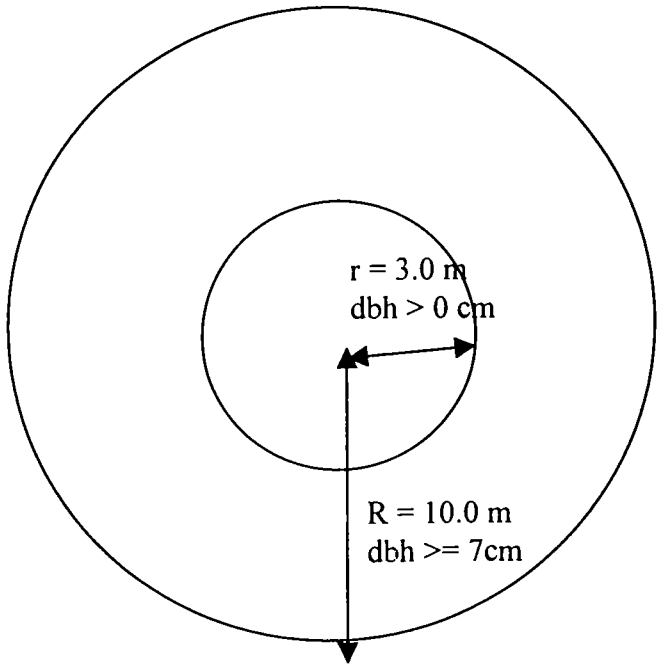


The total number of sample plots according to this system, will be more than 3,000 for the entire Kosovo and for all land use classes. These sample plots will initially be classified by means of orthophotos, satellite images or existing maps. This classification should result in an

assignment to one of the described land use classes. **All sample plots assigned to the classes "forest" or "other wooded land" should in principle be visited in the field for detailed measurements and classifications.** According to the currently available estimate of forest area, that would amount to more than 1,500 sample plots. Occurrence of landmines etc., in addition to otherwise inaccessible areas, will reduce the number of sample plots visited in the field. Sample plots on forest or other wooded land, not visited in the field, will be assessed based on the photo-interpreted attributes using generalized information from plots on similar forest types measured in the field.

The location of the plot center should be decisive for the assignment of a sample plot to one of the land use/land cover classes. A GPS receiver will be used for navigation to the exact location of the plot centre. As the accuracy of the GPS receiver is approximately +/- 5 m, the GPS measurement may deviate a few metres from the sample plot centre that has been indicated on the print-out of the orthophoto. That will have no practical consequences if the entire sample plot falls inside the same forest stand or the same land use/land cover class as it was assigned to in the photo interpretation. However, if there is an obvious discrepancy between the reading on the GPS receiver and the indication of the sample plot on the orthophoto, the orthophoto should be followed to the extent possible.

For example, the plot centre may be located very close to a boundary between forest and agricultural land. If the photo shows that the plot centre is located on forest, the plot should always be established as a forest plot, although the GPS receiver may indicate a plot centre on the agricultural land nearby. The only exception from this rule would be if actual changes have taken place after the pictures were taken in 2000-2001 (e.g. building or cultivation of forest land). When land use changes have taken place, the current situation should always be recorded.



Sample plots

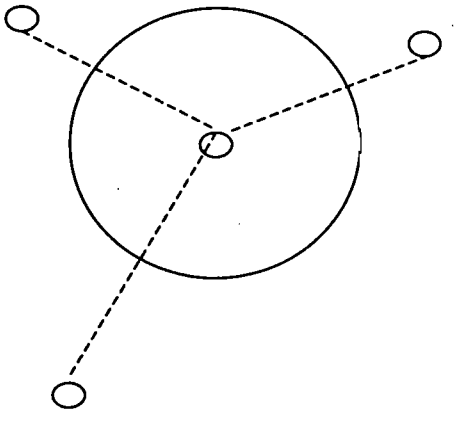
Inner circle (radius = 3.0 m): All trees with height equal to, or more than 1.3m (diameter at breast height > **0cm**) should be measured. Also: Assessment of regeneration.

Outer circle (radius = 10.0 m): All trees with diameter at breast height >= **7 cm** should be measured.

Circle with radius=20m (1256 m^2): Attributes relating to stand conditions (tree species composition, stand age etc.)

The radiuses will be measured along the ground. A correction for slope will be included in the processing of the data.

Marking of sample plots in the field: The centre of sample plots should be permanently marked with an aluminium pipe pushed or hammered into the ground so that only about 5 cm is visible above the ground. If it is not possible to get the pipe into the ground because of rocks etc., the plot centre could be moved up to one metre to the nearest location making this possible. If the plot centre falls on immovable rocks or bedrock, the plot centre should instead be marked with red paint.



Paint markings to indicate direction to plot centre

On at least three points surrounding the sample plot (NOT inside the 10m radius plot), a minimum of three paint markings should be made to indicate the direction to the plot centre. These markings should be made on rocks, stumps, trees or other immovable objects. The markings should be large enough to be visible from a distance of 10-20m. If the markings are being made on trees, there should be two paint marks on each tree; one at breast height and one immediately above the ground. As described in the detailed instructions for plot

measurements, azimuth and distance from the plot centre to the orientation points should be taken and recorded on the plot measurement form. The type of object that is chosen for marking should also be indicated on the sample plot form (e.g. "tree", "rock", "pole" etc.).

Partial plots: Sometimes two or more land use types or forest types can be found inside one sample plot having a radius of 10 m. If the forest or area characteristics are very different, the sample plot should be divided into two separate parts, and the inventory **should only take into consideration the specific part surrounding the plot centre:**

- If the sample plot is divided by a boundary between forest and non-forest
- If the sample plot is divided by a boundary between other wooded land and non-forest
- If the sample plot is divided by a boundary between forest and other wooded land
- If the sample plot is divided by a clearly defined boundary between a coniferous and a broadleaved stand (not in the case of mixed stands)
- If the sample plot is divided by a boundary between two clearly different age classes, or between an existing stand and a temporarily unstocked forest area (height difference between the two parts should as a guideline be at least 5-10 m to consider the plot as divided. A difference of at least 5m should be required for younger stands, up to 10m for older stands).

In the case of an boundary between an older stand and a regeneration stand, an older stand and an unstocked area etc., the outer limitation of the projections of the tree crowns on the ground should be considered the stand boundary.
In cases where a plot centre falls exactly on the boundary between two different land use classes (or forest stands), the area located north/east of the centre should be decisive for the classification. In most cases this will be indicated as a result of the photo interpretation. One individual sample plot should be assigned to only one land use class.

Measurements and assessments at plot level

Plot coordinates

Plot coordinates in the system indicated on topographic maps (Gauss-Krüger) should be recorded in metres.
East-west: Valid values are 0000001 through 9999999.
North-south: Valid values are 0000001 through 9999999.

Topographic map no.

The number of the topographic map sheet covering the sample plot should be recorded. Valid values are 00001 through 99999.

Date of inventory

Date of inventory is to be indicated for every sample plot (DDMMYY).

