



Forestry Department

Food and Agriculture Organization of the United Nations

TRAINING WORKSHOP ON  
HARMONIZATION OF LAND COVER AND  
FOREST CLASSIFICATION IN REMOTE  
SENSING - ASIA PACIFIC REGION

4-8 DECEMBER 2006  
DEHRADUN, INDIA

DRAFT - PROCEEDINGS

STRENGTHENING MONITORING, ASSESSMENT AND REPORTING  
ON SUSTAINABLE FOREST MANAGEMENT IN ASIA (GCP/INT/988/JPN)

DECEMBER 2006, ROME



## **Strengthening Monitoring, Assessment and Reporting (MAR) on Sustainable Forest Management (SFM) in Asia (GCP/INT/988/JPN)**

FAO initiated the project “Strengthening Monitoring, Assessment and Reporting on Sustainable Forest Management in Asia” (GCP/INT/988/JPN) in January 2006. The five-year project is funded by the Government of Japan.

The main objective of this project is to facilitate development of harmonized forest related national monitoring, assessment and reporting (MAR) systems in the Asia-Pacific region to contribute directly to the improvement of sustainable forest management (SFM) regimes. An allied objective of the project is to enhance the use of the MAR information in national decision-making, formulation of effective forest policies, and sustainable forest management and planning.

The project accomplishes its objectives in two phases. The first two years, the Development Phase, the project would focus on: (a) international activities like the establishment of linkages with forest-related processes; (b) facilitating development of a globally harmonized framework, guidelines and database structure, including pilot testing in some countries; (c) use of MAR information in forest planning and development of forest policies at the national level; (d) establishment of a country-level network of national focal points to various forest-related processes; and (e) initiate a set of national activities that facilitate the implementation of the harmonized MAR.

The Implementation Phase spreads over the remaining three years of the project period and focuses on the implementation of the harmonized MAR, including facilitation in the establishment of database at the national level in selected project countries within the Asia-Pacific region through studies, reviews, training, workshops and expert consultations. The detailed design of this phase will be finalized on the basis of a review of the activities and the outputs of the first phase.

All countries in the Asia-Pacific region can participate in the project, although the actual level and intensity of their involvement may vary among them. Forestry departments in respective countries have been requested to nominate their national focal points for this project.

The project is organized under the Forest Resources Development Service (FORM) in the Forest Resources Division (FOR) of FAO Forestry Department. The contact persons are:

Mr Peter Holmgren, Chief FORM

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Views of participants in a workshop reported in the proceeding may be considered as their personal views. These may be same or different from the official view of their country.

The MAR-SFM Working Paper Series provides an important forum for the rapid release of preliminary findings needed for validation and to facilitate the final development of official quality-controlled publications. Should users find any errors in the documents or have comments for improving their quality they should contact [Kailash.Govil@fao.org](mailto:Kailash.Govil@fao.org).

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## **Training Workshop on Harmonization of Land Cover and Forest Classifications in Remote Sensing - Asia Pacific Region**

### ***1 Background***

Food and Agriculture Organization of the United Nations (FAO) initiated the project “Strengthening Monitoring, Assessment, and Reporting (MAR) on Sustainable Forest Management (SFM) in Asia” - GCP/INT/988/JPN (hereinafter referred as MAR project) in January 2006. It is a five year project that is funded by the Government of Japan, with a view to developing a harmonized monitoring, assessment and reporting (MAR) system to contribute directly to the improvement of sustainable forest management (SFM) regimes in the Asia-Pacific region.

The main objective of this project is to facilitate development of harmonized forest related national monitoring, assessment and reporting (MAR) systems in the Asia-Pacific region to contribute directly to the improvement of sustainable forest management (SFM) regimes. An allied objective of the project is to enhance the use of the MAR information in national decision-making, formulation of effective forest policies, and sustainable forest management and planning.

### ***2 Organization of the training workshop***

The workshop was organized jointly by the MAR project and the “Global Land Cover Network” (GLCN) initiatives of FAO. The workshop was hosted by the Indian Institute of Remote Sensing (IIRS), Dehradun, India from 4<sup>th</sup> to 8<sup>th</sup> December 2006. The Governments of India, Italy, Japan, Netherlands, and Norway in addition to the United National Environment Programme (UNEP), UN Convention on Biological Diversity (CBD) and US Geological Survey (USGS) contributed in the implementation of the workshop.

