Statistics Division

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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Statistics Division

Food and Agriculture Organization of the United Nations(FAO)

# Workshop on Environment Statistics

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# FAO Land Use Statistics

→ The Food and Agriculture Organization of the United Nations (FAO) collects and disseminates information related to the subject areas

-among them natural resources, land use, agriculture and forestry.

→ The organization collects country information through a handful of different reporting processes

-compiles it as global data sets,
-available in periodically published reports
- FAO websites.

→ FAO is considered as the main authoritative source of information

- land use
-agriculture and forestry at global and regional level
- data published by the organization is widely used for many different purposes

# Presentation will cover

→ FAO Land Use database
- -Data sources
- -Updates
- -Accessibility
- -International vs Country data

→ Land use/Land cover classification
- -Sources of data
- -Land registers
- -Remote sensing(Agriculture and Forestry)

→ Statistics on Land tenure

# *FAOSTAT data on land use and land use changes*

- The global data set on land use maintained by FAO is published through the corporate statistics Website at FAOSTAT (http://faostat.fao.org).

- It is updated annually, and contains a chronological time series since 1961

- contain a large number of classes and subclasses of agriculture land, for which data are annually collected through a questionnaire sent to countries

# *FAOSTAT data on land use and land use changes*

- FRA 2005 collected information from more than 40 variables and for three points in time:
- 1990, 2000 and 2005

- FRA 2005 data are available for viewing and download at www.fao.org/forestry/fra2005.

- A CD-ROM is also available for free upon request

# Session6:Land resources

Total land area=Agriculture Area+Forest Area+Other Woodedland+Other Land.

**Concept of Land**

"

- A delineable area of the earth's terrestrial surface, embracing all attributes of the biosphere immediately above or below this surface,
- including those of the near surface climate, the soil and terrain forms,
- the surface hydrology including shallow lakes, rivers, marshes, and swamps,
- the near-surface sedimentary layers and associated groundwater and geohydrological reserves,
- the plant and animal populations,
- the human seulement pattern and physical results of past and present human activity, terracing, water storage or drainage structures, roads, buildings, etc. FAO,1995.

# Land Use

**Land use**: the sequence of operations carried out with the purpose to obtain goods and services from the land, characterized by the actual goods and services obtained as well as by the particular management interventions undertaken by the land users

Land use is generally determined by **socio-economic** market forces and the **biophysical** constraints and potentials imposed by the land resource

Information on the land use can be indirectly derived from agricultural census data, land cover information and from maps of the biophysical resource

**Few global databases are available** that allow the characterization of the land management interventions themselves

**Land use is the single most important driver of land degradation** as it focuses on interventions on the land which directly affect its status and impacts on goods and services

# The need for Land use information

**Land use information is required at three levels:**

- **Local level- physical planning and land management**
- **National level- resource policy and management,**
  **-planning for future use of land**
  **-for protection of the environment**
- **International level-**
  **-comparative descriptions and analysis of national patterns,**
  **-extending and monitoring assistance programmes**
- The information on current LU (and land resources) is needed for formulating changes leading to sustainable use of the resources

# The need for Land use information

**Major national development sectors in DCs**

**Policy formulation and planning**

- Natural resources and the environment (agriculture, agro-industries, forestry, minerals, water, fisheries,..)
- Human resources (e.g. education, health services and infrastructure)
- Prevention and mitigation of natural disasters and military conflicts
- Crime prevention
- Biofuel production

# Functional approach to land use :

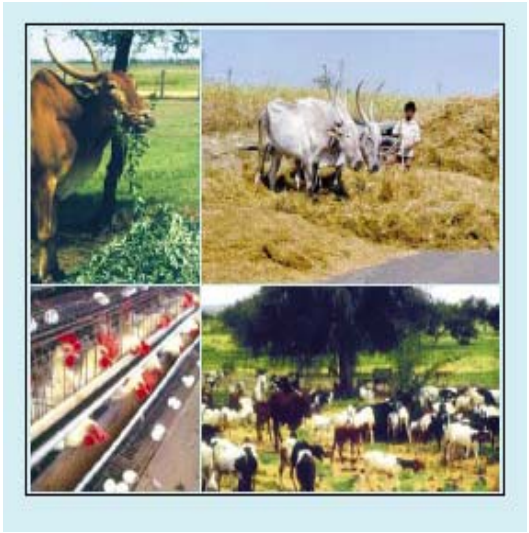
agriculture

forestry


"the description of land in terms of its socio-economic purpose" defined to be applicable for all land use purposes such as agriculture, forestry, residential, etc. (Duhamel, 1998).

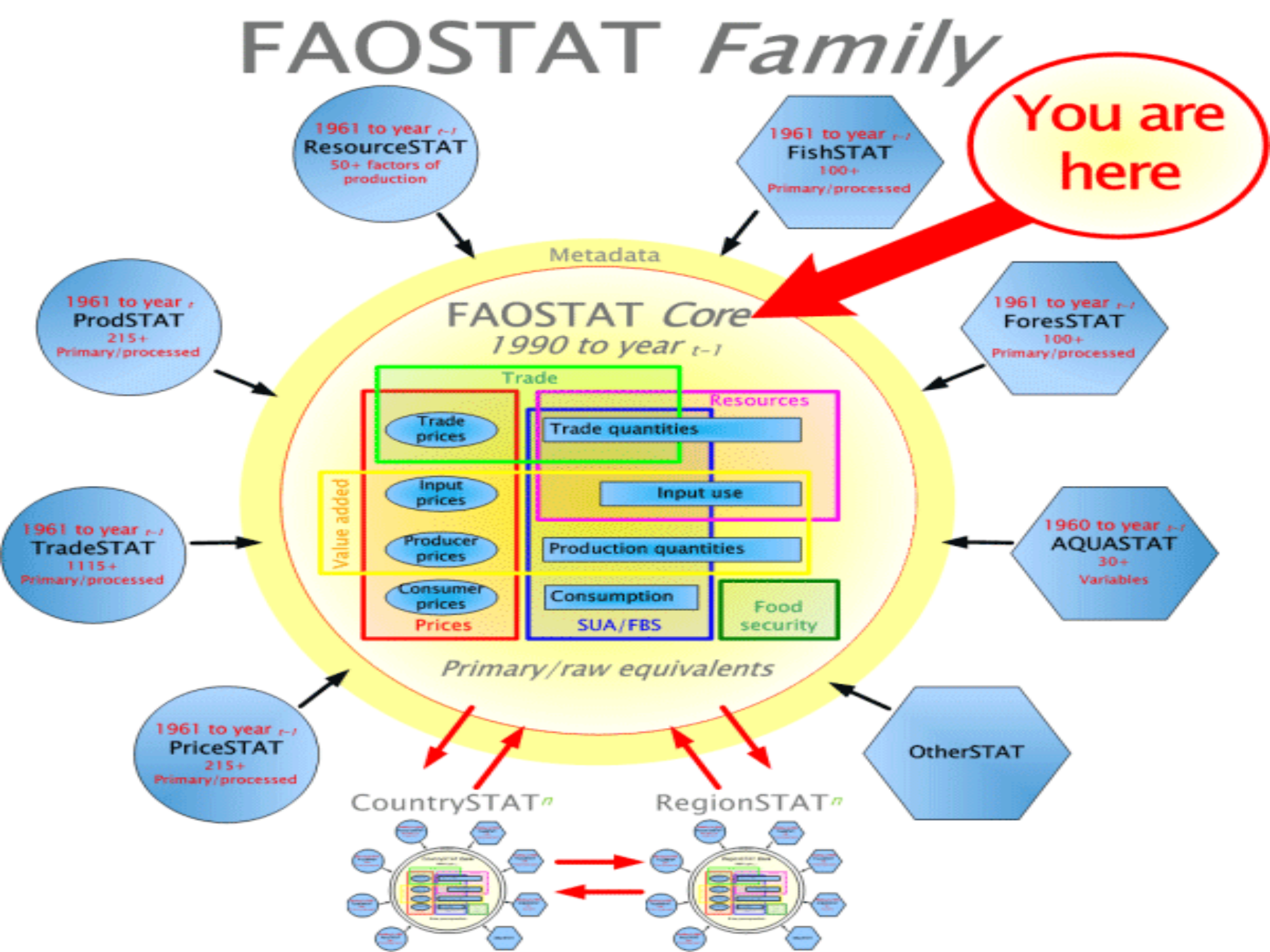
functional uses of land can be made at a single point in time or over a shortened period of time.

# Sequential approaches to land use



:

- **The approach defines land use as “a series of operations on land, carried out by humans, with the intention to obtain products and/or benefits through using land resources.” (Duhamel, 1998).**
- **By definition, the sequential approach requires observation over an extended period of time.**
- **Classification system devised by Mücher, Stomph and Fresco in 1993 (Duhamel, 1998).**


FAOSTAT Family
You are here
1961 to year t-1
ResourceSTAT
50+ factors of production
1961 to year t-1
FishSTAT
100+
Primary/processed
Metadata
1961 to year t
ProdSTAT
215+
Primary/processed
FAOSTAT Core
1990 to year t-1
1961 to year t-1
ForesSTAT
100+
Primary/processed
Trade
Resources
Trade prices
Trade quantities
Input prices
Input use
Value added
Producer prices
Production quantities
Consumer prices
Consumption
Prices
SUA/FBS
Food security
1961 to year t-1
TradeSTAT
1115+
Primary/processed
1960 to year t-1
AQUASTAT
30+
Variables
Primary/raw equivalents
1961 to year t-1
PriceSTAT
215+
Primary/processed
OtherSTAT
CountrySTATn
RegionSTATn

# FAO LAND RESOURCES STATISTICAL DATABASE

- Since 2002 data is compiled through a new integrated Resource Questionnaire recently developed by the FAO Statistics Division.
- The land resource questionnaire covers four main areas:

1. Land use and Irrigation
2. Land use – Plantations
3. Land prices
4. Metadata.

# Data collection is based on a new land use classification system.

- The first digit classifies the land into four classes
- At the second digit level, the classification goes into details areas that are more relevant for land use classification
- Some areas of the four main classes even go further to the third digit level with respect to further details of specific land use