Crew leader

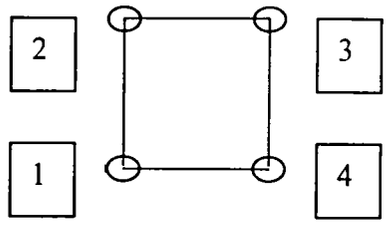
Each crew leader will be assigned a specific identification number. For each recorded sample plot, the name of the crew leader is to be included.

Cluster no.

Each crew leader should number the clusters of sample plots (group of 4 plots) he inventories throughout the season. The numbering is to be continued also when moving to another district for working there.
Valid values are 001 through 999.

Plot no. in cluster

Within each cluster (group of 4 plots), the individual sample plots should be numbered according to a specific system. The south-western plot is defined as plot no. 1, the north-western plot as no. 2, the north-eastern plot as no. 3 and the south-eastern plot as no. 4. Valid values are 1 through 4.



Inventory status

Inventory status	Code	Definition
Visited	1	The plot has been assessed in the field
Not visited	2	The plot has not been assessed in the field

In principle, all potential sample plot locations on forest or other wooded land should be visited in the field. All sample plots where field measurements have been taken, should be recorded as code '1'. However, in some cases the sample plot may be physically inaccessible, or going there may involve danger (minefields, extremely difficult terrain conditions). These plots should be avoided, and recorded as code '2'.

Azimuth to orientation mark 1

This measurement is the compass bearing from the aluminium pole in the plot centre to the paint marks made on trees, stones etc. outside the sample plot. Orientation mark 1 is the first one when starting from north and moving in clockwise direction.

Valid values: 0 through 360.

Distance to orientation mark 1

The distance from the aluminium pole in the plot centre to the paint marks made on trees, stones etc. outside the sample plot should be measured with a measuring tape and the distance recorded in 0.1m. Orientation mark 1 is the first one when starting from north and moving in clockwise direction. The distance will be measured along the ground.

Valid values: 100 through 400.

Object for orientation mark 1

There should be a short description of the object that has been marked as orientation mark no. 1, e.g. "tree", "tree by the roadside", "rock", "pole" etc.
Maximum 30 characters.

Azimuth to orientation mark 2

This measurement is the compass bearing from the aluminium pole in the plot centre to the paint marks made on trees, stones etc. outside the sample plot. Orientation mark 2 is the second one when starting from north and moving in clockwise direction.

Valid values: 0 through 360.

Distance to orientation mark 2

The distance from the aluminium pole in the plot centre to the paint marks made on trees, stones etc. outside the sample plot should be measured with a measuring tape and the distance recorded in 0.1m. Orientation mark 2 is the second one when starting from north and moving in clockwise direction. The distance will be measured along the ground.

Valid values: 100 through 400.

Object for orientation mark 2

There should be a short description of the object that has been marked as orientation mark no. 2, e.g. "tree", "tree by the roadside", "rock", "pole" etc.
Maximum 30 characters.

Azimuth to orientation mark 3

This measurement is the compass bearing from the aluminium pole in the plot centre to the paint marks made on trees, stones etc. outside the sample plot. Orientation mark 3 is the third one when starting from north and moving in clockwise direction.

Valid values: 0 through 360.

Distance to orientation mark 3

The distance from the aluminium pole in the plot centre to the paint marks made on trees, stones etc. outside the sample plot should be measured with a measuring tape and the distance recorded in 0.1m. Orientation mark 3 is the third one when starting from north and moving in clockwise direction. The distance will be measured along the ground.

Valid values: 100 through 400.

Object for orientation mark 3

There should be a short description of the object that has been marked as orientation mark no. 3, e.g. "tree", "tree by the roadside", "rock", "pole" etc.
Maximum 30 characters.

Plot status

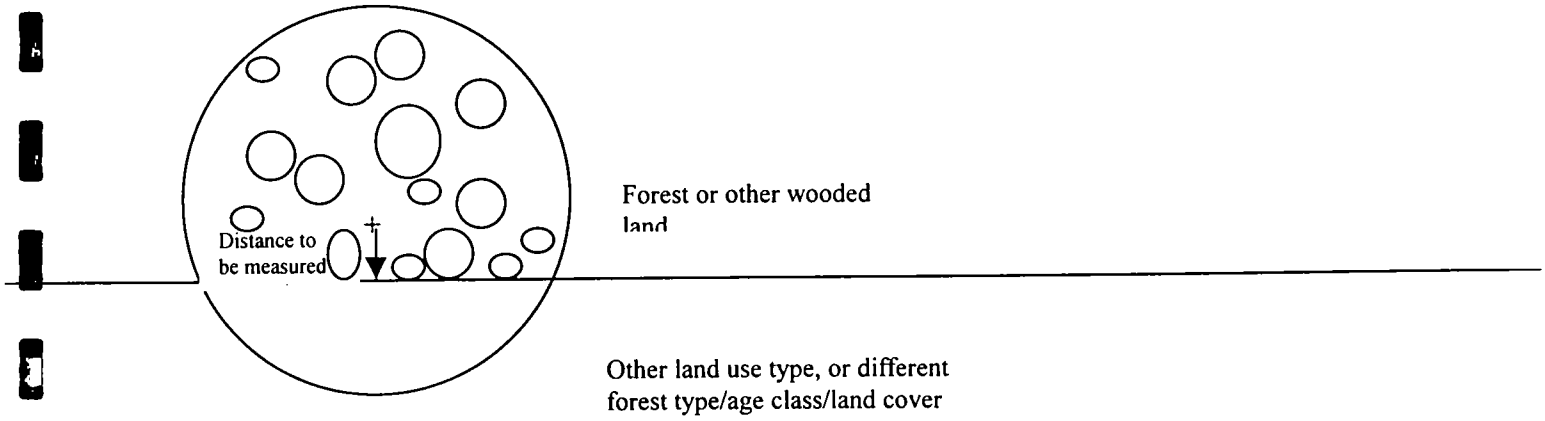
Plot status	Code	Definition
Full plot	1	The plot has been assigned to one single stand
Partial plot	2	The plot cannot be assigned to one single stand

A stand boundary may divide the sample plot into two or more parts (see above descriptions under "partial plots"), in such a way that land use class, stand age or tree species is very different on the two parts (e.g. agricultural land and forest, other wooded land and forest, regeneration and mature forest, broadleaved and coniferous forest). In such cases, only the stand where the plot centre is located should be assessed. If the plot centre corresponds exactly with the stand boundary, the stand located north/east of the centre should be assessed and recorded. The segment of the plot falling into another stand or area class should be delineated by a straight line. The smallest part to be delineated must constitute at least 15% of the total plot area, and the forested part must belong to a continuous stand / area class of at least 0.5 ha. For other land use types located within forest or other wooded land (e.g. smaller patches of agricultural land), the minimum size to be considered should be 200 m^2 (14x14 m).

If the two parts are not very different with regard to standing volume, site quality, stand age etc., the plot should not be divided, but the entire plot should be assigned to the area class where the plot centre is located.

Size of partial plot

The distance (in centimetres) should be measured from the plot centre, perpendicular to the straight line delineating the non-assessed segment of the sample plot. For half plots, 000 should always be recorded. For full plots 999 will be recorded. The distance will be measured along the ground.



