



## The Global Land Cover Network and the Relevancy of Harmonised Land Cover

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### Introduction

- Land cover is an expression of human activities and as such changes occur with alteration in land cover.
- Land cover is a geographical feature which may form a reference base for applications ranging from forest and rangeland monitoring, production of statistics, planning, investment, biodiversity, climate change, to desertification control.

## Land Cover Information Relevance at the National Level

### Increasing concerns about

- food security for growing population in developing countries,
- environmental degradation including the loss of biodiversity
- climate change accompanied by growing frequency of natural disasters



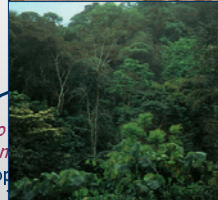
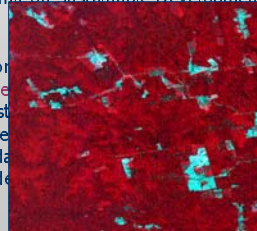
*"Importance of the availability of reliable land cover information for the management of the Earth's resources"*

UNCED-UN Conference on Environment and Development  
WSSD-World Summit on Sustainable Development

### Earth Summit records

#### RS/GIS technologies

- coordinated, systematic and harmonized collection of data
- assessment of data for environmental degradation



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## Meeting UN Requirements at the International Level FAO/UNEP Partnership

- UNEP
  - **Environmental Assessment**
    - Global, regional, sectoral
  - **Early Warning**
- FAO (from individual farmers to government policy makers)
  - **Food security**
  - **Sustainable agriculture, forestry and fisheries - SARD**
  - **International obligations - conventions**

**PACHAMAMA**  
Our Earth - Our Future

**WESTERN INDIAN OCEAN**  
ENVIRONMENT  
OUTLOOK

**Global Environment Outlook**

Early Warning of Selected Emerging Environmental Issues in Africa  
and Caribbean  
Early Warnings



## Challenges

- What are the primary drivers and processes of land cover change at local, regional, and global levels, and how can land cover be projected over time?
- What tools or methods are needed to allow a better characterization of historic and current land cover characteristics and dynamics?
- What are the consequences of land cover change on ecosystem services at regional and global scales?
- Others...?

## Drivers of Land Cover Change

- Population conditions, size and distribution
- Social and economic factors
- Resources access, availability, utilization
- Climate and land use changes
- Large, infrequent or recurrent disturbances (flooding, drought, volcanic eruptions, fires, and large storms)