### ***3 Objectives of the training workshop***

The main objective of the training workshop was to train the participants in reviewing and analysing the remote sensing based forest classifications in their countries to facilitate the harmonization and standardization at the sub-region and regional level and it included the new demands of remote sensing based information for reporting to Convention on Biological Diversity (CBD) in the year 2010. A supplementary objective was to inform the participants about the proposed design and the implementation process of the remote sensing component of Forest Resources Assessment (FRA) 2010.

### ***4 Participants***

A total of 41 professionals participated in the workshop. Out of this 20 were international trainee participants from 13 countries (Bhutan -1, Cambodia -1, China -2, India - 4, Indonesia - 2, Laos - 1, Mongolia -1, Myanmar -1, Nepal -2, Philippines -1, Republic of Korea - 1, Sri Lanka -2, Vietnam -1). In addition 10 staff and student of IIRS were also trained during the

workshop. A team of 11 resource persons (5 – FAO, 2 IIRS, 1 JRC, 1 USGS and 2 members of the Advisory Group of global FRA) intensively briefed, trained and served the needs of the participants. Annex 1 provides a detailed list of the participants.

## **5 Structure of the Workshop and Sessions**

The workshop followed a typical training structure and consisted of an inaugural session, hands-on training sessions, briefing sessions and finally evaluation, suggestion and recommendation sessions.

### **5.1 Inaugural Session**

Dr. V. K. Dadhwal, Dean IIRS, welcomed the participants and guests invited to the inaugural session of the workshop and also informed them about IIRS. Dr. K. D. Singh briefed the participants about the Land Cover Classification System (LCCS) in the Indian context. Dr. Kailash Govil (FAO) provided an overview of the Information and Knowledge Management at Forestry Department in FAO and about the rationale of organising the workshop. Dr. S. P. S. Kushwaha (Prof. and Head of Forest and Ecology Division) thanked the participants and guest for coming to the inaugural session of the workshop. The workshop was declared open with lighting of the traditional lamp.

### **5.2 Training Sessions**

#### **A. GLCN-LCCS Methodology**

Mr. Antonio Di Gregorio made presentations to explain the concept and contents of the GLCN, Africover and LCCS to the participants.

He mentioned that the GLCN was initiated to improve the harmonization on digitalized land cover maps all over the world, reconsidering the use of data, classifiers, and the relationship of data to end-user communities. He informed the participants about the Africover initiative of FAO, which was launched by FAO in 1997 to establish a digital geo-referenced database on land cover and geographic references for harmonization of forest-related information. The Africover aims to build up a common base on basic topographic information for all African countries by strengthening capacities of related institutions. He argued that the approaches developed during the Africover initiatives could be applied in the Asia Pacific (AP) region.

He informed the participants that the Land Cover Classification System (LCCS) is a comprehensive and standardized a priori classification system based software, designed to meet specific user requirements and created for mapping exercises independent of scales or means in the world. The LCCS was developed for the harmonization of geographic data as a result of the intensified use of GIS. The LCCS deals with information on land cover which changes quickly over time. The LCCS draws principally on physiognomic analysis of land cover, involving processes of classification, interpretation, accuracy analysis, multi-user database browser, and interpretation standardisation. Further that two software programmes are used for the interpretation process, i.e., Veda for the physiognomic and phonological analysis and GeoVis for mapping procedures with polygons. Manipulation of the LCCS software was demonstrated

by each function, including dichotomous phases of classification and a modular-hierarchical phase with a set of classifiers and their hierarchical arrangement tailored to the major land cover type. He mentioned that various forms of classification can be added upon users' needs. Finally that the LCCS can bridge a system to link natural resources statistical census with mapping programs at the national or regional level.

The participants made comments on scales and accuracy of maps from different statistical data, and needs for feedback of end-users to the LCCS in different languages for better integration of the programme through assessment of their information needs. On the other hand, a standardised format in a common language was also advocated to ensure the interpolability of the LCCS. The participants discussed the needs for refining clear and precise definition of land use types in LCCS, including natural forests, plantation forests and orchards with specific crop and tree species.