Municipality

Municipality	Code	Definition
Deçan / Decani	01	Plot centre located in Deçan / Decani municipality
Gjakovë / Djakovica	02	etc.
Gllogoc / Glogovac	03	
Gjilan /Gnjilane	04	
Dragash / Dragash	05	
Istog / Istok	06	
Kaçanic / Kacanik	07	

Klinë / Klina	08	
Fushë Kosovë / Kosovo Polje	09	
Kamenicë / Kamenica	10	
Mitrovicë / Mitrovica	11	
Lepcsaviq / Leposavic	12	
Lipjan / Lipljan	13	
Novo Bërdë / Novo Brdo	14	
Obiliq / Obilic	15	
Rahovec / Orahovac	16	
Pejë / Pec	17	
Podujevë / Podujevo	18	
Prishtinë / Pristina	19	
Prizren / Prizren	20	
Skenderaj / Srbica	21	
Shtime / Stimlje	22	
Shtërpcë / Strpce	23	
Suharekë / Suva Reka	24	
Ferizaj / Urosevac	25	
Viti / Vitina	26	
Vushtrri / Vucitrn	27	
Zubin Potok / Zubin Potok	28	
Zveçan / Zvecan	29	
Malishevë / Malisevo	30	

Elevation

Metres above sea level for the sample plot should be read from the GPS receiver (alternatively the topographic maps). Valid values are 0000 through 3000.

Slope

The average percentage of the deviation from the horizontal over the sample area. The measurement should be taken in the direction having the maximum slope, measured through the plot centre. The recommended procedure is to measure the slope from the plot centre to a point 10 m away. After having made two measurements in opposite directions, the average will be noted. It should be noted that the readings should always be made towards a point at the same height above the ground as the observers's eye. In case of partial plots, only the part covered by the measurements should be recorded. Valid values are 00 through 99.

For the assessment, the 10 m radius sample plot should be considered.

Aspect

The direction of drainage for most of the plot, recorded as the azimuth of this direction (downhill direction). Valid values are 000 through 360. 0 is only valid when slope is also 0.

For the assessment, the 10 m radius sample plot should be considered.

Land use class

Land use class	Code	Definition
Forest	01	Wooded land meeting definition of "forest"
Other wooded land	10	Wooded land not meeting definition of "forest"
Barren land	20	Unproductive land, areas not utilised
Agricultural land	30	Cultivated land excluding meadows and pastures
Meadows and pastures	31	Areas predominantly used for grazing
Urban areas, built-up land	40	Cities, villages, infrastructure etc.
Water	50	Lakes, major rivers, reservoirs

Comments:

Forest: Land with tree crown cover of more than 10 percent and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity in situ. May consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground: or of open forest formations with a continuous vegetation cover in which tree crown cover exceeds 10 percent. Young natural stands and all plantations established for forestry purposes which have yet to reach a crown density of 10 percent or tree height of 5 m are included under forest, as are areas normally forming part of the forest area which are temporaryly unstocked as a result of human intervention or natural causes but which are expected to revert to forest.
Includes: Forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas within the forest; forest in national parks, nature reserves and other protected areas such as those of special environmental, scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and a width of more than 20 m.
Excludes: Land predominantly used for agricultural practices.

Note that a forest road constituting an integral part of the forest should be considered "forest", while a public road through a forest should be considered "urban areas, built-up land". That means, if the plot centre falls on a forest road, the trees located inside the 10m radius plot should be measured and all the other measurements taken, that normally are being carried out on "forest". On the other hand, if the plot centre is located on a public road, no tree measurements nor any other measurements should be carried out inside the sample plot.

Also, the plot will be considered a full one if the plot centre is located at the roadside of a forest road, but a partial one when located at the roadside of a public road.

Other wooded land: Land either with a tree crown cover of 5-10 percent of trees able to reach a height of 5 m at maturity in situ; or a crown cover of more than 10 percent of trees not able to reach a height of 5 m at maturity in situ (e.g. dwarf or stunted trees) and shrub or bush cover.
Excludes: Areas having the tree, shrub or bush cover specified above but of less than 0.5 ha and width of 20 m, which are classed under "other land"; Land predominantly used for agricultural practices.

Note that the minimum size of continuous forest or other wooded land should be 0.5 ha (a square of 71x71 m, or corresponding). Areas having some tree cover, but, at the same time do not meet the requirements for forest or other wooded land, should be assigned to one of the other categories.

Plots on other land use classes than forest and other wooded land will in most cases be excluded from the list of coordinates that are to be visited in the field. However, in some cases the classification by means of remote sensing methods may not be feasible, and the actual land use class of the coordinate will have to be confirmed and recorded in the field. All sample plots pre-assigned to forest or other wooded land should be visited in the field.

For the assessment, the 10 m radius sample plot should be considered.

Ownership status

Should be assessed for all sample plots on 'forest' and 'other wooded land'.

Each of the sample plots should, to the extent possible, be assigned either to "public forest" or to "private forest". This assignment should be based on the best knowledge of the field personnel, or taken from other reliable sources. If there is no indication whether a forest stand should be assigned to either of these groups, the "unknown" category should be used.

Ownership status	Code	Definition
Unknown	0	Unknown, or unclear status
Public forest	1	Forest not privately owned
Private forest	2	Privately owned forest

For the assessment, the 10 m radius sample plot should be considered.

Tree species class

Tree species class	Code	Definition
Temporarily unstocked	0	Forest or other wooded land, temporarily without trees as a result of human intervention or natural causes
Predominantly coniferous	1	More than 75% of the tree crown cover consists of coniferous species
Predominantly broadleaved	2	More than 75% of the tree crown cover consists of broadleaved species
Mixed	3	Neither coniferous, nor broadleaved trees account for more than 75% of the tree crown area

Should be assessed for all sample plots on 'forest' and 'other wooded land'.

For the assessment, the 20 m radius sample plot should be considered.

Stand age

Should be assessed for all sample plots on 'forest' and 'other wooded land'.

If the stand age is available from local knowledge, management plans or any other reliable source, this information should be used and no further age assessment on the sample plot needs to be done. In young coniferous stands, age can be assessed by counting branch whorls.

Otherwise, the age must in most cases be assessed by counting annual rings from bore samples (boring to the core of the stem). In even-aged stands the age can be assessed by boring 1-2 representative trees. In uneven-aged stands the mean age may be obtained through weighting of individual sample trees with basal area. A good approximation can often be obtained by boring the recommended two sample trees (see selection of sample trees under "measurements and assessements at tree level") to the core, and calculating the average total age.

When the bore samples have been taken 1.3 m above ground level, or age has been determined by counting the branch whorls, the age has to be increased by adding those years which are normally required by a plant to reach 1.3 m height (usually 5-6 years), alternatively to reach the height of the first branch whorl.

For the assessment, the 20 m radius sample plot should be considered.

Lorey mean height

Should be assessed for all sample plots on 'forest' and 'other wooded land'.

The Lorey mean height is the basal area weighted mean height of the trees on the sample plot, i.e. the bigger trees will be given more weight in the calculation of the mean height. In an even-aged stand, the mean height may often be derived from 1-2 direct measurements of the canopy level. In young stands, the mean height can be estimated from taking the average height of the trees on the inner 3 m radius sample plot.