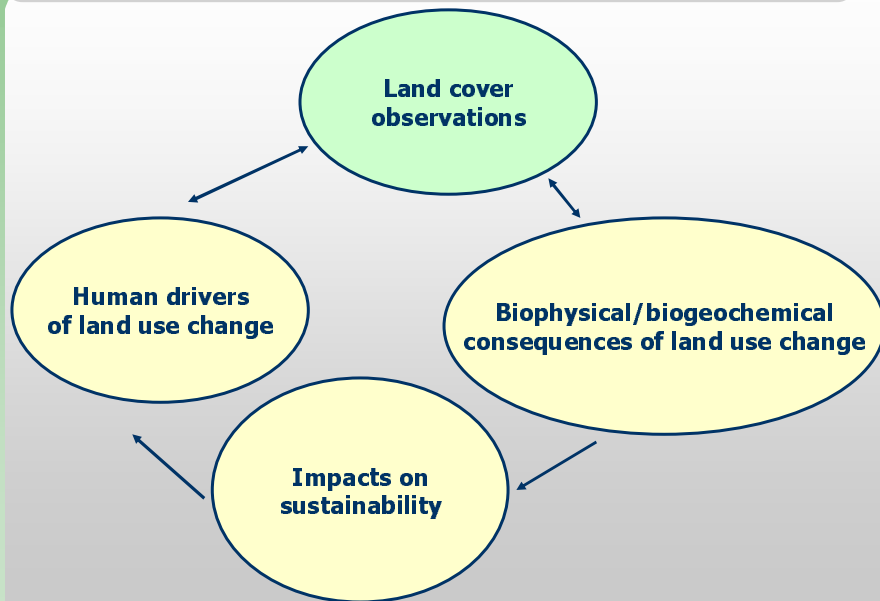


### What are the consequences of ecosystem services at risk?

- Climate Change
- Land Degradation
- Pollution and Toxicity
- Food Insecurity
- Deforestation
- Carbon Transfers
- Loss of Biodiversity
- Changes in fresh water availability

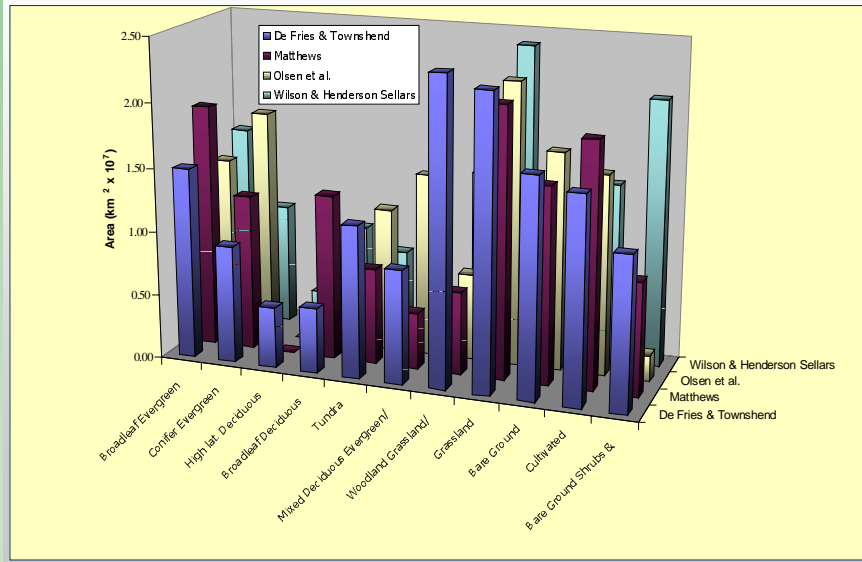


### Causes/Consequences of Land Cover Change



## Why do we need standards for Land Cover?

### Area estimates: 11 cover types, different global datasets



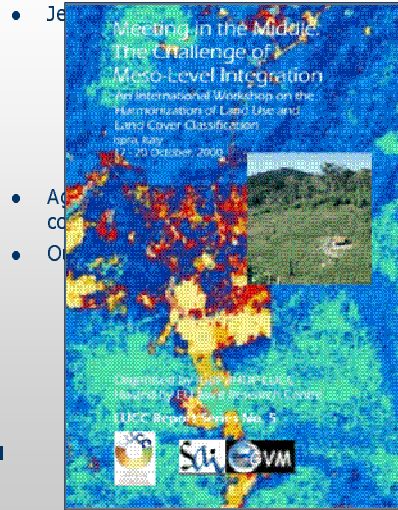
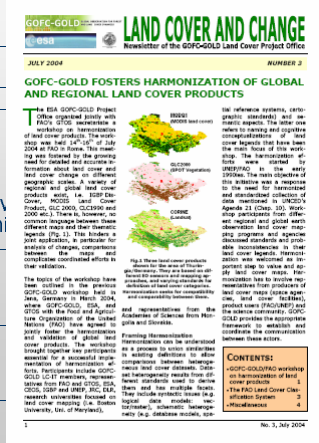
## LCCS: what is it? ... some basic concepts

- Comprehensive methodology for description, characterization, classification and comparison of most land cover features identified anywhere in the world, at any scale or level of detail
- Created in response to a need for
  - A harmonized and standardized collection and reporting on the status of land cover
  - Availability of land cover data for a wide range of applications and users
  - Comparison and correlation of land cover classes between different systems/approaches