# AGRICULTURAL RESOURCES - LAND USE AND IRRIGATION (000 Ha)

- Please report Land use data according to the classification listed in the questionnaire. However, if a different classification and land definitions have been used, please explain the differences in the NOTES column
  (or by adding a supplementary information sheet).
- For Land use categories description and other important instructions, please refer to the "Explanatory notes" and "Instructions" sheets.

| FAO CODE | LAND CATEGORIES | FORMULAS | 2002 | 2003 | 2004 | 2005 | 2006 | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | (000 Ha) | (000 Ha) | (000 Ha) | (000 Ha) | (000 Ha) | |
| | **Land use** | | | | | | | |
| 1A | Country area (1) | (1)=(2)+(21) | | | | | | |
| 1 | Land area (2) | (2)=(3)+(18)+(19)+(20) | | | | | | |
| 1.1 | Agricultural area (3) | (3)=(5)+(14) | | | | | | |
| 1.1.0 | Agricultural area irrigated (4) | (4)=(8)+(10)+(13)+(16) | | | | | | |
| 1.1.a | Arable land and Permanent crops (5) | (5)=(6)+(12) | | | | | | |
| 1.1.1 | Arable land (6) | (6)=(7)+(9)+(11) | | | | | | |
| 1.1.1.1 | Temporary crops (7) | | | | | | | |
| 1.1.1.1.1 | Temporary crops irrigated (8) | | | | | | | |
| 1.1.1.2 | Temporary meadows and pastures (9) | | | | | | | |
| 1.1.1.2.1 | Temporary meadows and pastures irrigated (10) | | | | | | | |
| 1.1.1.3 | Fallow land (temporary: less than 5 years) (11) | | | | | | | |

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| FAO CODE | LAND CATEGORIES | FORMULAS | 2002 | 2003 | 2004 | 2005 | 2006 | NOTES |
|---|---|---|---|---|---|---|---|---|
| | | | (000 Ha) | (000 Ha) | (000 Ha) | (000 Ha) | (000 Ha) | |
| | **Land use** | | | | | | | |
| 1.1.2 | Permanent crops (12) | | | | | | | |
| 1.1.2.1 | Permanent crops irrigated (13) | | | | | | | |
| 1.1.3 | Permanent meadows and pastures (14) | (14)=(15)+(17) | | | | | | |
| 1.1.3.a | Permanent meadows and pastures - Cultivated (more than 5 years) (15) | | | | | | | |
| 1.1.3.1 | Permanent meadows and pastures - Cultivated and irrigated (16) | | | | | | | |
| 1.1.3.b | Permanent meadows and pastures - Naturally grown (17) | | | | | | | |
| 1.2 | Forest area (18) | | | | | | | |
| 1.3 | Other wooded land (19) | | | | | | | |
| 1.4 | Other land (20) | | | | | | | |
| 2 | Inland water (21) | | | | | | | |

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  (or by adding a supplementary information sheet).
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| FAO CODE | LAND CATEGORIES | FORMULAS | 2002 (000 Ha) | 2003 (000 Ha) | 2004 (000 Ha) | 2005 (000 Ha) | 2006 (000 Ha) | NOTES |
|---|---|---|---|---|---|---|---|---|
| | **Land use** | | | | | | | |
| 2 | Inland water (21) | | | | | | | |
| | **Area equipped for Irrigation** | | | | | | | |
| 3 | Total area equipped for irrigation (22) | (22)=(23)+(24)+(25)+(26) | | | | | | |
| 3.1 | Arable land area equipped for irrigation (23) | | | | | | | |
| 3.2 | Permanent crops area equipped for irrigation (24) | | | | | | | |
| 3.3 | Permanent meadows and pastures area - Cultivated and equipped for irrigation (25) | | | | | | | |
| 3.4 | Other land area equipped for irrigation (26) | | | | | | | |
| | **Total planted area** | | | | | | | |
| 4 | Gross planted area (27) | | | | | | | |
| 4.1 | Net planted area (28) | | | | | | | |

**General comments/notes on this section**

# FAO land use data

- FAO land use data are significant for conducting studies from various perspectives on
- agricultural production,
- food security;
- deriving cropping intensity and feasibility for sustainable  agricultural development
- deriving land use indicators for measuring countries agricultural practices in view of sustainability  and environmental conditions.

| REGIONAL | INDICATOR | Unit | Av. 2000-02 | Av. 2003-05 |
|---|---|---|---|---|
| World | Agric Area/Country Area | (%) | 37 | 37 |
| World | ArL PermCr/Agric Area | (%) | 31 | 31 |
| World | Arable land/Agric Area | (%) | 28 | 29 |
| World | Perm Crops/Agric Area | (%) | 3 | 3 |
| World | Perm Past/Agric Area | (%) | 69 | 69 |
| Africa | Agric Area/Country Area | (%) | 37 | 38 |
| Africa | ArL PermCr/Agric Area | (%) | 20 | 21 |
| Africa | Arable land/Agric Area | (%) | 18 | 18 |
| Africa | Perm Crops/Agric Area | (%) | 2 | 2 |
| Africa | Perm Past/Agric Area | (%) | 80 | 79 |
| Sub-Saharan Africa (Excl. S.A.) | Agric Area/Country Area | (%) | 40 | 40 |
| Sub-Saharan Africa (Excl. S.A.) | ArL PermCr/Agric Area | (%) | 19 | 20 |
| Sub-Saharan Africa (Excl. S.A.) | Arable land/Agric Area | (%) | 17 | 18 |
| Sub-Saharan Africa (Excl. S.A.) | Perm Crops/Agric Area | (%) | 2 | 2 |
| Sub-Saharan Africa (Excl. S.A.) | Perm Past/Agric Area | (%) | 81 | 80 |
| Sub-Saharan Africa (Incl. S.A.) | Agric Area/Country Area | (%) | 42 | 42 |
| Sub-Saharan Africa (Incl. S.A.) | ArL PermCr/Agric Area | (%) | 19 | 20 |
| Sub-Saharan Africa (Incl. S.A.) | Arable land/Agric Area | (%) | 17 | 18 |
| Sub-Saharan Africa (Incl. S.A.) | Perm Crops/Agric Area | (%) | 2 | 2 |
| Sub-Saharan Africa (Incl. S.A.) | Perm Past/Agric Area | (%) | 81 | 80 |
| North Africa | Agric Area/Country Area | (%) | 17 | 17 |
| North Africa | ArL PermCr/Agric Area | (%) | 28 | 28 |
| North Africa | Arable land/Agric Area | (%) | 24 | 23 |
| North Africa | Perm Crops/Agric Area | (%) | 4 | 5 |
| North Africa | Perm Past/Agric Area | (%) | 72 | 72 |

# Current status of data availability (2001-2005)

| Land category | Number of Official data | % Official data on total data | Number of Unofficial data | % of Unofficial data on total data | Number of Estimated data | % of Estimated data on total data | Number of countries reporting official data | Total Reporting countries |
|---|---|---|---|---|---|---|---|---|
| **Africa (57 countries in the L.U. database)** | | | | | | | | |
| Agricultural area | 20 | 7.1 | - | - | 260 | 92.9 | 6 | 56 |
| Arable land | 23 | 8.1 | - | - | 257 | 91.8 | 9 | 56 |
| Permanent crops | 33 | 12.5 | - | - | 232 | 87.5 | 10 | 53 |
| Permanent meadows and pastures | 31 | 11.5 | - | - | 239 | 88.5 | 10 | 54 |
| Total area equipped for irrigation | 6 | 2.3 | 21 | 8.1 | 233 | 89.6 | 4 | 52 |
| **North and Central America (36 countries in the L.U. database)** | | | | | | | | |
| Agricultural area | 20 | 11.1 | - | - | 160 | 88.9 | 10 | 36 |
| Arable land | 13 | 7.4 | - | - | 162 | 92.6 | 7 | 35 |
| Permanent crops | 16 | 11.4 | - | - | 124 | 88.6 | 8 | 28 |
| Permanent meadows and pastures | 16 | 10.3 | - | - | 139 | 89.7 | 9 | 31 |
| Total area equipped for irrigation | 6 | 5.5 | 4 | 3.6 | 100 | 90.9 | 5 | 22 |

# Current status of data availability (2001-2005)

| Land category | Number of Official data | % Official data on total data | Number of Unofficial data | % of Unofficial data on total data | Number of Estimated data | % of Estimated data on total data | Number of countries reporting official data | Total Reporting countries |
|---|---|---|---|---|---|---|---|---|
| **South America (14 countries in the L.U. database)** | | | | | | | | |
| Agricultural area | 14 | 20.0 | - | - | 56 | 80.0 | 7 | 14 |
| Arable land | 9 | 13.8 | - | - | 56 | 86.2 | 3 | 13 |
| Permanent crops | 11 | 16.9 | - | - | 54 | 83.1 | 4 | 13 |
| Permanent meadows and pastures | 21 | 30.0 | - | - | 49 | 70.0 | 6 | 14 |
| Total area equipped for irrigation | 2 | 3.1 | 1 | 1.5 | 62 | 95.4 | 2 | 13 |
| **Asia (51 countries in the L.U. database)** | | | | | | | | |
| Agricultural area | 60 | 24.0 | - | - | 190 | 76.0 | 15 | 50 |
| Arable land | 66 | 26.4 | 2 | 0.8 | 182 | 72.8 | 21 | 50 |
| Permanent crops | 80 | 32.0 | 11 | 4.4 | 159 | 63.6 | 25 | 50 |
| Permanent meadows and pastures | 57 | 24.3 | 2 | 0.9 | 176 | 74.9 | 19 | 47 |
| Total area equipped for irrigation | 62 | 26.4 | 1 | 0.4 | 172 | 73.2 | 16 | 47 |