When a satisfactory number of sample trees have been selected, the mean height can be estimated as the aritmetic mean of these trees. This is especially useful for uneven-aged stands.

The mean height should be recorded in decimetres (0.1m).
Valid values are 000 through 500.

Dominant height

Should be assessed for all sample plots on 'forest'.

The dominant height is defined as the arithmetic mean of the height of the 10 largest trees (with regard to diameter) on an area of 0.1 ha. For the 10 m radius plot the dominant height will be based on the average of the 3 biggest trees on the sample plot. If there are only one or two trees of measurable size (at least 7 cm at breast height), the dominant height will be based on these. In case there are no trees of measurable size on the sample plot, 999 will be recorded.

The dominant height should be recorded in decimetres (0.1m).
Valid values are 000 through 500.

Current stand origin

Stand origin	Code	Definition
No existing developed stand	0	No trees with diameter more than 7cm
Natural seeding	1	Naturally regenerated high forest
Planting or artificial seeding	2	Artificially regenerated high forest
Mixed coppice/high forest	3	Stand with trees of both stool-shoot and seedling origin
Coppice	4	Low forest composed of stool-shoots
Coppice with standards	5	As previous class, but with scattered bigger trees

Should be assessed for all sample plots on 'forest' and take into consideration the existing trees with a diameter at breast height more than 7cm.

For the assessment, the 20 m radius sample plot should be considered.

High forest:

Forest normally composed of trees of seedling origin, but may also include trees from vegetative reproduction, e.g. poplars. Includes stands in process of transformation into high forest.

Coppice and coppice with standards (low forest):

Forest composed of stool-shoots or root suckers with or without scattered bigger trees (standards), which may be of seedling or coppice origin.

Origin of smaller trees/regeneration

Stand origin	Code	Definition
No existing smaller trees/regeneration	0	No trees with diameter less than 7cm
Natural seeding	1	Naturally regenerated high forest
Planting or artificial seeding	2	Artificially regenerated high forest
Mixed coppice/high forest	3	Stand with trees of both stool-shoot and seedling origin
Coppice	4	Low forest composed of stool-shoots

Should be assessed for all sample plots on 'forest' and take into consideration the existing trees with a diameter at breast height less than 7cm, including regeneration with a height between 0.1 and 1.3m.

For the assessment, the 20 m radius sample plot should be considered.

High forest:

Forest normally composed of trees of seedling origin, but may also include trees from vegetative reproduction, e.g. poplars. Includes stands in process of transformation into high forest.

Coppice and coppice with standards (low forest): Forest composed of stool-shoots or root suckers with or without scattered bigger trees

Stand structure

Should be assessed for all sample plots classified as 'forest'.

Stand structure	Code	Definition
Forest under regeneration	0	Temporarily unstocked forest land
Even-aged stand	1	Even-aged forest
Two storeyed stand	2	Forest clearly divided into an overstorey and an understorey
Uneven-aged stand	3	Uneven-aged forest, the trees distributed into several layers

For the assessment, the 20 m radius sample plot should be considered.

Even-aged stand:
Forest in which the predominant proportion of the trees falls into the same age class, generally resulting in a single storey forest. The age difference between the oldest and youngest trees should as a guideline be less than 20% of the stand age when mature. Even-aged stands are usually produced by cutting all trees within a relatively short period, by natural disturbances that eliminate most vegetation in the previous stand, or by systematically removing all trees except from one specific age class.

Two storeyed stand:
Forest clearly divided into an overstorey and an understorey. The age difference between the oldest and youngest trees should as a guideline be at least 20% of the stand age when mature.

Uneven-aged stand:
Forest in which there is a mixture of different age classes. Usually, the trees cannot be separated into different storeys. This can be either achieved through selection treatment interventions or naturally in mixed species stands, where species with different growth performance and top heights have been established.

Treatment opportunity class

Should be assessed for all sample plots on 'forest'.

Identifies the physical opportunity to improve stand conditions by applying management practices. The need for forest invention that already exists or is expected to emerge during the next 5 years should be decisive for this assessment.

Treatment opportunity class	Code	Definition
No treatment	0	No treatment
Regen. without site preparation	1	Regeneration without site preparation
Regen. with site preparation	2	Regeneration with site preparation
Conversion	3	Stand conversion
Cleaning-thinning	4	Cleaning-thinning (pre-commercial)
Thinning	5	Thinning (commercial)
Clearcut, strip clearcut harvest	6	Clear cut harvest, strip clearcut harvest
Selection	7	Partial cut harvest, selection felling
Salvage	8	Salvage harvest

For the assessment, the 20 m radius sample plot should be considered.

No treatment:
Stand is characterized by an adequate stock of growing-stock trees in reasonably good condition.

Regeneration without site preparation:
The area is characterized by the absence of a manageable stand because of inadequate stocking of growing stock. Growth will be much below the potential for the site if the area is left alone. Prospects are not good for natural regeneration. Artificial regeneration will require little or no site preparation.

Regeneration with site preparation:
The area is characterized by the absence of a manageable stand because of inadequate stocking of growing stock. Growth will be much below the potential for the site if the area is left alone. Either natural or artificial regeneration will require site preparation.

Stand conversion:
The area is characterized by stands of undesirable, chronically diseased, or off-site species. Growth and quality will be much below the potential for the site if the area is left alone. The best prospect is for conversion to a different forest type or species.

Cleaning-thinning:
The stand is characterized by a dense stocking of seedlings and saplings (pre-commercial). Stagnation appears likely if left alone. Stocking must be reduced to help crop trees attain dominance.

Thinning:
The stand is characterized by a dense stocking of growing stock. Stocking must be reduced to prevent stagnation or to confine growth to selected, high quality crop trees.

Clear cut harvest:
The area is characterized by a mature or overmature sawtimber stand of sufficient volume to justify a commercial harvest. The best prospect is to harvest the stand and regenerate.

Partial cut harvest, selection felling:
The stand is characterized by poletimber or sawtimber size trees with sufficient merchantable volume for a commercial harvest, which will meet intermediate stand treatment needs or

prepare the stand for natural regeneration. The stand is of a favored species composition and may be even or uneven aged. Under this code are assigned stands suitable for the selection system to maintain an uneven age stand, including femelschlag system etc.

Salvage harvesting:
The stand is characterized by excessive damage to merchantable timber because of fire, insects, disease, wind, ice, or other destructive agents. The best prospect is to remove damaged or threatened material.

Illegal/uncontrolled logging

Should be assessed for all sample plots on 'forest'.

Uncontrolled cutting will be characterized by obvious non-sustainable and non-recommendable forest treatment, like high stumps, concentration of harvesting along roads and/or no considerations towards regeneration. For harvesting carried out during the most recent year, the stumps should have KFA's hammer mark. Harvesting that is more than 3 years old should not be taken into consideration. A minimum of two clearly illegally felled trees on the location should be observed for recording"uncontrolled harvest".