## Evolution of the UN standard for Land Cover Classification – facilitating standardized reporting – LCCS

- Evolution of the UN standard

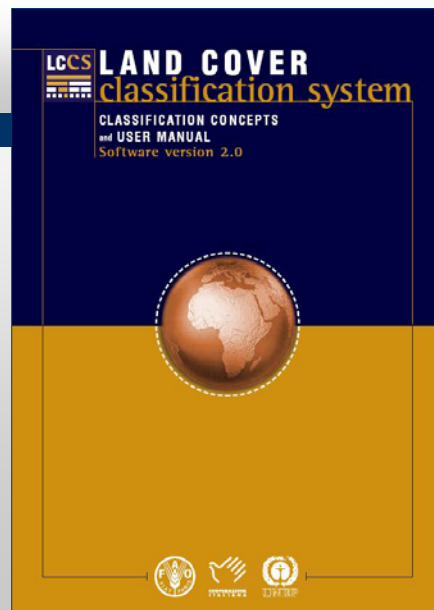
- Early '90s: UNEP/FAO
  - GOCF-GOLD** forms
  - internationally agreed reference



- Agreed
  - On
  - harmonization mechanisms
  - Refined strategy for validation global land cover products

## LCCS to ISO TC211

- LCCS is now an example of an evolving standard of ISO TC 211 – submitted by FAO (a Class A Liaison Member) - to become an ISO standard through a consensus building process
- already an FAO/UNEP standard
- Critical importance of ISO process



## Attaining International Accreditation - LCCS to ISO TC211

- Draft NWIP (New Working Item Proposal) was posted as ISO/TC211 N 1486 - September 2003
- Comments were discussed during the ISO/TC211 plenary session in Berlin, October 2003
- Final NWIP should be finalized before the end of August 2005 - official ballot at ISO/TC211 plenary in Montreal, October 2005
- Move through the process... Committee Draft/DIS/IS

**GLCN**

**Global Land Cover Network**



## Africover Project

- AFRICOVER-EA project has made available timely and location-specific land cover information for ten African countries
- Egypt, Sudan, Eritrea, Somalia, Kenya, Uganda, Tanzania, Rwanda, Burundi and the Democratic Republic of Congo
- Covering an area of over 8.5 million km<sup>2</sup>

## Database Characteristics

- Homogenous Cartographic Standards - WGS84 datum and ellipsoid, UTM projection, < 100m planimetric accuracy)
- Flexibility of the database - ability to map detailed inherent L.C. features of each single country maintaining at the same time a regional harmonization)
- Multi-User Oriented
- Standardised & Unambiguous class definitions
- Easy accessibility and free dissemination
- Consistency - Production storage and distribution of the product
- Follows the same specifications in all countries
- Quality and reliability - same level of quality and thematic accuracy for each country

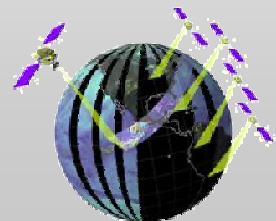
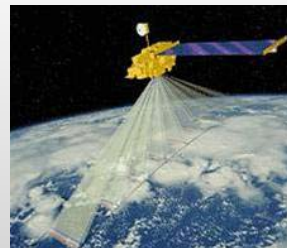