The discussion highlighted the ambiguity and controversies in definitions of open and sparse forests in humid and dry forests. The current definition of trees over 5 m high would be a problem in the cases of mangrove and bamboo vegetation. More development-oriented classifiers would be required for land use classification, while the LCCS lays an emphasis on environmental factors. Antonio stressed that the LCCS was a fully open and flexible system in consideration of national and local differences, based on physiognomic characteristics and incorporating user-defined classifiers (codes) in the LCCS software. Further that the LCCS can be interrelated with systems, languages and different sub-regions/regions by using a translator module. The LCCS provides a common language to bridge existing systems by capturing similarities among different systems in different countries.

All the participants actively participated in laboratory sessions that followed the above discussions to gain hands-on-experience in use of LCCS software.

## **B. Mapping Accuracy Programme (MAP)**

The MAP is a statistical program to allow the automatic calculation of the thematic mapping accuracy using different methods and different expected levels of statistical confidence. The accuracy is assessed in both qualitative and quantitative ways. In the latter case, the assessment is done by single point, multiple points or polygon areas. Sample polygons are extracted by random sampling using the software for the analysis of accuracy. Antonio explained the concepts of classification and legend, minimum mapping unit/mixed mapping unit (MMU), and different types of mixed coding for mixed units to the participants. The mixed unit concept is an important component of the cartographic standards of a map and is directly linked with the scale and the concept of MMA (minimum mapping area). He mentioned that current threshold of 2 ha (MMA) will get smaller with each technological progress in the future. This standard is applied in LCCS when passing from the abstraction of the classification (by definition not related to scale) to a specific legend. Several kinds of mixed units exist.

Antonio mentioned that the fragmentation of land use units with their large heterogeneity in small patches is frequently found inside grasslands and it might hamper the standardisation of cartographic database in densely populated Asian countries. Rotational changes of landscape for example due to shifting cultivation raise another level of problems. However, mixed units of natural vegetation would improve the representation of actual land cover. There was a suggestion that it would be better for producers to fix the MMU rather than interpreters, but

there should be a room for consultation with end users on its determination. Several questions or comments were made on the MAP, such as edit or split of polygons, definition of classes for accurate selection of polygons, and selection of accessible polygon areas for cross-check in the field. MAP automatically conducts statistical analysis for the selection of polygons. If the number of polygons is not enough for verification, reclassification will be made with some additional classes. Unsuitable polygons can be edited or excluded from the software.

### **C. GeoVIS**

Mr. Craig von Hagen introduced the GeoVIS, a vector-based editing system (software) which is specifically designed for thematic interpretation. It is a user-friendly system that embeds the main tools of vector drawing and editing, including topological functions, with advanced capabilities of raster management and a direct link with LCCS.

The participants showed keen interest in the software and learned manipulation of the GeoVIS software during hands-on-experience under excellent guidance of Craig.

Dr. S P S Kushwaha made a presentation to demonstrate strength of IIRS in application of LCCS. This was complemented through a presentation by Mr. Subhash Ashutosh on experience of Forest Survey of India (FSI) in use of LCCS & GeoVIS for Land Cover Mapping in India.

### **D. Harmonization of forest and land cover classification**

Dr. Kailash Govil introduced and Antonio explained the similarities and differences in the thresholds among the national classifications in Asian countries.

The countries were organised in following four sub-regional groups for experimenting on harmonisation of forest and land cover classification in their sub-region considering physiognomic categories and land use using LCCS software.

**Group 1 (East Asia)** -China, Mongolia and Korea

**Group 2a (Mainly South East Asia)** - Cambodia, Laos, and Vietnam

**Group 2b (Mainly South East Asia)** - Indonesia and Philippines

**Group 3 (Mainly South Asia)** - Bhutan, India, Nepal, Sri Lanka and Myanmar

The hand-on-exercise highlighted inconsistencies or ambiguities in forest classification systems among the relating to the definition of ecological types of forests, non-forest vegetation, and other land use as well as physiognomic or phonological characteristics of forests (crown coverage: open/sparse/closed forests, evergreen/ deciduous forests, etc.).

The group work was organised in two steps. During the first step, each country participant developed a matrix of harmonisation of forest/land classification in comparison to the existing national land cover classification on primarily vegetated or non-vegetated land in terrestrial or aquatic/flooded areas, using the LCCS classification and coding system. Then in the second step, the participants in each sub-group first identified the commonality and differences among their national classes as codified by them in LCCS and then developed a harmonised classification for their sub-regional group as indicated below.