# Current status of data availability (2001-2005)

| Land category | Number of Official data | % Official data on total data | Number of Unofficial data | % of Unofficial data on total data | Number of Estimated data | % of Estimated data on total data | Number of countries reporting official data | Total Reporting countries |
|---|---|---|---|---|---|---|---|---|
| **Europe (43 countries in the L.U. database)** | | | | | | | | |
| Agricultural area | 128 | 61.0 | 3 | 1.4 | 79 | 37.6 | 35 | 42 |
| Arable land | 161 | 76.7 | 7 | 3.3 | 42 | 20.0 | 35 | 42 |
| Permanent crops | 147 | 81.7 | 8 | 4.4 | 25 | 13.9 | 33 | 36 |
| Permanent meadows and pastures | 157 | 80.5 | 3 | 1.5 | 35 | 17.9 | 35 | 39 |
| Total area equipped for irrigation | 57 | 32.6 | 1 | 0.5 | 117 | 66.9 | 20 | 35 |
| **Oceania (27 countries in the L.U. database)** | | | | | | | | |
| Agricultural area | 7 | 6.4 | - | - | 103 | 93.6 | 3 | 22 |
| Arable land | 6 | 6.0 | - | - | 94 | 94.0 | 3 | 20 |
| Permanent crops | 9 | 8.6 | - | - | 96 | 91.4 | 3 | 21 |
| Permanent meadows and pastures | 6 | 8.0 | - | - | 69 | 92.0 | 3 | 17 |
| Total area equipped for irrigation | 10 | 40.0 | - | - | 15 | 60.0 | 3 | 5 |

# LAND USE AND LAND COVER DATA

## *FAOSTAT databases*

- Is a main source for country level data on agricultural land and forests, and other wooded land is


http://faostat.fao.org/default.aspx

FAOSTAT provides access to over 3 million time-series and cross sectional data relating to food and agriculture. FAOSTAT contains data for 200 countries and more than 200 primary products and inputs, just in its core.

The national version of FAOSTAT, **CountrySTAT**, is being implemented in about 20 countries and three regions. It offers a two-way bridge amongst sub national, national, regional and international statistics on food and agriculture.

**The following subject domains are updated annually-**
**Production,**
**Trade,**
**Supply Utilization Accounts,**
**Food Balance Sheets,**
**Producer prices,**
**Trade unit values**
**Fertilizers.**

# National level LU and LC statistics

| | | | |
|---|---|---|---|
| LU | Agricultural land | | Ministry of Agriculture/NSO |
| LC | Forest and other wooded land | | Department of Forests |
| LU | Built-up and related land | | Urban & regional Planning |
| LC | Open land | Wet (no vegtn.) | Ministry of Natural Resources |
| | | Dry (with special vegtn. <2m) | |
| | | n.e.s (with no vegtn) | |
| LC | Waters | | Department of Fisheries<br>Ministry of Natural Resources |

*UNSD questionnaire/FAO Resources questionnaires,for example*

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# Problems and difficulties compiling and processing global information from national data

- Definitions used by reporting countries vary considerably and items classified under the same category often relate to differing kinds of land (e.g. pasture and woodland).
- Definition of “Arable land” used by most countries refers to the land that is potentially cultivable, whereas the FAO's definition refers to land under temporary crops, meadow and pasture

# Problems and difficulties processing...

Fallow areas sometimes counted under arable land, these are :

- i) land that has been left idle in the current crop season to improve the productivity of the land
- ii) land that is left fallow for a longer time period and for which no cultivation activity has been planned

# Problems and difficulties processing...

- Data on agro-forestry, fallow areas, pasture and shifting cultivation are very rarely available and are very often mixed-up with arable land, grasslands or forest land
- The multiple-use characteristics of grasslands and forest lands presents a high degree of complexity in a land classification system (agro-forestry, plantation, grazing)

# Problems and difficulties processing...

- Wooded land is applied by some countries to refer to ‘woodland’. In most developed countries, animals graze in these areas. Statistically, the areas where animals graze are classified as pasture.

- The definition of land with tree cover is a source of confusion, particularly when data provided is collected from remote sensing or maps. It is not clear for some countries how to classify fruit trees plantation (olive plantation), rubber plantation and forest trees to produce nuts (Pinus pinea).

# Problems and difficulties processing

- ‘Other land’ does not always refer to the same type of land in different classifications.

- Quantity and quality of data collected were often hindered by the lack of satisfactory cooperation between the statistical offices and the ministries/authorities responsible for environmental issues in the countries.

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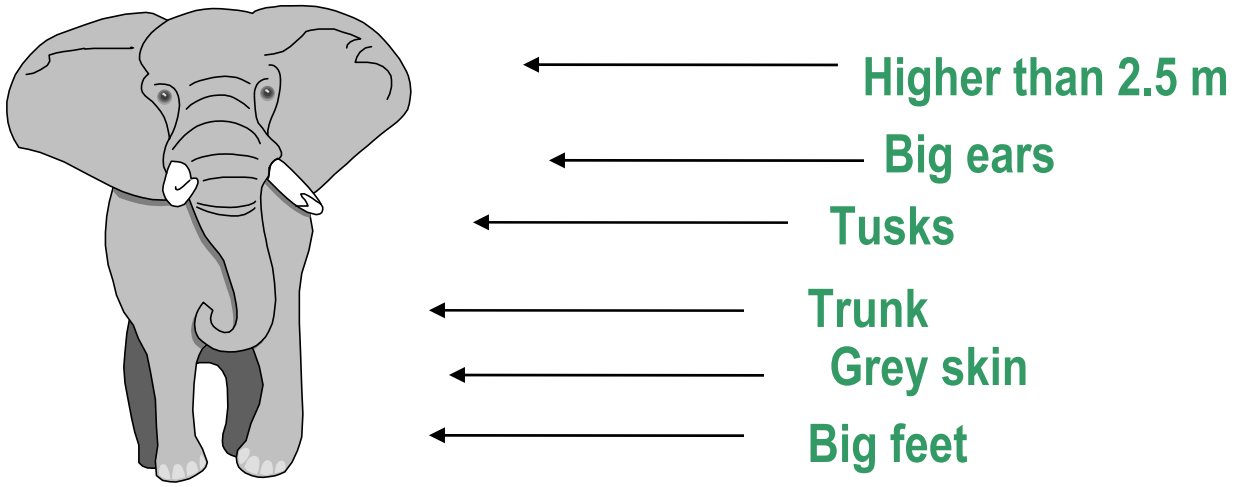
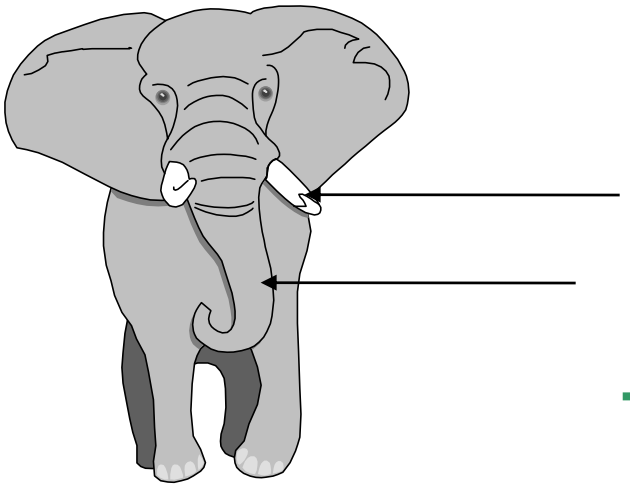
# *Concepts, methods & classifications*

**For Example:**

If an elephant needs to be described, all the possible features may be used



If an elephant needs to be classified, only a few elements should be used, i.e., those that allow a clear identification:



**Tusks**

**Trunk**

All other attributes of the elephant can be linked in the database to these two distinctive features.

# Principles of classification

- cover total area of land needs to be classified,
- categories of classification should not overlap,
- take into account the multi-purpose nature of land use,
- based on a clear and systematic description of the class,
- spatially and temporally consistent,
- independent from scale and data collection tools,
- classification should not be confused with legends,
- comprehensive rules for describing and naming classes.

(e.g. Eurostat 1991, Young 1992, FAO 1996, LANES 1997, Di Gregorio and Jansen, 1997, Duhamel 1998).

# Land classification

- Used as a guide for collecting selected information on land relevant for decision making
  - policy formulation; environmental monitoring (e. land degradation); .....
- Systematic arrangement ; grouping by similar characteristics
  - land cover (bio-physical cover) (LCCS-FAO)
  - land use (purpose: goods and services, inputs, management

# National LU classification systems

- Generally, 'a priori' systems (Classes defined before data collection

## Reasons for updating many national systems

- Incomplete inventories of existing land uses
- Insufficient consistency and precision in categorizing land uses
- Greater user expectations of data content (must support an increasing range of LU applications e.g. site selection, taxation, environmental impact assessment, ..)
- inadequate standards for data collection (at times related to lack of inter-agency cooperation) and data sharing
- outdated data inventory methodologies that do not exploit GIS, databases and other modern information technologies

# FAO Land Cover Classification System (LCCS

- answer to the needs of a variety of users focusing on mapping exercises, independent of the scale or means used to map
- it enables a comparison of land cover classes regardless of data source, thematic discipline or country
- support to on-going initiatives on classifications and land cover at international level (Duhamel, 1989)
- LCCS,2005

# The new land use classification proposed FAOSTAT relate to:

- Land use classification is used as a guide for collecting information on land with the objective of creating an effective database Total Area (including area under inland water bodies),
- that provides the information required for various agricultural and environmental purposes Land Area (excluding area under inland water bodies),
- assessing land production potentials, monitor land use changes and human impact on the land, soil degradation and many other damaging effects at different level Agricultural area,
- Land use Database properly developed will serve numerous purposes on national, regional and international levels.
- **source:FAO-ESS,November 2005-Proposal for FAOSTAT Land Use classification**