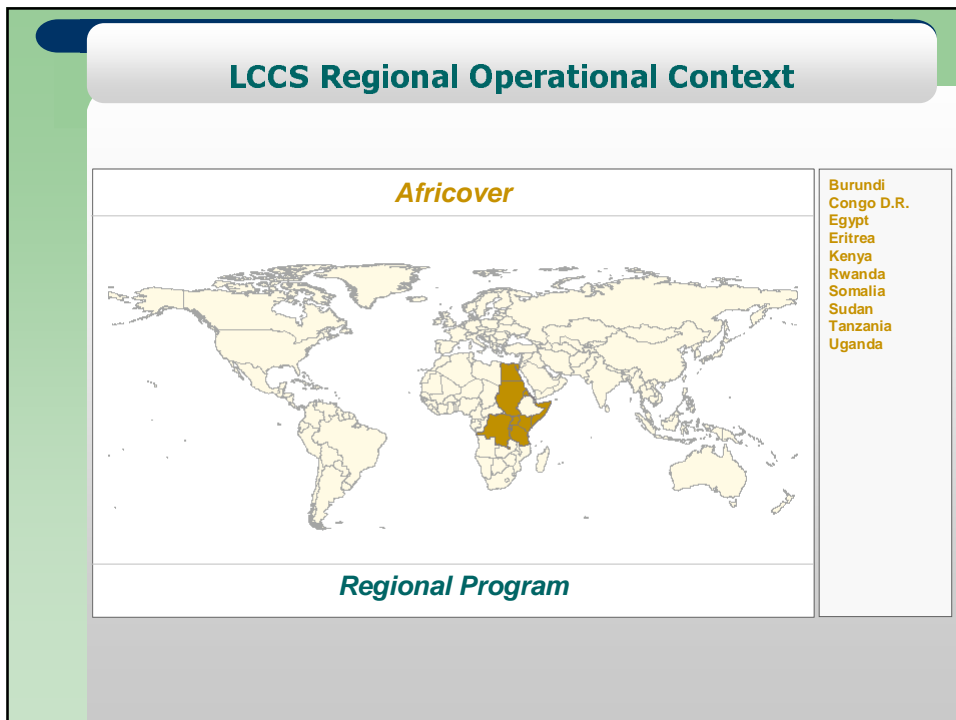
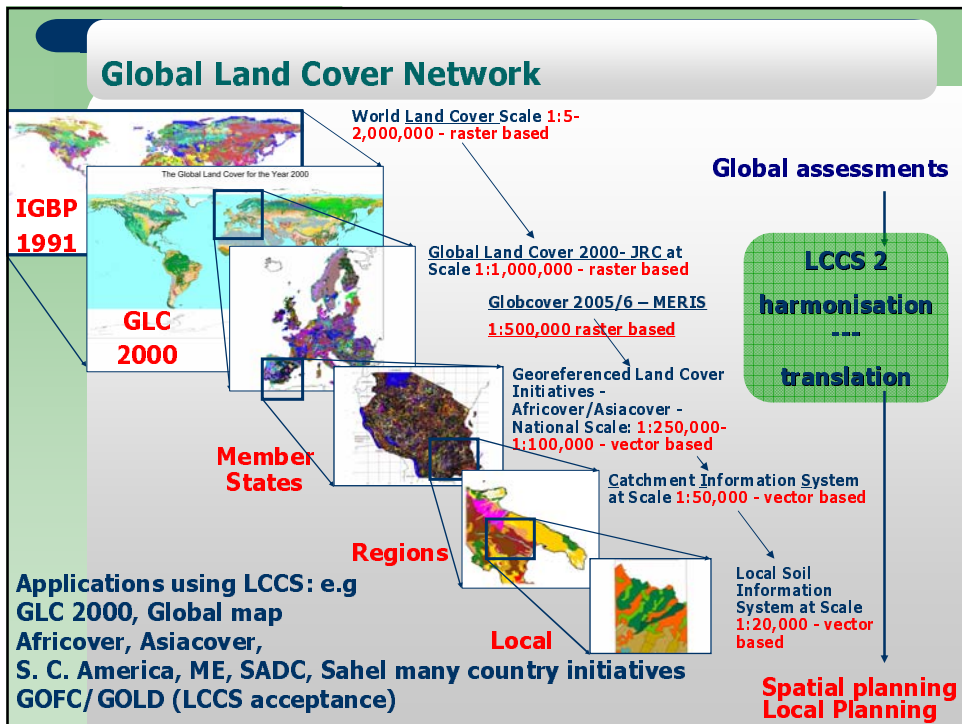
## GLCN Initiative - Overview