The group 1 covering East Asia sub-region consisting of China, Mongolia, and South Korea identified common groupings (plantations, orchards, broadleaved/coniferous evergreen/deciduous forests, bamboo, shrubs, etc.) to develop specific LCCS coding with dominant species (e.g., fir, pine, spruce, larch, palm, tea, etc.). However, they encountered problems in distinguishing open and closed natural forests, grouped into single classifiers. They concluded that LCCS and GeoVIS were useful to cover all classes in the East Asia countries, suitable for land cover mapping but also identified several issues, such as a conflict with current users' needs for land cover classification. The sub-group suggested improvement in LCCS by increasing forest classes, and establishment of a coordination mechanism for harmonisation of forest classification.

The group 2 covering part of Southeast Asia consisting of Cambodia, Lao PDR and Vietnam was also able to find common broad classification for forests (evergreen/deciduous broadleaved forest, mangrove, plantations, and dry/inundated shrubs) based on several LCCS attributes such as life form, cover, leaf type, leaf phenology, and stratification. The group also identified differences in their forest definitions, local land cover classes, classification of forest plantations including newly regenerated forest, and definition of canopy closure. The group suggested modification or improvement in LCCS software to take care of problems in combination of physiognomic and ecological elements, use of forest cover and other land cover classes, and adjustment of LCCS to sub-regional characteristics.

The group 3 covering remaining Southeast Asia consisted of Indonesia and Philippines. They group was able to capture commonalities and differences at the sub-regional level as well as areas where LCCS system needs improvement. The group recommended additional classes for the next lower level classification with LCCS as well identified the need for more ground validated higher resolution satellite data for harmonization.

The group 4 covering South Asia sub-region consisted of Bhutan, India, Nepal and Sri Lanka. Myanmar decided to do its exercise in isolation. The group identified commonalities in life form and land cover, but variability in other elements. They tried to harmonise the national systems using physiognomic variables in a hierarchical framework. They also identified similar problems with LCCS and its defined classes.

As regards harmonization at the regional level, Antonio explained how LCCS software and utilities can be used to relate these sub-regionally harmonised classifications to develop a single harmonised classification system for the Asian region. He emphasized that the LCCS does not aim to change the national classification system, but helps to improve the understanding at sub-regional, regional and global levels by providing a common language and linking alternative classification systems. He agreed with sub-groups that there is a need to develop either a forest module or an enhanced version of LCCS to address various problems faced by the sub-groups.

The exercise established the potential and the feasibility of LCCS framework to develop regionally harmonised classification. It also highlighted certain incompatibilities and inconsistencies in LCCS software that need to be addressed through development of either a forest specific module or an upgraded version of LCCS software.

### **5.3 Briefing Sessions**

The participants were briefed on the potential use of remote sensing in addressing some of the information needs at the national level as well as about the remote sensing component of FRA 2010 and internet gateway to access and provide information.

Dr. V. K, Dadhwal briefed the participants on carbon accounting using remote sensing inputs by demonstrating and explaining development of “Terrestrial Carbon Budget” in India. Dr. J. K. Rawat, member Advisory Group to FRA, introduced the broadened conceptual framework of the next round of Forest Resource Assessment (FRA 2010) specifically the addition of the legal policy and institutional framework as the seventh criteria to the existing six criteria of FRA 2005 and introduction of remote sensing component. Dr. Kailash Govil complemented this with his presentation of the detailed plan of global and regional monitoring of forest through remote sensing under FRA 2010. He explained the sampling design and the mix of high and medium resolution imageries in this respect. Dr. Hans-Jürgen Stibig provided details of TREES project of JRC (Italy) to contribute to forest monitoring of forests in tropical region through remote sensing. He informed that the JRC plans to cover almost entire Asia except for China, Japan, North and South Korea, Australia and New Zealand. Dr. Chandra Giri presented methods to assess degradation, fragmentation and deforestation through remote sensing using case studies from USGS. He explained the use of radiometric and geometric calibration and post-classification in this respect. He also briefed the participants about the national land cover database in the United States. Dr, Maxim Lobovikov advocated the need and availability of alternatives methodologies to assess and monitor bamboo and rattan resources. Dr. S P S Kushwaha informed the participants about IIRS work on biodiversity characterisation at the landscape level using satellite based remote sensing and GIS applications specifically development of vegetation type maps by calculation of disturbance index, biological richness, and total importance value.