# Comparative table of the land use classifications

| WCA 2000 | FAOSTAT 2000 | FAOSTAT 2005 | UNSD/UNEP | UN-ECE | FRA | FAOSTAT (New proposal) |
|---|---|---|---|---|---|---|
| | Total area | | | | | Country area |
| | Land area | | | | | Land area |
| **Agricultural land** | **Agricultural area** | | **Agricultural land** | **Agricultural land** | | **Agricultural land** |
| Cultivated land | | | | | | |
| Cropland | | | | | | |
| Arable land | Arable land and permanent crops | | Arable land | | | Arable land |
| | Arable land | Temporary crops | | | | Temporary crops (1)Irrigated, (2) Non Irrigated. |
| | | Temporary meadows | | | | Temporary meadows and pastures. (1)Irrigated, (2) Non Irrigated. |
| | | Land temporarily fallow | | | | Fallow land |
| Land under permanent crop- in open air | Permanent crops | Permanent crops | Land under permanent crops | | | Permanent crops. (1)Irrigated, (2) Non Irrigated. |

# Comparative table of the land use classifications

| WCA 2000 | FAOSTAT 2000 | FAOSTAT 2005 | UNSD/UNEP | UN-ECE | FRA | FAOSTAT (New proposal) |
|---|---|---|---|---|---|---|
| Land under permanent meadows and pastures:<br>(1) Cultivated<br>(2) Naturally grown | Permanent meadows | Permanent meadows and pastures | Land under permanent meadows and | | | Permanent meadows and pastures. |
| Land temporarily fallows | | | Fallow and other agricultural land | | | |
| All other arable land | | | | | | |
| Land under protective cover. (1) Temporary crops, (2) Permanent crops | | | | | | |

# Comparative table of the land use classifications

| WCA 2000 | FAOSTAT 2000 | FAOSTAT 2005 | UNSD/UNEP | UN-ECE | FRA | FAOSTAT (New proposal) |
|---|---|---|---|---|---|---|
| | | **Forest (or) other wooded land** | **Forest** | **Forest** | **Forest** | **Forest** |
| | | | | | | Natural forests: (1)Broadleaved forest, (2) Coniferous forest, |
| | | | | | | (3) Bamboos/Palm |
| | | | | | | (4) Mixed forest |
| | | | | | | Forest plantations: |
| | | | | | | (1) Broadleaved plantation |
| | | | | | | (2) Coniferous plantation |
| | | | Other wooded land | Other wooded land | Other wooded land | Other wooded land: |
| | | | | | | (1) Shrubs |
| | | | | | | (2) Forest fallow. |

# Comparative table of the land use classifications

| WCA 2000 | FAOSTAT 2000 | FAOSTAT 2005 | UNSD/UNEP | UN-ECE | FRA | FAOSTAT (New proposal) |
|---|---|---|---|---|---|---|
| | | **Other land** | **Built-up and related land** | **Built-up and related land** | **Other land** | **Built-up and related land** |
| | | | Wet open land | Wet open land | | Wet open land |
| | | | Dry open land with special vegetation cover | Dry open land with special vegetation cover | | Dry open land with special vegetation cover |
| | | | Open land without, or with insignificant, vegetation cover | Open land without or with insignificant vegetation cover | | Open land without, or with insignificant, vegetation cover |
| | | | Total land area | | | |
| | | | **Waters** | **Waters** | **Inland water bodies** | **Waters** |

# FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS - STATISTICS DIVISION

## AGRICULTURAL RESOURCES - LAND USE AND IRRIGATION (000 Ha)

- Please report Land use data according to the classification listed in the questionnaire. However, if a different classification and land definitions have been used, please explain the differences in the NOTES column
  (or by adding a supplementary information sheet).
- For Land use categories description and other important instructions, please refer to the "Explanatory notes" and "Instructions" sheets.

| FAO CODE | LAND CATEGORIES | FORMULAS | 2003 (000 Ha) | 2004 (000 Ha) | 2005 (000 Ha) | 2006 (000 Ha) | 2007 (000 Ha) | NOTES |
|---|---|---|---|---|---|---|---|---|
| | **Land use** | | | | | | | |
| 1A | Country area (1) | (1)=(2)+(21) | | | | | | |
| 1 | Land area (2) | (2)=(3)+(18)+(19)+(20) | | | | | | |
| 1.1 | Agricultural area (3) | (3)=(5)+(14) | | | | | | |
| 1.1.0 | Agricultural area irrigated (4) | (4)=(8)+(10)+(13)+(16) | | | | | | |
| 1.1.a | Arable land and Permanent crops (5) | (5)=(6)+(12) | | | | | | |
| 1.1.1 | Arable land (6) | (6)=(7)+(9)+(11) | | | | | | |
| 1.1.1.1 | Temporary crops (7) | | | | | | | |
| 1.1.1.1.1 | Temporary crops irrigated (8) | | | | | | | |
| 1.1.1.2 | Temporary meadows and pastures (9) | | | | | | | |
| 1.1.1.2.1 | Temporary meadows and pastures irrigated (10) | | | | | | | |
| 1.1.1.3 | Fallow land (temporary: less than 5 years) (11) | | | | | | | |

# FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS - STATISTICS DIVISION

## AGRICULTURAL RESOURCES - LAND USE AND IRRIGATION (000 Ha)

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| FAO CODE | LAND CATEGORIES | FORMULAS | 2003 (000 Ha) | 2004 (000 Ha) | 2005 (000 Ha) | 2006 (000 Ha) | 2007 (000 Ha) | NOTES |
|---|---|---|---|---|---|---|---|---|
| | **Land use** | | | | | | | |
| 1.1.2 | Permanent crops (12) | | | | | | | |
| 1.1.2.1 | Permanent crops irrigated (13) | | | | | | | |
| 1.1.3 | Permanent meadows and pastures (14) | (14)=(15)+(17) | | | | | | |
| 1.1.3.a | Permanent meadows and pastures - Cultivated (more than 5 years) (15) | | | | | | | |
| 1.1.3.1 | Permanent meadows and pastures - Cultivated and irrigated (16) | | | | | | | |
| 1.1.3.b | Permanent meadows and pastures - Naturally grown (17) | | | | | | | |
| 1.2 | Forest area (18) | | | | | | | |
| 1.3 | Other wooded land (19) | | | | | | | |
| 1.4 | Other land (20) | | | | | | | |
| 2 | Inland water (21) | | | | | | | |

Statistics Division

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

# FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS - STATISTICS DIVISION

## AGRICULTURAL RESOURCES - LAND USE AND IRRIGATION (000 Ha)

- Please report Land use data according to the classification listed in the questionnaire. However, if a different classification and land definitions have been used, please explain the differences in the NOTES column
  (or by adding a supplementary information sheet).
- For Land use categories description and other important instructions, please refer to the "Explanatory notes" and "Instructions" sheets.

| FAO CODE | LAND CATEGORIES | FORMULAS | 2003 (000 Ha) | 2004 (000 Ha) | 2005 (000 Ha) | 2006 (000 Ha) | 2007 (000 Ha) | NOTES |
|---|---|---|---|---|---|---|---|---|
| | **Land use** | | | | | | | |
| 2 | Inland water (21) | | | | | | | |
| | **Area equipped for Irrigation** | | | | | | | |
| 3 | Total area equipped for irrigation (22) | (22)=(23)+(24)+(25)+(26) | | | | | | |
| 3.1 | Arable land area equipped for irrigation (23) | | | | | | | |
| 3.2 | Permanent crops area equipped for irrigation (24) | | | | | | | |
| 3.3 | Permanent meadows and pastures area - Cultivated and equipped for irrigation (25) | | | | | | | |
| 3.4 | Other land area equipped for irrigation (26) | | | | | | | |
| | **Total planted area** | | | | | | | |
| 4 | Gross planted area (27) | | | | | | | |
| 4.1 | Net planted area (28) | | | | | | | |
| | **General comments/notes on this section** | | | | | | | |

| Actual code | Provisional code | Land use Classes | Definition |
|---|---|---|---|
| | | **Country area** | **Total area including land area and inland water bodies.** |
| 31 | 1 | Land area | Total area excluding area under inland water bodies. Inland water bodies generally includes major rivers and lakes. |
| **51** | **1.1** | **Agricultural Area** | **The sum of area under Elements "Arable land and "Permanent crops" and "Permanent pastures"** |
| 71 | 1.1.1 | Arable land | Land under elements "temporary crops", "temporary meadows", "kitchen garden', and "temporary fallow". Data for "Arable land" are not meant to indicate the amount of land that is potentially cultivable. |
| | 1.1.1.1 | Temporary crops | All land used for crops with a less than one-year growing cycle and which must be newly sown or planted for further production after the harvest. |
| 102 | 1.1.1.1.1 | Temporary crops irrigated | The same as 1.1.1.1 but irrigated. |
| | 1.1.1.1.2 | Temporary crops non irrigated | The same as 1.1.1.1 but non irrigated. |
| | 1.1.1.2 | Temporary meadows & pastures | Land cultivated for a period of less than five years for growing herbaceous forage crops for mowing or pasture. A period of less than 5 years is used to differentiate between temporary and permanent meadows. |
| | 1.1.1.2.1 | Temporary meadows & pastures irrigated | The same as 1.1.1.2 but irrigated. |
| | 1.1.1.2.2 | Temporary meadows &pastures non irrigated | The same as 1.1.1.2 but non irrigated. |
| 101 | 1.1.1.3 | Fallow land | Cultivated land that is not seeded for one or more growing seasons. The maximum idle season is less than five years. |

| Actual code | Provisional code | Land use Classes | Definition |
|---|---|---|---|
| 121 | 1.1.2 | Permanent crops | Land cultivated with crops that occupy the land for long periods and need not be replanted after each harvest, such as cocoa, coffee and rubber; this category includes land under flowering shrubs, fruit trees, nut trees and vines, but excludes land under trees grown for wood or timber (Forest land and wooded land). |
| | 1.1.2.1 | Permanent crops irrigated | The same as 1.1.2 but irrigated. |
| | 1.1.2.2 | Permanent crops non irrigated | The same as 1.1.2 but non irrigated. |
| 131 | 1.1. 3 | Permanent meadows & pastures | Land used permanently for grazing (five years or more) which includes herbaceous forage crops, either cultivated or growing wild (wild shrubs, wild prairie or grazing land). |
| | 1.1.3.1 | Permanent meadows & pastures irrigated | The same as 1.1.3 but irrigated. |
| | 1.1.3.2. | Permanent meadows & pastures non irrigated | The same as 1.1.3 but non irrigated. |