- Common effort of FAO and UNEP to answer the need expressed by the international community for a global land cover standardized data base
- Based on the recommendations of the Agenda 21 for coordinated, systematic and harmonized collection and assessment of data on land cover and environmental conditions, especially for monitoring degradation
- Driven by standards (classification, geodetic, & thematic standards)
- Led to development of a global, harmonized land cover classification and mapping strategy, with the objective to provide direction, focus and guidance for harmonization of land cover mapping and monitoring at national, regional and global levels
- This initiative has been launched at the conference "Strategies for Global Land Cover Mapping and Monitoring" held in Florence May 2002 during which a common final declaration (the Artimino declaration) was issued.

## Information framework for Global Monitoring of Land Cover

- Objectives
  - To improve linkages between global, regional and national studies on land cover and the environment
  - To improve standardization, homogenization, compatibility and efficiency of information provided by different applications
  - To provide information that improves design and efficiency of sampling for validation of land cover products at global, regional and national levels.
  - To increase use and sharing of remote sensing data and its derived datasets
- To provide comparable products at global, regional, and national and lower levels
- To undertake capacity development and institution strengthening to maximize benefits for developing countries
- To support operational development and use by national stakeholders of products emanating from the programme





## LCCS Regional Operational Context – S.E.Asia

### Asiacover



Cambodia

China  
(Yunnan)

Lao PDR

Malaysia

Myanmar

Thailand

Viet Nam

### Regional Program

## LCCS Operational Context

### New Full Country Mapping - ongoing



Albania

Iraq

Libyan A.J.

Moldova R.