Finally, Craig von Hagen introduced the GeoNetwork, an Open Source Software for accessing and providing metadata over internet. The GeoNetwork is a free and open source catalogue application to manage spatially referenced resources, providing powerful metadata editing and search functions as well as an embedded interactive web map viewer.

### **5.4 Concluding Session**

The concluding session covered evaluation, suggestion and recommendation. The participants were provided with the standard evaluation form of IIRS to evaluate the workshop. The participants deliberated on suggestions and recommendations based on past workshop sessions. To facilitate this process a set of leading questions was also provided to them. This set of questions was developed on their observations in the group work. The next section provides the results of evaluation and summary recommendations and suggestions of this training workshop.

Dr. Devendra Pande, Director General, FSI was the chief guest for the concluding session and he spoke on the importance of the harmonization process and utility of LCCS software. Dr. George Mathew, Dr George Joseph, Director of the United Nations Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP), Dehradun presided as the Chair-person of the concluding session. He informed the participants that the Centre aims to

establish national capabilities in the Asia Pacific region to design and implement education, research and application programmes in space science and technology, in particular, in the areas of (1) Remote Sensing and Geographic Information Systems, (2) Satellite Communications and Global Positioning Systems, (3) Satellite Meteorology and Global Climate, and (4) Space and Atmospheric Sciences. He assured all possible support of the UN Centre in building country national capacities in this regard. He distributed certificates to the participants of the workshop. Dr. Kailash Govil, FAO thanked IIRS all staff including those working in the background, all contributing resource persons and institutions, and the participants for the success for the workshop. Dr. S PS Kushwaha thanked FAO for organising the workshop and thanked all the participants and resource person for their support.

## ***6 Evaluation, Suggestions and Recommendations***

The participants unanimously rated the workshop as highly effective and useful and suggested more follow-up workshops to work on harmonization at the regional level.

The participants resolved that the harmonization is necessary for fostering unambiguous use of classes to facilitate, exchange and sharing of research, expertise and knowledge among countries to enhance efficiency of the current management, planning and policy formulation processes. They recommended the establishment and strengthening of networking among concerned professionals within and among the countries. They felt that the LCCS, GeoVis and Geo Network are useful tools to facilitate harmonization of remote sensing based forest classifications at national, sub-regional, regional and global levels. They suggested that LCCS should be made an essential element of all remote sensing surveys but the commonalities in definitions among countries rather than LCCS should derive the process of harmonization. In view of the existing incompatibilities, they recommended that any further use of LCCS should be subject to necessary modification and/or development of a specific module for forest classes. It should address forest land use in an explicit manner and provide for creation of more user-based classifications.

They also resolved that the FAO and other related organization and institutions should, in close consultation with countries, establish necessary network of experts and institutions and also formalise the process of development of design and implementation of global, regional and national remote sensing surveys. FAO and other related organizations/ institutions should continue to support this group of national experts to maintain consistency, networking and to further strengthen and advance their capacities. Lastly FAO and other related organizations and institutions should organise the follow-up training workshops at the global, regional, sub-regional and national level to continue this important task of harmonization of remote sensing based forest classifications in the region.

## ***7 Follow-up***

The MAR project will follow-up on harmonisation of the forest/land cover classification in the AP region through collaboration with related organisations and observing technical progresses in each country. It is expected that such harmonisation processes and needs will further motivate the project countries to accelerate the development of their national networks on MAR.

In this regard, the MAR project is organising a follow-up workshop on broadening, harmonization and cross-sectoral integration of ground based national forest inventories in the Asia Pacific region in March 2007 in China.