| Actual code | Provisional code | Land use Classes | Definition |
|---|---|---|---|
| **141** | **1.2** | **Forest Land** | **Land spanning more than 0.5 ha with trees higher than 5 m and a canopy cover of more than 10 % , or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.** |
| | 1.2.1 | Natural forest | Natural forests with natural and assisted natural regeneration are forests composed of indigenous trees, not planted by man. Or in other words forests excluding plantations. |
| | 1.2.1.1 | Broadleaved forest | Forest with predominance (more than 75 % of tree crown cover) of trees of broadleaved species. |
| | 1.2.1.2 | Coniferous forest | Forest with predominance (more than 75 % of tree crown cover) of trees of coniferous species. |
| | 1.2.1.3 | Bamboos/Palm | Forest on which more than 75% of the crown cover consists of tree species other than coniferous or broadleaved species (e.g. tree-form species of the bamboo, palm and fern families) |
| | 1.2.1.4 | Mixed forest | Forest in which neither coniferous, nor broadleaved, nor palms, nor bamboos, account for more than 75 percent of the tree crown cover. |
| | 1.2.2 | Forest plantation (Man made forest) | Forest stands established by planting or/and seeding in the process of afforestation or reforestation. |
| | 1.2.2.1 | Broadleaved plantation | Forest stands established by planting or/and seeding in the process of afforestation or reforestation with predominance of trees of broadleaved species. |
| | 1.2.2.2 | Coniferous plantation | Forest stands established by planting or/and seeding in the process of afforestation or reforestation with predominance of trees of coniferous species. |

| Actual code | Provisional code | Land use Classes | Definition |
|---|---|---|---|
| | **1.3** | **Other wooded land** | **Land not classified as "Forest", spanning more than 0.5 ha; with trees higher than 5 m and a canopy cover of 5-10 %, or with a combined cover of shrubs, bushes and trees above 10 %.** |
| | 1.3.1 | Shrubs | Refer to vegetation types where the dominant woody elements are shrubs i.e. woody perennial plants, generally of more than 0.5 m and less than 5 m in height on maturity and without a definite crown. |
| | 1.3.2 | Forest fallow | Refers to all complexes of woody vegetation deriving from the clearing of natural forest for shifting agriculture. |

| Actual code | Provisional code | Land use Classes | Definition |
|---|---|---|---|
| | **1.4** | **Other land** | **Land not classified as Agricultural land, Forest land and other wooded land.** |
| | 1.4.1 | Built-up and related land | Land under houses, roads, mines and quarries and any other facilities, including their auxiliary spaces, deliberately installed for the pursuit of human activities. |
| | 1.4.2 | Wet open land | Non-wooded sites either partially, temporarily or permanently water-logged, the water of which may be fresh, brackish or saline, on blanket or raised peatlands. The water may be either stagnant or running, and is usually shallow, especially if it is saline |
| | 1.4.3 | Dry open land with special vegetation cover | Non-wooded land which is covered by low vegetation (less than 2 metres). |
| | 1.4.4 | Open land without, or with insignificant, vegetation cover | Non-built up land the surface of which either is not covered at all by vegetation or scarcely covered by some vegetation, which precludes its inclusion in other categories of the classification. |
| | 2 | **Inland water** | **Area occupied by majors rivers, lakes and reservoirs.** |

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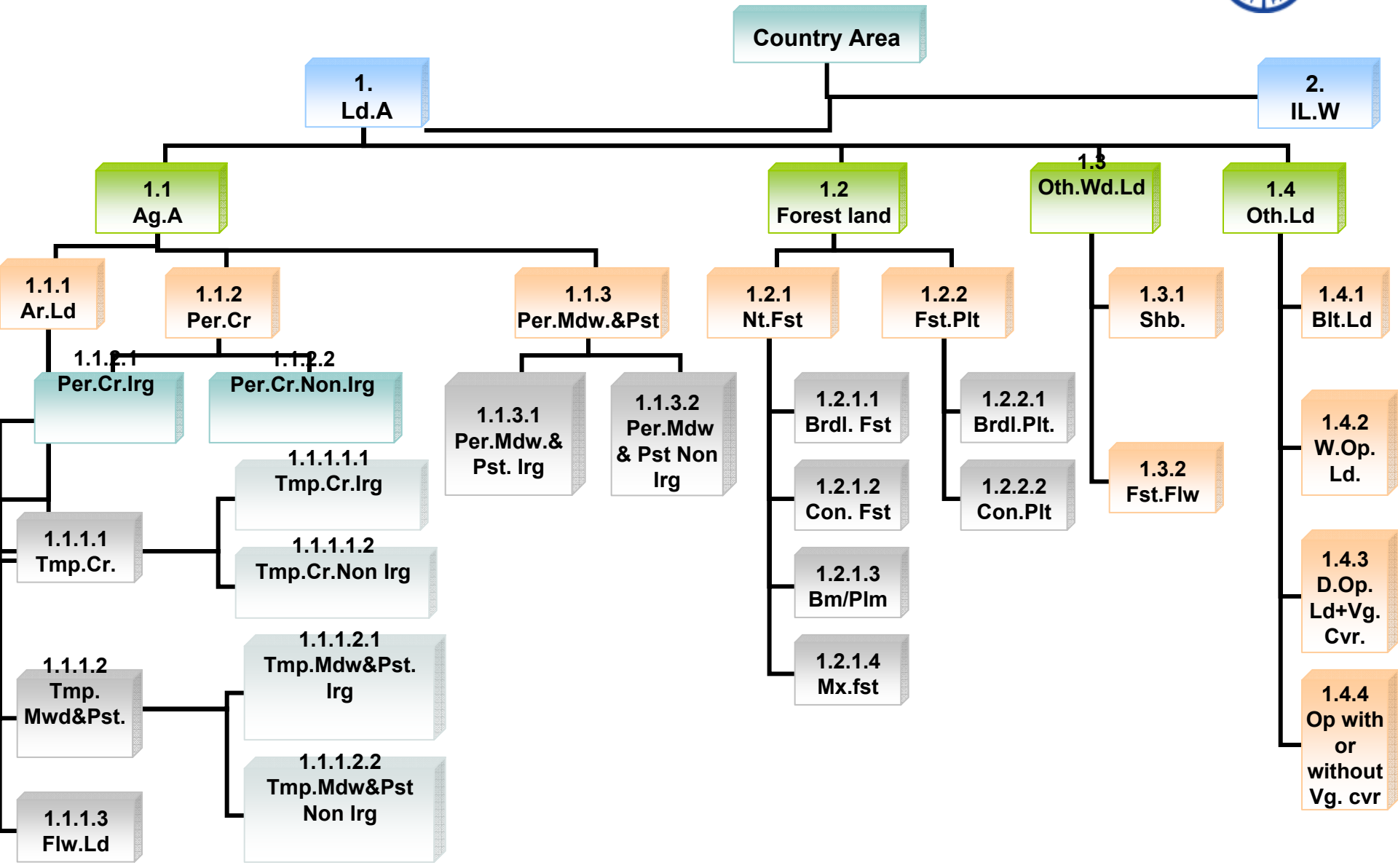


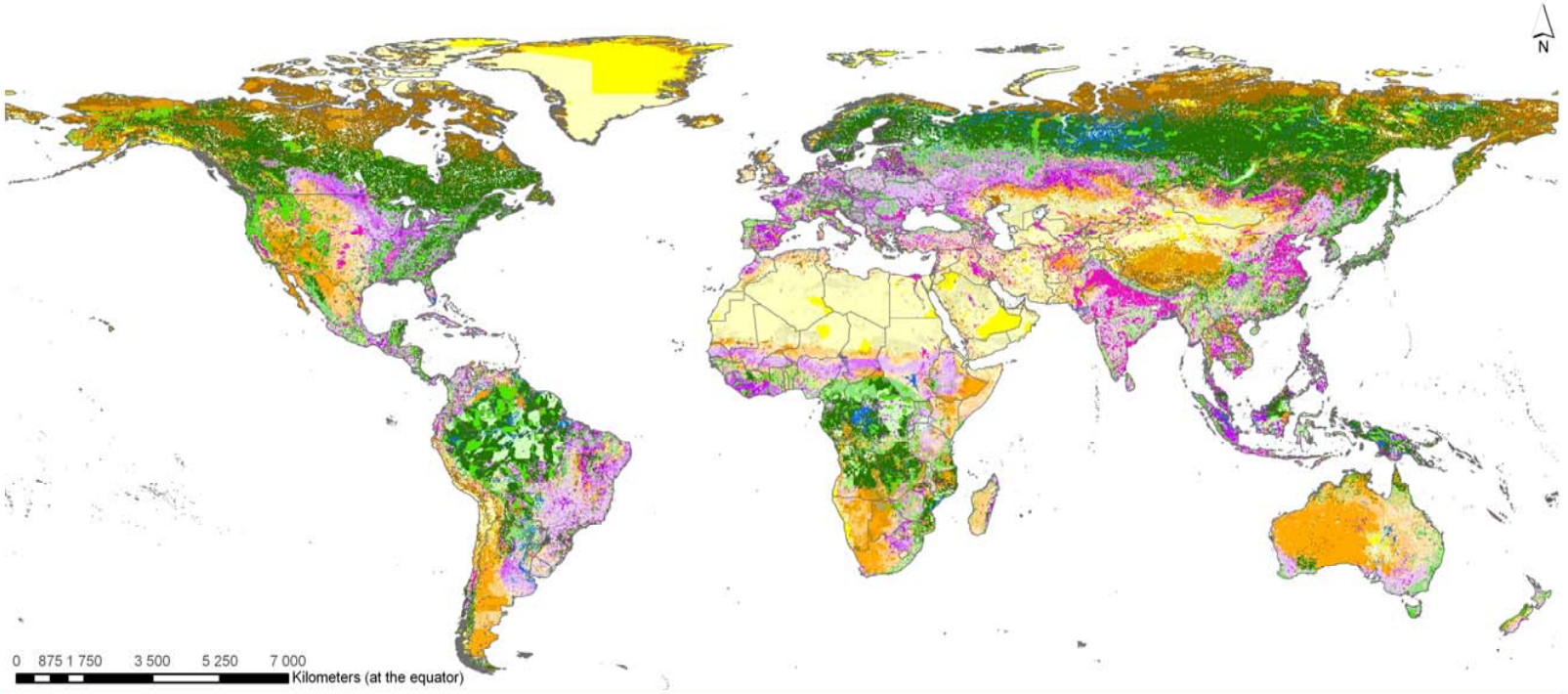
# Land Use Systems

- Classifications to draw up first approximation to streamline and to further harmonize international land use classification system. The classification proposed is a combination of the different concepts and definition used by the international organisations to ensure comparability and compatibility.