Romania

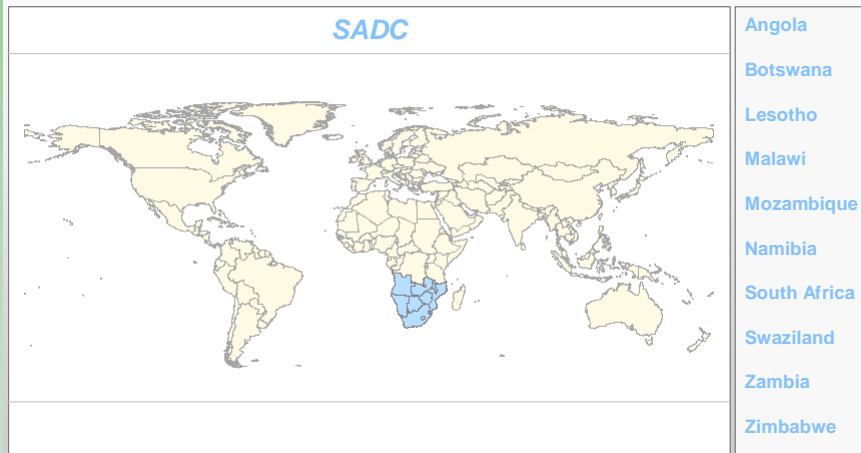
Yemen

Jordan

Lebanon

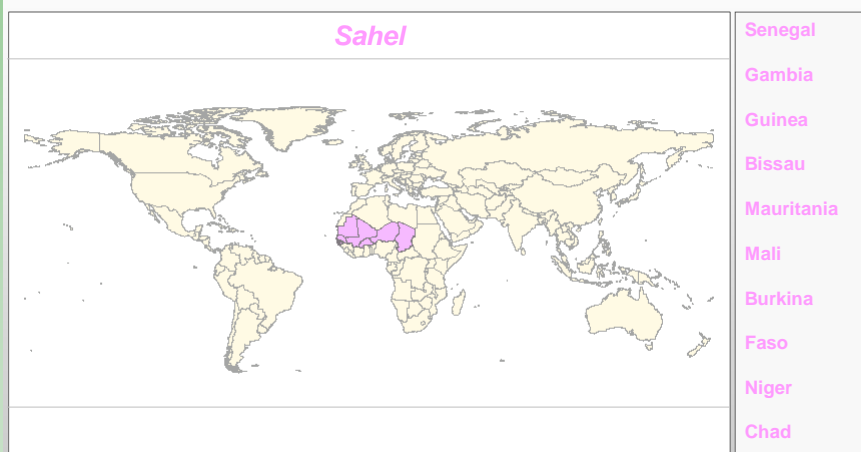
Oman

## LCCS Regional Operational Context



*Regional Program – proposed new harmonisation project*

## LCCS Operational Context



*Regional Program – proposed new harmonisation project*

## LCCS Operational Context

### *Official Translation*



Afghanistan  
Lebanon  
New Zealand  
South Africa

## LCCS Operational Context

### *Translation in Progress*



Burkina Faso  
Cambodia  
Cameroon  
Yunnan  
(China)  
Ghana  
Guinea  
Java  
(Indonesia)  
Iran Isl.R.  
Lao P'sD.R.  
Malaysia  
Mali  
Mongolia  
Myanmar  
Nepal  
Niger  
Nigeria  
Senegal  
Thailand  
Togo  
Viet Nam

## LCCS Operational Context

### Partial Country Mapping



Brazil  
Bulgaria  
Chile  
Indonesia  
Madagascar  
Mexico  
Tunisia

## GLCN Workshops - undertaken

- Dakar 10-14 Nov 2003



**25 participants from 13 countries - Niger, Burkina Faso, Ivory Coast, Senegal, Gambia, Cape Verde, Benin, Togo, Ghana, Mauritania, Mali, Cameroon, Nigeria**

- Bangkok 10-14 Nov 2003



**36 participants from 16 countries - Thailand, Iran, Vietnam, Nepal, Sri Lanka, China, Cambodia, Philippines, Mongolia, Bangladesh, Myanmar, Bhutan, Bangladesh, Indonesia, India, Laos**

## GLCN Workshops – undertaken

- South America Nov 2004



**Participants  
from 20 countries**

- Southern Africa December 2004



**Participants from  
approx. 13 countries**

## GLCN Workshops – planned

- North Africa/Middle East March 2005



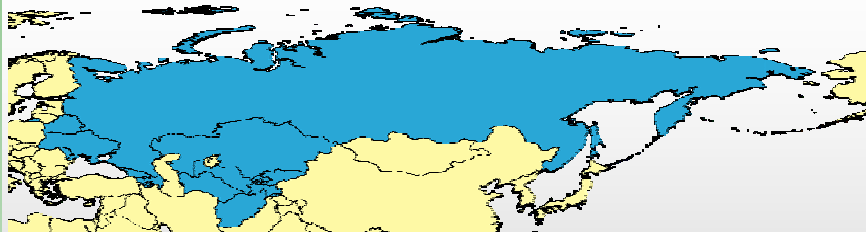
**Participants from  
18 countries**

- Central America October 2005



**Participants  
from approx. 12  
countries**

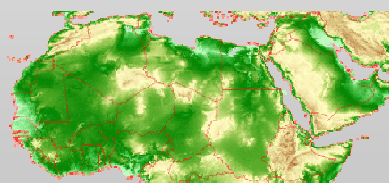
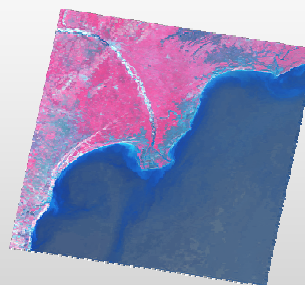
## GLCN Workshops – planned