Illegal/uncontrolled logging	Code	Definition
No illegal/uncontrolled logging	0	No observation of illegal/uncontrolled harvest activities
Uncontrolled harvest	1	Visible indications of illegal/uncontrolled harvest activities

The observation unit is a circle with 50 m radius around the sample plot centre.

Crown cover percentage

Should be assessed for all sample plots on 'forest' and 'other wooded land'.

The percentage of the sample plot that would be covered with tree crowns, when observed from above. 100% crown cover should be recorded as 99. Valid values are 00 through 99.

For the assessment, the 10 m radius sample plot should be considered.

Soil depth

Soil depth	Code	Definition
Soil depth < 25 cm	1	Clearly visible spots with bare rocks/bedrock
Soil depth 25-50 cm	2	Some smaller spots with bare rocks/bedrock
Soil depth 50-80cm	3	No visible bare rocks/bedrock, the terrain has often some irregularities
Soil depth > 80cm	4	No visible bare rocks/bedrock, the terrain has usually no irregularities

Should be assessed for all sample plots on 'forest' and 'other wooded land'.

The average soil depth of the 10 m radius plot will be assessed.

Number of trees with diameter <7 cm at 1.3 m

Should be assessed for all sample plots classified as 'forest' or 'other wooded land'.

The number of coniferous and broadleaved trees with a diameter between 0 and 6.9 cm (tree height >= 1.3 m) will be assessed on the 3m radius plot (inner plot circle). Both commercial and non-commercial trees should be counted. The trees should not be subject to a detailed species identification, but only assigned to "coniferous" or "broadleaved" trees.

Coniferous trees $d_{1.3m}$=0-7cm	Number of trees
Broadleaved trees $d_{1.3m}$=0-7cm	Number of trees

For each class: Valid values are 000 through 999.

Number of trees with height 0.1-1.3 m (main plants)

Should be assessed for all sample plots classified as 'forest'.

The number of coniferous and broadleaved trees with a height between 0.1 and 1.3m should be assessed on the 3m radius plot (inner plot circle). Only trees and tree species capable of developing into trees that can be commercially utilised should be considered, i.e. not typical shrub and brushwood. The assessment should consider only the "main plants", i.e. well-developed plants that are expected to be part of the future stand and that are important for the homogeneous spatial distribution. That means; if there are two or more trees closely together, only one of these should usually be counted. In the case of several shoots from an old stump, only one of these will also be counted. The regeneration should not be subject to a detailed species identification, but only assigned to "coniferous" or "broadleaved" trees.

Valid values are 00 through 99.

Damage of smaller trees/regeneration

Cause of damage	Code	Definition
None	0	No damage or unknown cause of death
Insect	1	Damage caused by insects

Disease/fungus	2	Damage caused by diseases or fungi
Fire	3	Damage caused by fire
Animal	4	Damage caused by animal
Weather	5	Damage caused by weather/climate
Human impact	6	Damage caused by unintended human impact (logging, driving etc.)
Suppression	7	Damage caused by suppression
Miscellaneous	8	Damage caused by various other impacts

Should be assessed for all sample plots on 'forest'.

Should be assessed for all sample plots on 'forest' and take into consideration the existing trees with a diameter at breast height less than 7cm, including regeneration with a height between 0.1 and 1.3m.

One cause of damage can be assessed for the trees on the 3m radius circle, or no damage indicated (code 0).
Damage is recorded for live trees if the presence of damage or pathogen activity is serious enough to reduce the quality or vigour of the tree. When a stand is damaged by more than agent, the most severe damage is coded. When damages are observed on less than 6% of trees, 0 is recorded. Damage recorded for dead trees is the cause of death. When the cause of death cannot be determined for a tree, 0 is also recorded.

Intensity of damage of smaller trees/regeneration

Intensity of damage	Code	Definition
0-5%	0	No damage, or number of damaged trees < 6%
6-25%	1	Number of damaged trees 6-25%
26-50%	2	Number of damaged trees 26-50%
51-75%	3	Number of damaged trees 51-75%
76-100%	4	Number of damaged trees 76-100%

Should be assessed for all sample plots on 'forest'.
Should be assessed for all sample plots on 'forest' and take into consideration the existing trees with a diameter at breast height less than 7cm, including regeneration with a height between 0.1 and 1.3m.

Intensity of damage should be assessed for the 3m radius circle.

Occurrence of dead biomass on the sample plot

Dead biomass	Code	Definition
No dead biomass	0	There exists no measurable dead biomass on the sample plot
Dead biomass	1	There exists measurable dead biomass on the sample plot

In case there is any dead trees with diameter >= 7cm on the sample plot, these will have to be assessed under the tree measurements.

For the assessment, the 10 m radius sample plot should be considered.

Occurrence of juniper trees and brushes

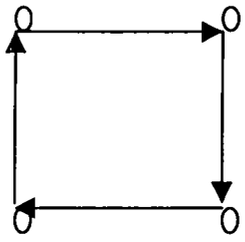
Should be assessed for all sample plots on 'forest' and 'other wooded land'.

The number of juniper (Juniperus Communis) trees and brushes on the 20 m radius sample plot, bearing a significant amount of berries. Valid values are 00 through 99.

Visible signs of animals

Should be assessed for all sample plots on 'forest' and 'other wooded land'.

While walking between the individual sample plots of a cluster, any visible signs of the animals listed below should be recorded. To plot no. 1 of the cluster should be assigned the observations made between plot 1 and 2, to plot no. 2 the observations made between 2 and 3 etc. As visible signs should be included direct observations, footprints, excrements, browsing, bark damages etc. Possible signs of animals while walking from the road towards the first plot of the cluster (and return) should not be recorded (only between plot no. 1-2-3-4-1). Up to four different codes (1-6) can be recorded for each plot. Valid values are 1111 through 6666. For example, if signs of a bear and a wood grouse have been observed, 1600 will be recorded.



Visible signs of animals	Code	Definition
Bear	1	Ursus ursus
Wolf	2	Canis lupus
Wild boar	3	Sus scrofa
Red deer	4	Cervus elaphus
Roe deer	5	Capreolus capreolus
Wood grouse species	6	Tetraonidae

Occurrence of animals, according to local knowledge

Should be assessed for all sample plots on 'forest' and 'other wooded land'.

Information on the same animal groups as for the previous attribute should be collected, but in this case the information should be based on local knowledge, and not on direct observations. The field workers will have to obtain information if the animal species normally are present in the area around the sample plot. Up to four different codes (1-6) can be recorded for each

plot. Valid values are 1111 through 6666. For example, if the occurrence of bear and wood grouse have been confirmed, 1600 will be recorded.