| LAND USE SYSTEMS | | | Climatic Ecosystem(s) | Land use Attributes | | | | Biophysical Attributes | | | | Socio economic Attributes | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID # | Ecosystem based on land cover | Major Land use | Ecosystem[1] | Livestock type | Dominant Crop type or group | Small scale irrigation | Crop Management index | Temperature regime class[2] | LGP class[3] | Dominant Soil Unit | Slope class | Population Density | Poverty Index |
| 1 | Forest | No use/ not managed (Natural) | | | | | | | | | | | |
| 2 | | Protected | | | | | | | | | | | |
| 3 | | Managed | | | | | L-M-H[4] | | | | | | |
| 4 | | Pastoralism if moderate or higher | | Livestock type | | | | | | | | | |
| 5 | | Agro forestry | | | Crop type | Yes/No | L-M-H | | | | | | |
| 6 | | Plantations | | | Crop type | Yes/No | L-M-H | | | | | | |
| 7 | Herbaceous | No use/not managed | | | | | | | | | | | |
| 8 | | Protected | | | | | | | | | | | |
| 9 | | Extensive pastoralism | | Livestock type | | | | | | | | | |
| 10 | | Mod. intensive pastoralism | | Livestock type | | | | | | | | | |
| 11 | | Intensive pastoralism | | Livestock type | | | | | | | | | |
| 12 | | Stable fed | | Livestock type | | | | | | | | | |
| 13 | Agricultural land | Rainfed agriculture (Subsistence/Commercial) | | Livestock type | Crop type | Yes/No | L-M-H | | | | | | |
| 14 | | Agro-pastoralism mod. intensive | | Livestock type | Crop type | Yes/No | L-M-H | | | | | | |
| 15 | | Agro-pastoralism intensive | | Livestock type | Crop type | | L-M-H | | | | | | |
| 16 | | Large scale Irrigation (>25% pixel size) | | | Crop type | | L-M-H | | | | | | |
| 17 | | Protected | | | | | L-M-H | | | | | | |
| 18 | Urban land | | | Livestock type | | | | | | | | | |
| 19 | Wetlands | No use/ not managed | | | | | | | | | | | |
| 20 | | Protected | | | | | | | | | | | |
| 21 | | Mangrove | | | | | | | | | | | |
| 22 | | Agro-pastoralism | | Livestock type | Crop type | | L-M-H | | | | | | |
| 23 | Bare areas | No use / not managed | | | | | | | | | | | |
| 24 | | Protected | | | | | | | | | | | |
| 25 | | Extensive pastoralism | | Livestock type | | | | | | | | | |
| 26 | | Mod. intensive pastoralism? | | Livestock type | | | | | | | | | |
| 27 | Open Water | No use/ not managed | | | | | | | | | | | |
| 28 | | Protected | | | | | | | | | | | |
| 29 | | Inland Fisheries | | | | | | | | | | | |

[1] Tropics, Subtropics summer rainfall, Mediterranean, Dry Subtropics, Temperate, Boreal, Polar, Deserts, Drylands, Sub-Humid, Humid, Per-humid, Mountainous
[2] See column 3 in Table 2
[3] Hyperarid, Arid, Dry semi arid, Moist semi arid, Sub-humid, Humid and Per-humid.
[4] L= low ; M= Medium; H= High.

# Land use systems of the world




Geographic Projection

## Land use systems

- 1 Forestry no use / not managed (Natural)
- 2 Forestry Protected areas
- 4 Forestry Pastoralism moderate or higher
- 5 Forestry Pastoralism moderate or higher with scattered plantations
- 6 Forestry Scattered Plantations
- 7 Herbaceous no use / not managed (Natural)
- 8 Herbaceous Protected areas
- 9 Herbaceous Extensive pastoralism
- 10 Herbaceous Mod. Intensive pastoralism
- 11 Herbaceous Intensive pastoralism
- 13 Rainfed Agriculture (Subsistence / commercial)
- 14 Agro-pastoralism Mod. Intensive
- 15 Agro-pastoralism Intensive
- 16 Agro-pastoralism mod. intensive or higher with Large scale irrigation
- 17 Agriculture Large scale irrigation (> 25% pixel size)
- 18 Agriculture Protected areas
- 19 Urban areas
- 20 Wetlands no use / not managed (Natural)
- 21 Wetlands Protected areas
- 22 Wetlands Mangroves
- 23 Wetlands Agro-pastoralism
- 24 Bare areas no use / not managed (Natural)
- 25 Bare areas Protected areas
- 26 Bare areas Extensive pastoralism
- 27 Bare areas Mod. Intensive pastoralism or higher
- 28 Water Coastal or no use / not managed (Natural)
- 29 Water Protected areas
- 30 Water Inland Fisheries
- Country boundaries



Reference: LADA, 2008. "Mapping Land Use Systems at global and regional scales for Land Degradation Assessment Analysis". Nachtergaele F. & Petri M. (under publication).

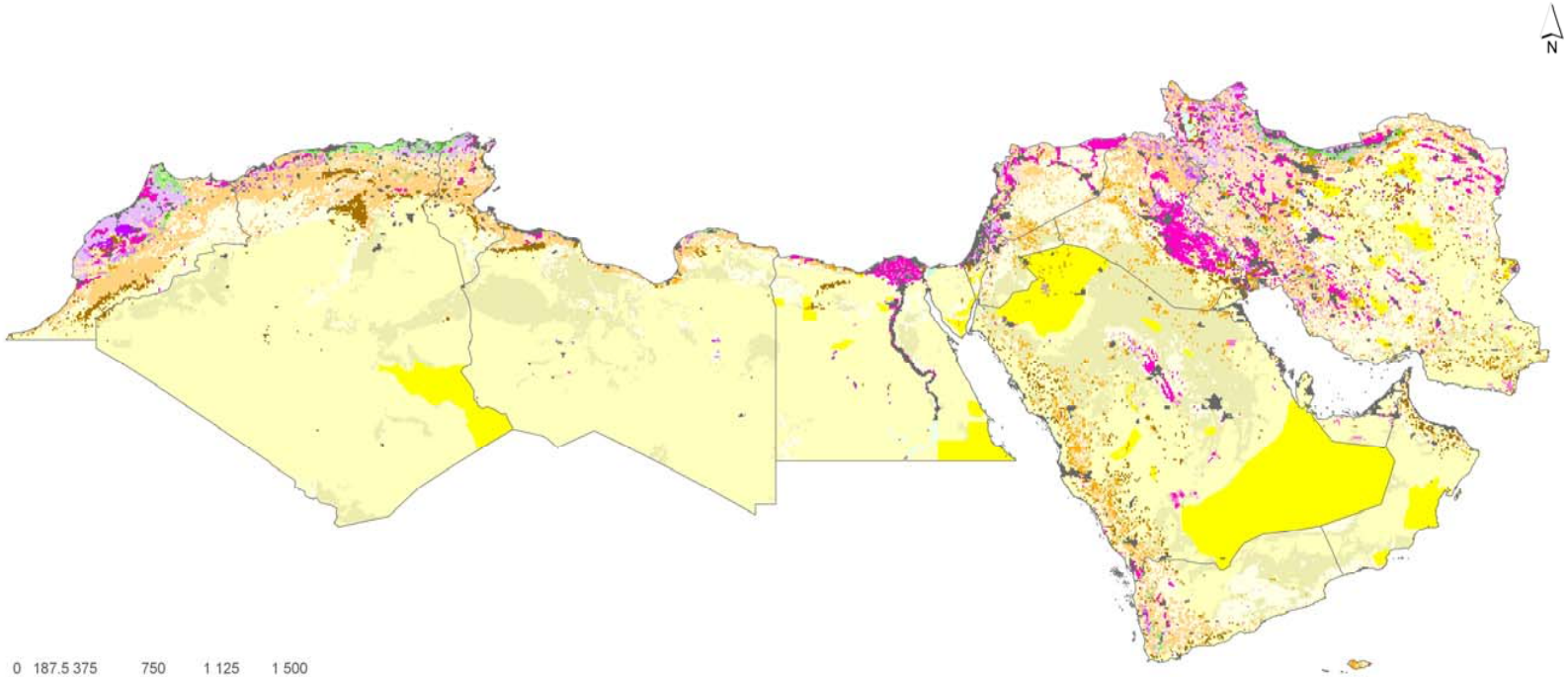
The Land Use Database of the world was developed as part of the project Land Degradation Assessment in Drylands (LADA), a four-year project funded by the Global Environment Facility (GEF). The project is implemented by the United Nations Environment Programme (UNEP) and executed by the Food and Agriculture Organization of the United Nations (FAO).



UNEP GEF

# Land use systems of the world

## North Africa & Near East




Geographic Projection

### Land use systems

- 1 Forestry no use / not managed (Natural)
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- 10 Herbaceous Mod. Intensive pastoralism
- 11 Herbaceous Intensive pastoralism
- 13 Rainfed Agriculture (Subsistence / commercial)
- 14 Agro-pastoralism Mod. Intensive
- 15 Agro-pastoralism Intensive
- 16 Agro-pastoralism mod. intensive or higher with Large scale irrigation
- 17 Agriculture Large scale irrigation (> 25% pixel size)
- 18 Agriculture Protected areas
- 19 Urban areas
- 20 Wetlands no use / not managed (Natural)
- 21 Wetlands Protected areas
- 22 Wetlands Mangroves
- 23 Wetlands Agro-pastoralism
- 24 Bare areas no use / not managed (Natural)
- 25 Bare areas Protected areas
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The geographic representation employed on this map do not imply of any opinion whatsoever concerning the legal status of any county, territory, or concerning the delineation of its boundaries.