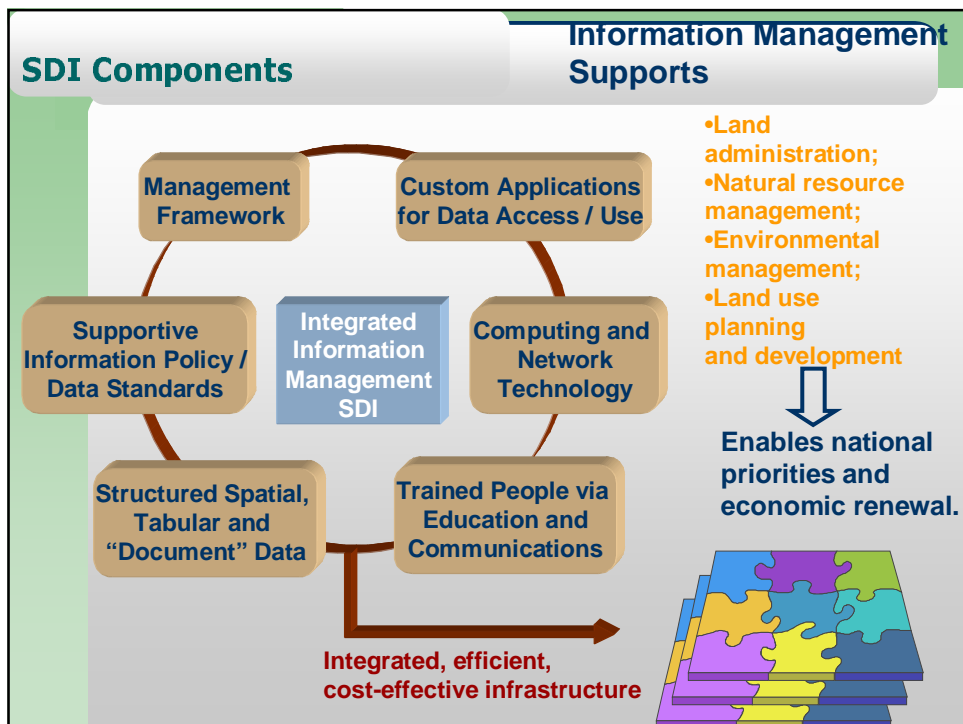
- NIS/CIS states (end 2005)
  - Afghanistan
  - Armenia
  - Azerbaijan, Republic of
  - Belarus
  - Georgia
  - Kazakhstan
  - Kyrgyzstan
  - Moldova, Republic
  - Russian Federation
  - Tajikistan
  - Turkmenistan
  - Ukraine
  - Uzbekistan

## GLCN Data Distribution

- Among the outreach activities promoted by GLCN is the data distribution of:
- **Historical High Resolution Satellite Imagery** - Global set of Landsat images (all bands) - Sensors
  - MSS
  - TM
  - ETM+
- **SRTM DEM**: Global coverage of Shuttle Radar Topography Mission Digital (SRTM) elevation data.

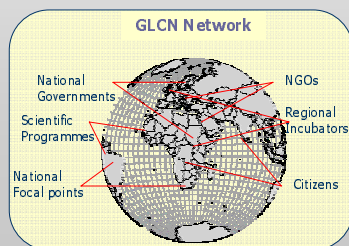






## Building a Global Coalition – Partnership - capturing global diversity

- A number of initiatives are already in existence
- No single entity at national, regional or international level can undertake this task alone
- Added-value for synergy and harmonization
- Key partners: governments, industry, academic institutions, in addition to operational programmes and organizations (Participating agencies in this workshop are invited to become active participants in this process and to become engaged as national and sometimes regional incubators for implementation, outreach and standards adoption)



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GLOBAL LAND COVER NETWORK




## Partners and Donors

- FAO
- UNEP
- IAO


- Italian Cooperation
- Government of the Netherlands



- Government of the Czech Republic
- Government of Libya
- Government of USA



- Government of India
- Government of Brazil
- Government of South Africa



## Thank you







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