## ***Annexes***

**Annex 1 – List of Participants**

**Annex 2 – Revised Agenda**

**Annex 3 – Presentation at the workshop**

## Annex 1 – List of Participants

<b>International Participants</b>	
Penjor Sonam	Bhutan
Teang Sokhom	Cambodia
Xia Chaozong	China
Zhang Lei	China
Alok Saxena	India (Ministry of Environment and Forests)
Anoop Singh	India (Andhra Pradesh Forest Department)
Subhash Ashutosh	India (Ministry of Environment and Forests)
O.P. Gaba	India (Department of Space)
Rina Djuariah	Indonesia
Anny Meilani	Indonesia
Thavone Vongphosy	Lao PDR
Zagdaa Narangerel	Mongolia
Maung Maung Than	Myanmar
Birenda Bajracharya	Nepal (ICIMOD)
Nagendra Prasad Paudyal	Nepal
Cabanayan Callanta Jose Jr.	Philippines
Lee Seung Ho	R. Korea
Bamunu Arachchige Jayanada	Sri Lanka
Tilak Premakantha Kachchakaduge	Sri Lanka
Pham Manh Cuong	Vietnam
<b>IIRS participants</b>	
I. J. Singh	India (IIRS -Staff)
S.K. Srivastava	India (IIRS -Staff)
Suresh Kumar	India (IIRS -Staff)
C. Jeganathan	India (IIRS -Staff)
Sandeep Maithani	India (IIRS -Staff)
Tilok Bharadwaj	India (IIRS -Staff)
Balak Ram	India (IIRS -Staff)
Rajiv Kumar	India (IIRS -Staff)
Utpal Sarma	India (IIRS -Staff)
Federico Chiani	Italy (IIRS - Student)
<b>Resource Persons</b>	
Chandra Giri	USA (USGS)
Craig von Hagen	Kenya (FAO - Consultant)
Di Gregorio Antonio	Italy (FAO-Consultant)
Dr. K. D. Singh	India (FAO- Consultant)
Hans - Jurgen Stibig	Italy (JRC)
Dr. Kailash Govil	Italy (FAO)
Masahiro Otsuka	Thailand (FAO)
Dr. J. K. Rawat	India (Haryana FD). Member Advisory Group FRA
Dr. Maxim Lobovikov	INBAR, China. Member Advisory Group FRA
Dr. V .K. Dadhwal	India (Dean, IIRS)
Dr. S.P.S. Kushwaha	India (Prof. IIRS)

## Annex 2 - Revised Agenda

### Training Workshop on Harmonization of Land Cover and Forest Classifications in Remote Sensing - Asia Pacific Region

IIRS, Dehradun, India, 4-8 December 2006

#### Organized by:

Global Land Cover Network (GLCN)  
Monitoring, Assessment, and Reporting Project (MAR)

#### Sponsored by:

Government of Italy  
United Nations Environment Programme – UNEP  
Food and Agriculture Organization of the United Nations – FAO

#### Hosted by:

Indian Institute of Remote Sensing – IIRS



#### With the support:

FAO Representation in India

#### Monday, 4 December

##### Opening Ceremony (9:30 - 10:30)

09:30 - 09:45 Welcome by IIRS - Dr. V. K. Dadhwal, IIRS  
09:45 - 09:55 Introduction to workshop theme - Dr. K. D. Singh  
09:55 - 10:05 Broader Picture- Information and Knowledge Management at FAO- Dr. Kailash Govil, FAO  
10:05 - 10:20 Inaugural Address by Chief Guest, Mr. Jagdish Kiswan, DG, ICFRE  
10:20 - 10:30 Vote of Thanks by Workshop Coordinator, Dr. S. P. S Kushwaha, IIRS  
10:30 - 11:00 Welcome Tea

##### GLCN methodology (11:00 - 15:30) – LCCS

11:00 - 12:00 Africover/GLCN initiative – Antonio Di Gregorio  
12:00 - 13:00 GLCN Methodological approach  
13:00 - 14:00 Lunch  
14:00 - 15:30 LCCS Concept/software  
15:30 - 15:45 Tea/Coffee  
15:45 - 17:35 LCCS (Discussion, Demonstration and Hands on Exercises)

#### Tuesday, 5 December

##### GLCN methodology (9:30-15:30) – Geo VIS

09:30 - 11:00 LCCS (Discussion and Demonstration)  
11:00 - 11:15 Tea/Coffee  
11:15 - 13:00 Mapping Accuracy Programme (MAP) – Antonio Di Gregorio

##### 13:00 - 14:00 Lunch

14:00 - 15:30 GeoVIS introduction and overview – Craig von Hagen  
15:30 - 15:45 Tea/Coffee