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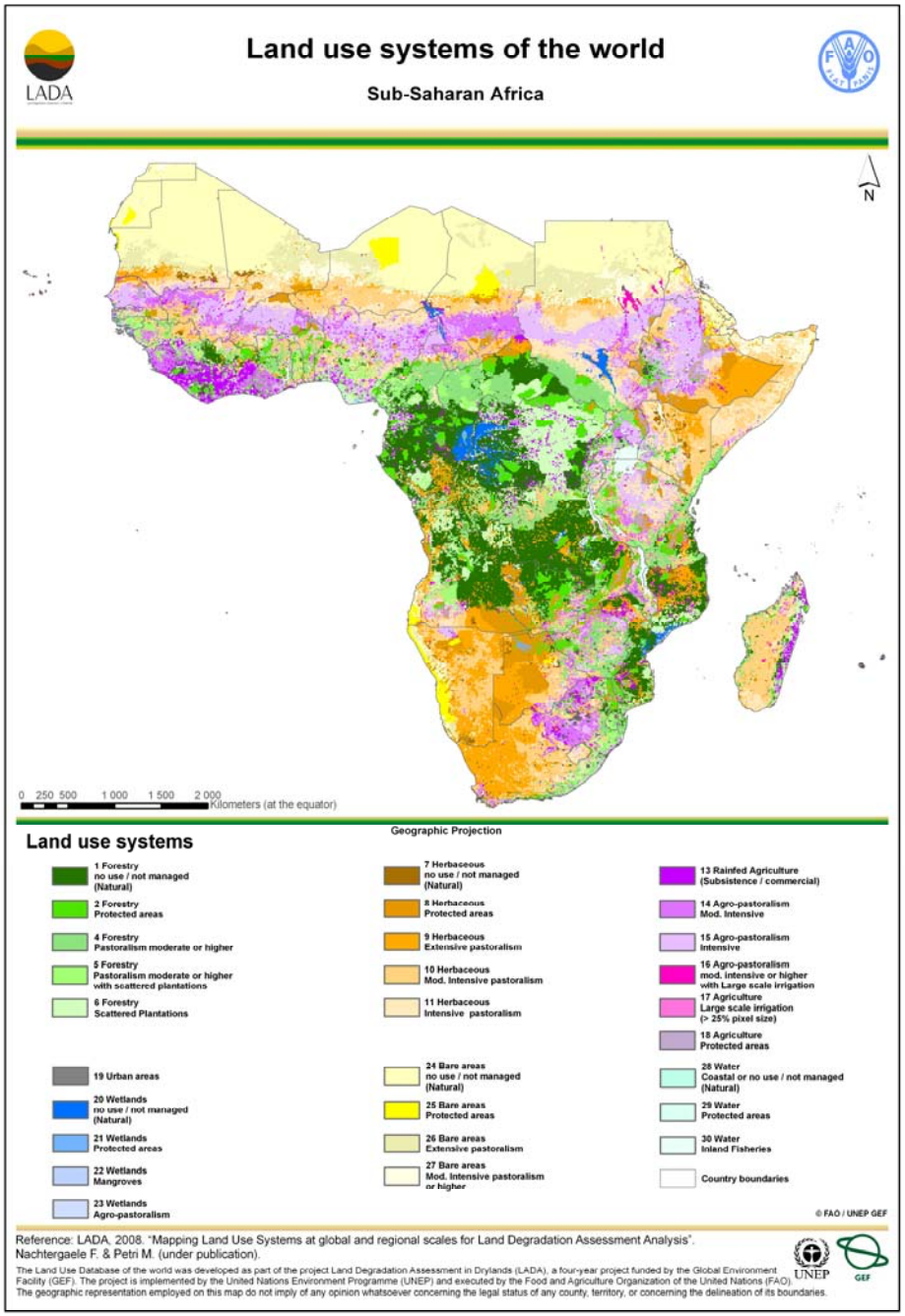

# Major Land Use Systems in Sub-Saharan Africa (1)

- **1.Open water land use systems**
  Great lakes are relatively important in sub Saharan Africa (Victoria, Chad) and have often well developed inland fisheries. This system has not been investigated in any detail.

- **2.Urban land use systems**
  On the basis of the (unpublished) FAO database on rural and urban population aggregated at a 5 arc-minute resolution, the major cities of the continent have been identified and mapped. Many cities have specific land uses and produce typically urban goods and services (recreation, industrial products, shelter etc...). Often, and particularly in Africa, they are also used in a scattered way for garden agriculture producing say vegetables and flowers. No further characterization of land use systems has been attempted at this regional/global scale.

- **3. Irrigated land use systems**
  In the remaining rural areas the presence of irrigation schemes is checked. If more than 5% of the pixel is equipped for irrigation according to the Irrigation map produced by (University of Frankfurt and /FAO, (Siebert et al, 20076) the pixel is considered irrigated and it is presumed crops are grown. The land use system is considered to belong to the irrigated class (without specification of crops grown, although they are predominantly cotton and sugarcane).

- **4. Protected Areas**
  In a next step, the Protected Areas with a continuous extent of more than 10 000 ha are identified. Protected areas have a specific status and are often established as wildlife or forest reserves. Protected areas are a particular land use system defined by its legal status with specific implications on agricultural practices (low livestock pressure, absence of crops). Note that protected areas were not part of Dixon's farming system classification**.**

- **5. (Sub)-Tropical Highland Land Use Systems**
  Tropical and subtropical highlands are defined by their temperature regime. Within these areas where cropland or a tree cover occurs the dominant crops and crop groups are determined and successive iteration results in specifying if industrial tree crops (coffee, oil palm and banana/plantain), maize or small grains (wheat and barley) predominate. Presence or absence of livestock is used to further subdivide the cropland systems. Areas not occupied by crops nor having significant livestock are considered virgin pastures or forests.

# Major Land Use Systems in Sub-Saharan Africa (2)

- **6. Wetland based Land Use Systems**

  Wetlands are defined in the GLC-2000 land cover layer. Note that they don't fully correspond to the wetlands map produced by WCMC, which has not been used in the present exercise. The only land use system that is really characterized is rice cultivation and mangrove presence. All other wetland areas are not further characterized as there are very few and small areas occurring regionally. It may well be worth while to explore the possibilities of the more complete wetland map in the future.

- **7. Land Use Systems in Arid Areas**

  Arid areas are defined by their moisture regime (LGP < 120 days). Three different types of land use systems are recognized based on the presence of livestock. The first one is indicating transhumance and nomadic livestock systems where low livestock presence is associated with low population density. The second one presents higher level of livestock in arid areas and correspond to pastoral systems., Finally, a natural system indicates any other sparse land cover with no livestock.

- **8. Tree based Land Use Systems in non-arid lowlands of sub-Saharan Africa**

  Industrial tree crops include coffee, plantain/banana and cocoa. Relatively little information is available on their occurrence in agricultural census data. Use has been made of AgroMAPS information and an unreleased Beta version of IFPRI land use information (You and Wood, 2006), to determine their main areas of occurrence. A specific system of rice growing in a forest environment occurs in Madagascar. Where industrial crops are grown in a forest environment the land use system is called (Industrial) Tree crops. Other areas are considered Virgin forests.

- **9. Pastoral and Agro-Pastoral Land Use Systems**

  These are the pastoral and agro-pastoral land use systems that occur outside arid and highland areas. A differentiation is made between areas with high livestock numbers and those that have less. The presence of crop land (often sorghum and millet) indicates agro-pastoral systems while pastoral systems are exclusively dominated by livestock.

# Major Land Use Systems in Sub-Saharan Africa (3)

- **10.Cropped land use systems**

  Lands characterized by the presence of agriculture in GLC-2000 are first checked for livestock presence in significant numbers (TLU> 0.33). The main land use systems characterized in both cases are three crop groups: root crops (cassava, etc.), or root crops in combination with cereals (maize, sorghum, etc) or cereal only cropping. Other cropland stands for areas where crops are grown that are neither cereals nor root crops. This concerns in particular the significant area of pulses (cowpea in Nigeria) and oil crops (groundnuts in Senegal for instance). These two classes were not foreseen in the Dixon farming system classification, but given their importance in the region in general and in specific countries in particular, they have been added to the Land Use System.

- **11. Natural vegetation systems**

  A number of natural vegetation systems with very low livestock numbers and no cropped land are included in the schemes presented above. This concerns in particular “Tree based systems” which are virgin forests, the arid areas without livestock which are bare or with spare bush lands, the highland systems without crops or livestock. Eventually in the final scheme these will be grouped separately from the “farming systems” (as Dixon did) in a separate land use system defined by non-use.

  Please note that these areas are extensive in Sub-Saharan Africa as they concern for instance 21.5 % of the total land area under sparse vegetation without crops or livestock, while15.3% of the total land areas is under virgin forests.

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# Land Degradation, Land use/ Land Cover Data Sources

data collection by several different government depts. (e.g. forestry, agriculture, livestock, fisheries,..)!!