Occurrence of animals	Code	Definition
Bear	1	Ursus ursus
Wolf	2	Canis lupus
Wild boar	3	Sus scrofa
Red deer	4	Cervus elaphus
Roe deer	5	Capreolus capreolus
Wood grouse species	6	Tetraonidae

Measurements and assessments at tree level

Tree species

Tree species	Code	Definition
Turkey Oak	01	Quercus cerris
Durmast Oak	02	Quercus petraea
Other Quercus sp.	09	Quercus spp.
Beech sp.	19	Fagus spp.
Hornbeam sp.	29	Carpinus spp.
Ash sp.	39	Fraxinus spp.
Poplar and Aspen	49	Populus spp.
Elm sp.	59	Ulmus spp.
Alder sp.	69	Alnus spp.
Sycamore	70	Acer pseudoplatanus
Other maple sp.	79	Acer spp.
Silver Birch	90	Betula verrucosa
Lime sp.	91	Tilia sp.
Sweet Chestnut	95	Castanea sativa
Other broadleaved trees	99	Broadleaved tree species not specifically listed
European Silver Fir	100	Abies alba
Norway Spruce	110	Picea abies
Macedonian Pine	120	Pinus peuce
Whitebark Pine	121	Pinus heldreichii
Scots Pine	122	Pinus silvestris
Black Pine	123	Pinus nigra
Eastern White Pine	124	Pinus strobus
Douglas Fir	130	Pseudosuga douglasi
Larch sp.	149	Larix spp.
Other coniferous trees	199	Coniferous tree species not specifically listed

Azimuth to tree

Azimuth to tree should be measured for all trees on 'forest' and 'other wooded land' with a diameter at breast height equal to, or more than 7 cm.
This measurement is the compass bearing from the aluminium pole in the plot centre to the centre of the stem at breast height.
Valid values: 0 through 360.

Distance to tree

Distance to tree should be measured for all trees on 'forest' and 'other wooded land' with a diameter at breast height equal to, or more than 7 cm.
The distance from the aluminium pole in the plot centre to the centre of the stem at breast height should be measured with a measuring tape and the distance recorded in centimetres (0.01m). This distance is to be measured along the ground.

Valid values: 0000 through 1000.

Tree status

Tree status	Code	Definition
Live	1	Live, standing tree with green foliage
Downed tree, salvageable	2	Dead tree, can still be commercially utilized
Downed tree, not salvageable	3	Dead tree, cannot be commercially utilized
Snag, salvageable	4	Standing dead tree, can be com. utilized
Snag, not salvageable	5	Standing dead tree, cannot be com. utilized

Code 2 comprises newly windthrown trees, still having green foliage, in addition to other non-decayed trees on the forest floor. Newly harvested trees, not yet extracted from the forest, should never be assessed under any of these categories. Trees lying on the forest floor should be included only if the breast height point is located inside the sample plot.

Diameter at breast height

Diameter at breast height should be measured for all trees on 'forest' and 'other wooded land' with a diameter at breast height equal to, or more than 7 cm. The current diameter of the tree at breast height (1.3 m above ground level) should be measured in millimetres. For dead, salvageable dead, or snag trees, this is the diameter of the tree at the time it died. In most cases the tree is still standing and the diameter is measured. If the bark has fallen off the tree, an estimated bark thickness is used to obtain this diameter so that it is an estimator of the diameter at the time the tree died. When measuring dead trees on the forest floor, possible remaining stumps must be taken into consideration when selecting the correct measurement point (1.3 m from original ground level). Trees lying on the forest floor should be included only if the breast height point is located inside the sample plot. As breast height point should be considered 1.3 m from the butt end of the remaining part of the tree, if the butt log has been removed from the forest. If the tree has an irregularity at breast height, affecting the diameter measurement, the measurement point should be shifted the shortest possible distance up or down, to avoid this irregularity.

The caliper should be kept perpendicular to the stem while measuring, and the beam of the caliper should always be directed towards (or away from) the plot centre.

In case of forking below breast height level, each stem should be recorded separately. Forks above breast height level are to be recorded as one single tree.

If the diameter is beyond the range of the caliper, the measurement tape should be used instead.

Valid values are 0070 through 1999.

Volume reduction

Volume reduction should be estimated for all trees (live or dead) on 'forest' and 'other wooded land' with a diameter at breast height equal to, or more than 7 cm.

Volume reduction percentage is to be estimated for all trees where the top has been broken or in some other way is damaged, and that has lost 20% or more of its volume. To this group should also be assigned trees with unusual form due to harvesting of foliage for animal fodder or other utilisation.

If e.g. 70% of the estimated tree volume is present compared to a normal tree with the same diameter, the value "30" should be recorded.

Valid values: 20 through 99. For normal trees without damage, 00 should be recorded.

Damage

Cause of damage	Code	Definition
None	0	No damage or unknown cause of death
Insect	1	Damage caused by insects
Disease/fungus	2	Damage caused by diseases or fungi
Fire	3	Damage caused by fire
Animal	4	Damage caused by animal
Weather	5	Damage caused by weather/climate
Human impact	6	Damage caused by unintended human impact (logging, driving etc.)
Suppression	7	Damage caused by suppression
Miscellaneous	8	Damage caused by various other impacts

Damage should be assessed for all trees on the sample plot with a dbh equal to or more than 7 cm.

Damage is recorded for live trees if the presence of damage or pathogen activity is serious enough to reduce the quality or vigour of the tree. When a tree is damaged by more than agent, the most severe damage is coded. When no damage is observed on a live tree, 0 is recorded. Damage recorded for dead trees is the cause of death. When the cause of death cannot be determined for a tree, 0 is recorded.

Tree quality grade

Will be assessed for all trees with dbh equal to, or exceeding 7 cm

Tree quality grade	Code	Definition
High quality	1	Trees of high quality; boles straight, no visible stem damage; high quality timber products
Average quality	2	Trees of average quality; small fire scars or other irregularities, slightly twisted or bent boles; construction-timber
Low quality	3	Trees of low quality. Large irregularities, bent or forked; firewood

Tree type (sample tree/tally tree)

Tree type	Code	Definition
Tally tree	1	Simple measurements
Sample tree	2	Extended measurements

On tally trees only dbh, tree species, azimuth, distance and damages will be assessed. Sample trees are trees that should also be subject to more detailed measurements, as height, bark and increment measurements. All trees with a diameter more than 7 cm can be selected as sample trees. Excluded as sample trees are trees which, due to major damage or irregularity, have a highly unnormal height-diameter relationship. In such cases, the tree should be excluded as a sample tree and assigned to tally trees only.

Sample trees are selected according to the following procedure: Select the three biggest trees (with regard to diameter) on the sample plot. In addition, the three trees that are closest to the plot centre should also be chosen as sample trees. If two or more trees are located at exactly the same distance from the plot centre, making it complicated to select which is no. 3, no. 4 etc., the biggest of the trees in question should always be chosen. Thus, there will normally be a total of 6 sample trees on a plot. If the total number of regular trees on the sample plot is less than 6, all of them will be selected as sample trees. If there exists trees on the sample plot of a species that is not repesented by the 6 sample trees, the biggest (with regard to diameter) of these trees should be selected as an additional sample tree. The aim is that there should be at least one sample tree of every tree species occurring on the sample plot.

Tree height

Tree height should be measured for all trees classified as "sample tree". The tree height should be defined as the length of the bole, measured along its core from the stump to the top of the tree. The tree height should be measured by means of hypsometer, and recorded in decimetres (0.1m). To obtain a correct height measurement, the observing distance to the tree should always be measured horizontally. If the measurement is being taken from a point at approximately the same level as the tree, this can more easily be accomplished. Valid values are 013 through 500.