##### GLCN Further Applications and End User Community Continued (15:45 - 17:30)

15:45-17:30 GeoVIS (Discussion, Demonstration and Hands on Exercises)

##### Evening Session (17:30 - 19:00)

17:30 - 19:00 Hands on Practice on LCCS and GeoVIS

### **Wednesday, 6 December**

#### **Harmonization of Land and Forest Cover Classification**

09:30 - 10:00 Harmonization of Land and Forest Cover Classification - Dr. Kailash Govil

10:00 - 10:30 Process of Harmonization in AP Region - Antonio Di Gregorio

10:30 - 11:00 Hands on Exercise - Translation of national legends into LCCS

11:00 - 11:15 Tea/ Coffee

11:15 - 13:00 Hands on Exercise - Translation of national legends into LCCS

**13:00 - 14:00 Lunch**

14:00 - 15:30 Hands on Exercise – Group Work - Sub-regional Harmonization of translated legends

15:30 - 15:45 Tea/Coffee

15:45 - 17:30 Hands on Exercise – Group Work - Sub-regional Harmonization of translated legends

#### **Evening Session (17:30 - 19:00)**

17:30 - 19:00 Hands on Exercise – Group Work - Sub-regional Harmonization of translated legends

### **Thursday, 7 December**

#### **Remote Sensing for International Reporting (9:30-13:00)**

09:30 - 10:00 Scope of Remote Sensing in Carbon pools and fluxes assessment - Dr. V. K. Dadhwal, IIRS

10:00 - 10:30 FRA 2010 – Framework and Scope - Dr. J. K. Rawat, Advisory Group FRA

10:30 - 11:00 Global Monitoring Of Forests: Plans for FRA 2010 Remote Sensing – Dr. Kailash Govil, FAO

11:00 - 11:15 Tea/Coffee

11:15 - 11:45 GeoNetwork Open Source Software - Craig von Hagen

11:45 - 12:15 TREE III and FRA 2010 – Dr. Hans-Jürgen Stibig JRC -EC

12:15 - 12:45 Biodiversity Characterisation at Landscape Level – Dr. S. P. S. Kushwaha, IIRS

12:45 - 13:15 Bamboo and Rattan Assessment - Dr. Maxim Lobovikov, INBAR

**13:15 - 14:15 Lunch**

#### **Forest Degradation, Forest Fragmentation and Deforestation (14:00 - 15:30)**

14:15 - 14:45 Forest Degradation, Fragmentation and Deforestation - Dr. Chandra Giri, USGS

14:45 - 15:30 United States National Land Cover Database - Dr. Chandra Giri, USGS

15:30 - 15:45 Tea/ Coffee

#### **Indian Experiences with LCCS (15:45 – 16:45)**

15:45 – 16:15 IIRS Experience on LCCS in India – Dr. S. P. S. Kushwaha

16:15 – 16:45 LCCS & GeoVIS for Land Cover Mapping- Sharing of FSI Exercise - Subhash Ashutosh

15:45 - 17:30 Hands on Exercise – Group Work - Sub-regional Harmonization of translated legends

#### **Evening Session (17:30 - 19:00)**

17:30 - 19:00 Hands on Exercise – Group work - Sub-regional Harmonization of translated legends

### **Friday, 8 December 2005**

#### **Synthesis, Evaluation, Suggestions And Conclusion**

09:30 – 10:30 Plenary Session - Sub-regional Harmonization – Outputs from Group works

10:30 - 10:30 LCCS - Harmonization at Regional Level - Antonio Di Gregorio

10:30 - 11:00 Plenary Session -Summarising Evaluation and Developing Suggestion and Recommendations

11:00 - 11:15 Tea/Coffee

11:15 - 12:15 Plenary Session - Finalization of Suggestions and Recommendations

#### **Concluding Session**

12:15 - 12:30 Introduction to and Distribution of Certificated by Dr George Joseph, Director, UN CSSTEAP

12:30 – 12:45 Concluding address – Dr. Kailash Govil, FAO

12:45 – 13:00 Closing remarks by Chief Guest- Dr. D. Pande, DG, FSI

13:00 – 13:15 Vote of Thanks – Dr. S. P. S. Kushwaha, IIRS

**13:15 - 14:15 Workshop Closing Lunch**

## **Annex 3 – Presentations at the workshop**