Bark thickness

To be assessed for all trees where tree type='sample tree'

Measurement of bark thickness should be taken by means of the bark gauge and recorded in millimetres. Bark thickness should always be measured at breast height (1.3 m above ground level). The measurement point should be where the caliper arm touches the stem, and preferably along a line from the plot centre towards the core. Valid values are 00 through 50.

Width of 10 annual rings

To be assessed for two trees on each sample plot where tree type='sample tree' Preferably these should be no. 2 (with regard to diameter) of the three biggest trees and no. 2 (with regard to diameter) of the nearest 3 trees to the plot centre.

A core will be taken with an increment borer at 1.3 metres above ground and approximately in the direction of the mean diameter. The annual rings should not be measured where there are irregularities in the bole, and the boring should be made so that the annual rings do not form an oblique angle to the axis of the core.

The measurement should be made from last year's annual ring, and should include the 10 previous years. The measurement will be made in 0.1 millimetres.

Valid values: 000 through 999.

Proposal for basic forest classification system to be used in photo interpretation of Kosovo

Coordinates of observation plots should be selected as indicated in detailed guidelines.

If the selected plot centre falls on one of the land use classes listed below, the plot should be assigned to the appropriate type. In cases where a plot centre falls exactly on the boundary between two different land use classes (or forest stands), the area located north/east of the centre should be decisive for the classification. One individual sample plot should be assigned to only one land use class.

Land use class

Land use class	Code	Definition
Forest	01	Wooded land (>0.5 ha) meeting definition of "forest"
Other wooded land	10	Wooded land (>0.5 ha) not meeting definition of "forest"
Barren land	20	Unproductive land, areas not utilised
Agricultural land	30	Cultivated land excl. meadows and pastures
Meadows and pastures	31	Areas predominantly used for grazing
Urban areas, built-up land	40	Cities, villages, infrastructure etc.
Water	50	Lakes, major rivers, reservoirs
Not identificable	99	Photo interpretation not possible

Comments:

Forest: Land with tree crown cover of more than 10 percent and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity in situ. May consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground: or of open forest formations with a with a continuous vegetation cover in which tree crown cover exceeds 10 percent. Young natural stands and all plantations established for forestry purposes which have yet to reach a crown density of 10 percent or tree height of 5 m are included under forest, as are areas normally forming part of the forest area which are temporaryly unstocked as a result of human intervention or natural causes but which are expected to revert to forest.
Includes: Forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas within the forest; forest in national parks, nature reserves and other protected areas such as those of special environmental, scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and a width of more than 20 m.
Excludes: Land predominantly used for agricultural practices.

Other wooded land: Land either with a tree crown cover of 5-10 percent of trees able to reach a height of 5 m at maturity in situ; or a crown cover of more than 10 percent of trees not able to reach a height of 5 m at maturity in situ (e.g. dwarf or stunted trees) and shrub or bush cover.
Excludes: Areas having the tree, shrub or bush cover specified above but of less than 0.5 ha and width of 20 m, which are classed under "other land"; Land predominantly used for agricultural practices.

Note that the minimum size of continuous forest or other wooded land should be 0.5 ha (a square of 71x71 m, or corresponding). Areas having some tree cover, but, at the same time do not meet the requirements for forest or other wooded land, should be assigned to one of the other categories.

Stand type

Stand type	Code	Definition
Regeneration stand	01	Regeneration/recently cleared area
Younger coniferous stands (>75% conifers)	11	Mean height generally < 12m
Advanced coniferous stands (>75% conifers)	12	Mean height generally >=12m
Younger broadleaved or mixed stands	21	Mean height generally < 12m
Advanced broadleaved or mixed stands	22	Mean height generally >=12m
Shrub, brushwood	30	Woody plants 0.5-5m height, without definite stem and crown
Not identificable	99	Photo interpretation not possible

Should be assessed for all sample plots classified as forest or other wooded land.

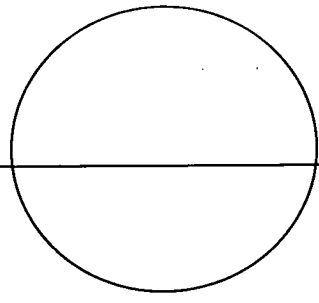
Comments:

Regeneration stand. Forest being prepared for regeneration or in the process of reforestation by planting, seeding or natural regeneration after the previous stand was totally or partly removed, e.g. by felling, fire or windblow. Includes stands of seed trees.

Partial plots. Sometimes two or more land use types, forest types or age classes can be found inside one sample plot with a radius of 10 m. If the forest or area characteristics are very different, the sample plot should be divided into two separate parts, and the photo interpretation **should only take into consideration the specific part surrounding the plot centre:**

- If the sample plot is divided by a boundary between forest and non-forest

- If the sample plot is divided by a boundary between other wooded land and non-forest
- If the sample plot is divided by a boundary between forest and other wooded land
- If the sample plot is divided by a clearly defined boundary between coniferous and broadleaved stands (not in the case of mixed stands)
- If the sample plot is divided between young forest or a recently cleared forest area, and an older stand



Should be assessed

Should not be assessed

Crown cover percentage

The percentage of the sample plot that is covered with tree crowns. **Should be assessed for all sample plots, also those falling outside forest and other wooded land,** within a radius of 10 m around the plot centre. In the case of a partial plot (as described above) where a stand boundary is dividing the sample plot into two separate parts, only the stand where the centre falls should be considered for this assessment. 100% crown cover should be recorded as 99.

Valid range: 00-99

Risk of mines and other UXO

Risk of mines and other UXO	Code	Definition
Low	01	No particular indication
Some risk	02	Indication of some occurrence
High risk	03	Indication of high occurrence
Not identificable	99	Information not available

Comments:

All sample plot locations and the surrounding area (especially the area between the nearest access road and the sample plot location) should be checked against the latest maps from UNMIK MACC. Also possible other information on risk of mines and other remaining explosives should be taken into consideration.

PLOT RECORD FORM

Team leader..

X						
Y						

Map number:

Cluster no:

Municip

Inventory status: :

Size of p (cm):

Orientation mark 1		Orientation mark 2		Orientation mark 3	
Azimuth (°)	Distance (dm)	Azimuth (°)	Distance (dm)	Azimuth	Distance (dm)
000	000	000	000	000	000

Elevation (m)	Slope (%)	Aspect (°)	Land use class	Ownership st
0000	00	000	00	0

Tree species class	0	
Stand age (years)	000	
Mean height (dm)	000	
Dominant height (dm)	000	
Current stand origin	0	
Treatment opportunity class	0	
Illegal/uncontrolled logging	0	
Stand structure	0	
Crown cover (%)	00	
Soil depth	0	

Number of trees < 7 cm Dbh (00)	Coniferous	Dbh 0 - 1.9	
		Dbh 2.0 - 3.9	
		Dbh 4.0 - 5.9	
		Dbh 6.0 - 6.9	
	Broadleaved	Dbh 0 - 1.9	
		Dbh 2.0 - 3.9	
		Dbh 4.0 - 5.9	
		Dbh 6.0 - 6.9	

Plot number	*Code*
South-western	1
North-western	2
North-eastern	3
South-eastern	4

Municipality	*Code*
See separate sheet	

Inventory status	*Code*
Plot visited	1
Plot not visited	2

Plot status	*Code*
Full plot	1
Partial plot	2

Land use class	*Code*
Forest	01
Other wooded land	10
Barren land	20
Agricultural land	30
Meadow/pasture	31
Urban/built-up land	40
Water	50

Ownership status	*Code*
Unknown	0
Public forest	1
Private forest	2

Tree species class	*Code*
Temporarily unstocked	0
Predominant coniferous	1
Predominant broadleave	2
Mixed	3

Stand origin	*Code*
Natural seeding	1
Planting/artificial seeding	2
Coppice	3
Coppice with standards	4

Treatment class	*Code*
No treatment	0
Regen., no site prep.	1
Regen., w/ site prep.	2
Conversion	3
Cleaning-thinning	4
Thinning	5
Clearcut	6
Shelterwood	7
Seed tree	8
Selection	9
Salvage	10

Illegal/uncont. log.	*Code*
No illegal logging	0
Uncontrolled logging	1

Stand structure type	*Code*
No high forest	0
Even-aged stand	1
uneven-aged stand	2

Regeneration (00)	Coniferous	
	Broadleaved	
Damage of regeneration/smaller trees		
Intensity of damage of regeneration/smaller trees		

Number of juniper trees and brushes:

Visible signs of animals (valid values 1111 - 6666):

Damage of regeneration and smaller trees - cause	*Code*
None	0
Insect	1
Disease/fungus	2
Fire	3
Animal	4
Weather	5
Human impact	6
Suppression	7
Miscellaneous	8

Intensity of damage of regeneration/smaller trees	*Code*
0 - 5%	1
6 - 25%	2
26 - 50%	3
51 - 75%	4
76 - 100%	5

Animals	*Code*
Bear	1
Wolf	2
Wild boar	3
Red deer	4
Roe deer	5
Capercaillie/ black grouse	6

TREE RECORD FORM

Team leader: ....

Date: ☐ ☐ ☐ **Cluster no:** ☐ **Plot no:** ☐

dd mm yy 001-999 1-4

Tree species	Azimuth (°)	Distance (cm)	Dbh (mm)	Tree type	Height (dm)	Tree status	Damage	Bark thickness (mm)	Yearly shoot length (cm)	Annual ring width (0,1 mm)	Tree quality grade
000	000	0000	0000	0	000	0	0	00	000	000	0

Codes

Plot number	*Code*
South-western	1
North-western	2
North-eastern	3
South-eastern	4

Tree species	*Code*
see separate sheet	

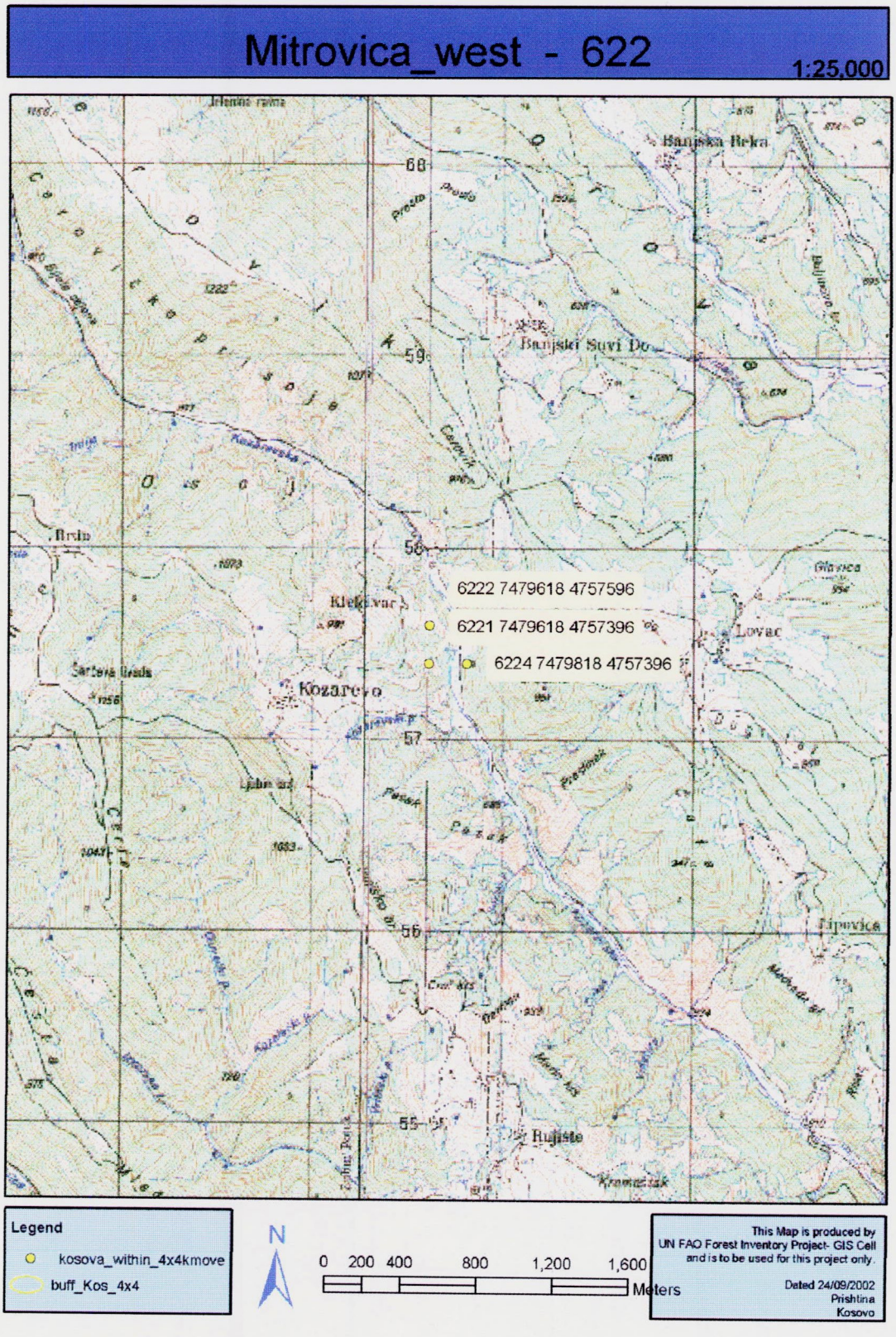
Tree type	*Code*
Tally tree	1
Sample tree	2

Tree status	*Code*
Live	1
Downed tree, salvageable	2
Downed tree, not salvageable	3
Snag, salvageable	4
Snag, not salvageable	5

Cause of damage	*Code*
None	0
Insect	1
Disease/fungus	2
Fire	3
Animal	4
Weather	5
Human impact	6
Suppression	8
Miscellaneous	9

Tree quality grade	*Code*
High quality	1
Average quality	2
Low quality	3

Exemple of plot dokumentation – map 1: 25 000 (plot 622)



Exemple of plot dokumentation – orthophotomap 1: 5 000 (plot 622)