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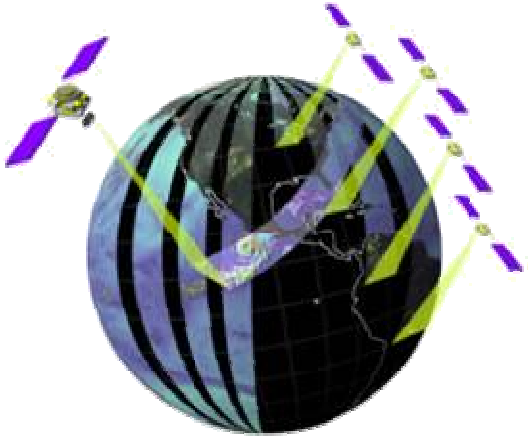
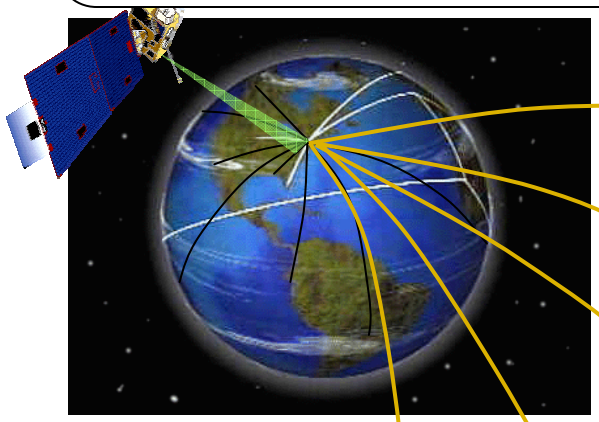
# Global Land Cover Network (GLCN) Information framework for Global Monitoring of Land Cover

**Objectives**

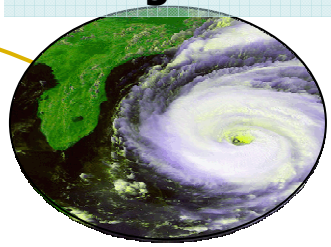
- **To improve linkages between global, regional and national studies on land cover and the environment**
- **To improve standardization, homogenization, compatibility and efficiency of information provided by different applications**
- **To provide information that improves design and efficiency of 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**



# Cascading Benefits from a Global Land Cover Network



**Disaster Management**



Hurricane Landfall Forecasting

**Transportation**

Infrastructure and Road Siting

**Natural Resources**

Biodiverstiy and Forest Management

**Agriculture**

Food Security and Precision Farming

**Training**

Student and Teacher Training

## At National level:

- **Strengthen Capacities**
- **Solve practical problems**
- **Contribute to informed decision making**
- **Communicate with users**

# Land Cover Information Relevance at the National Level

Increasing concerns about

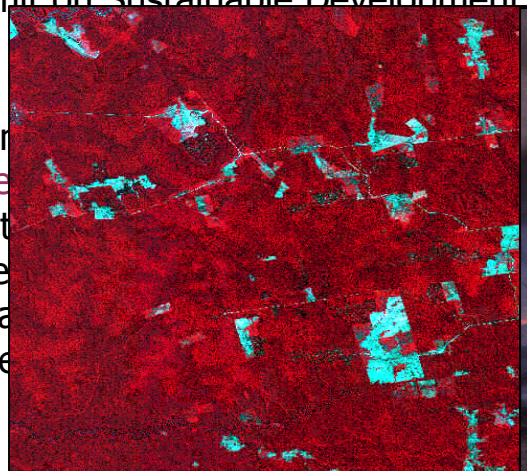
- food security for growing population in developing countries,
- environmental degradation including the loss of biodiversity
- climate change accompanied by growing frequency of natural disasters

*"Importance of the availability of reliable land co*
*management of the Earth's ren*

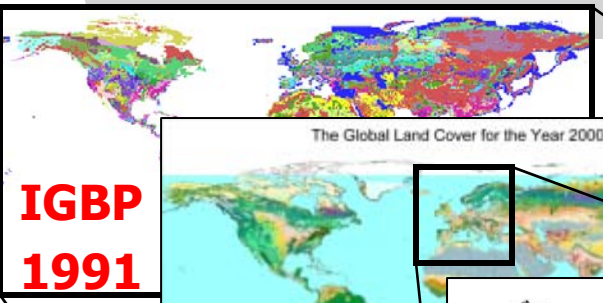
UNCED-UN Conference on Environment and Develop
WSSD-World Summit on Sustainable Development

Earth Summit recor
RS/GIS technologie

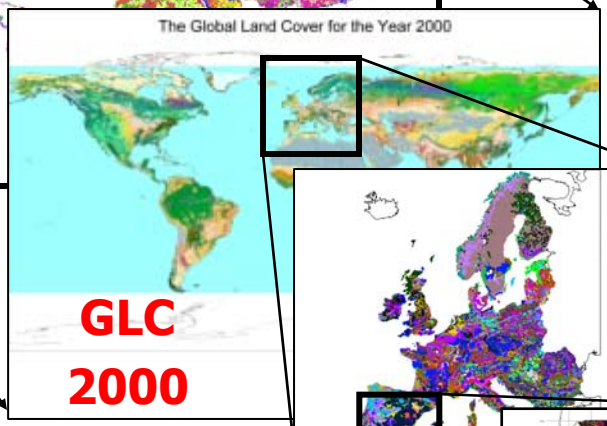
- coordinated, syst harmonized colle
- assessment of da environmental de



# GLCN



IGBP 1991




GLC 2000

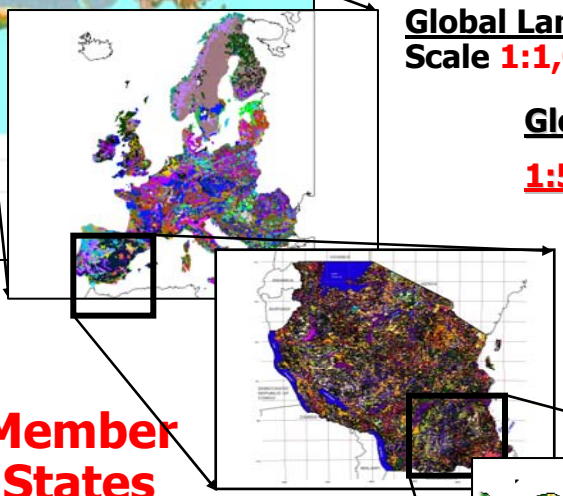
World Land Cover Scale 1:5-2,000,000 - raster based

Global assessments

Global Land Cover 2000- JRC at Scale 1:1,000,000 - raster based

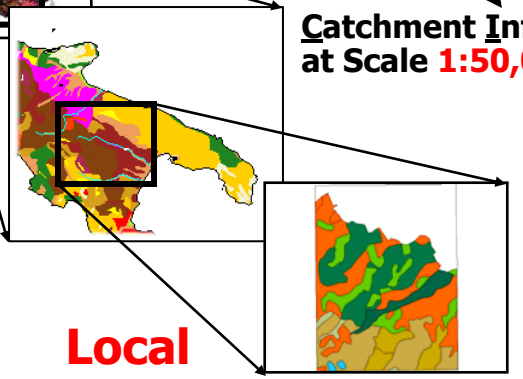
Globcover 2005/6 – MERIS 1:500,000 raster based

LCCS 2 harmonisation --- translation



Georeferenced Land Cover Initiatives - Africover/Asiacover - National Scale: 1:250,000-1:100,000 - vector based

Member States



Catchment Information System at Scale 1:50,000 - vector based

Regions



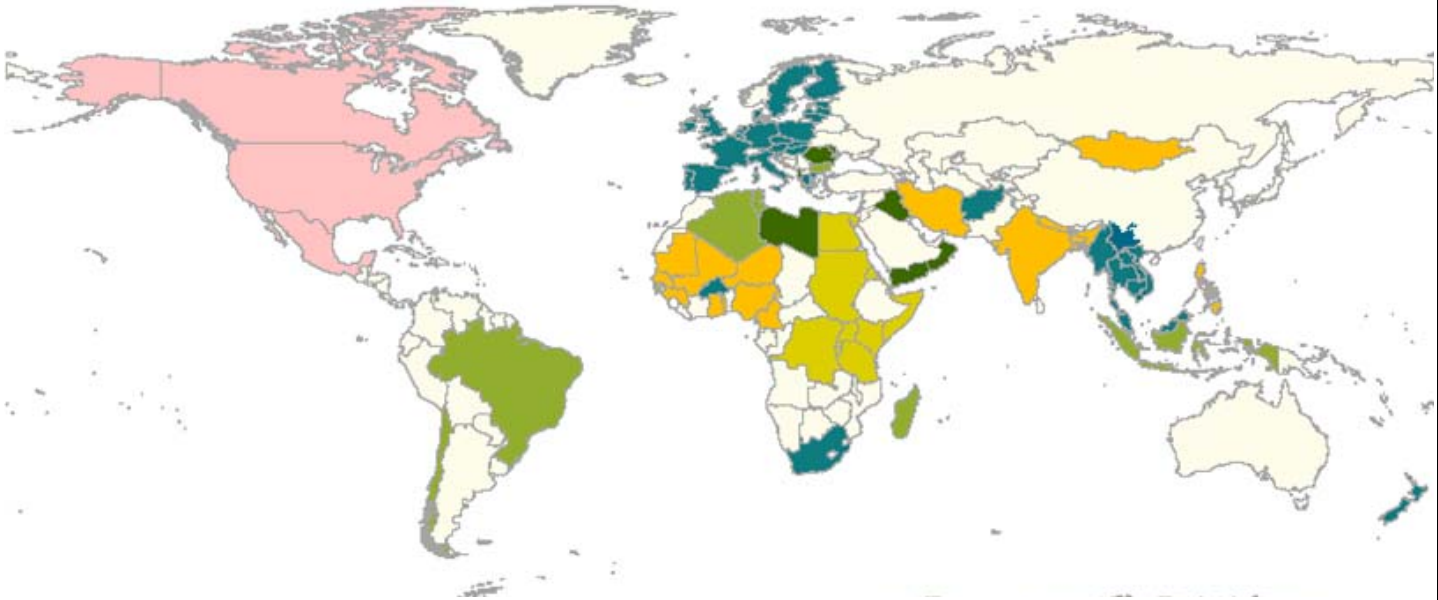
Local Soil Information System at Scale 1:20,000 - vector based

Local

Applications using LCCS: e.g
GLC 2000, Global map Africover, Asiacover,
S. C. America, ME, SADC, Sahel many country initiatives
GOFC/GOLD (LCCS acceptance)

Spatial planning
Local Planning

# LCCS Mapping Standards: Operational Context



**Countries fully mapped with LCCS**
Albania, Iraq, Libyan Arab Jamahiriya, Moldova, Oman, Romania, Yemen

**Countries fully mapped with LCCS (africover)**
Burundi, DR Congo, Egypt, Eritrea, Kenya, Rwanda, Somalia, Sudan, Uganda, United Republic of Tanzania

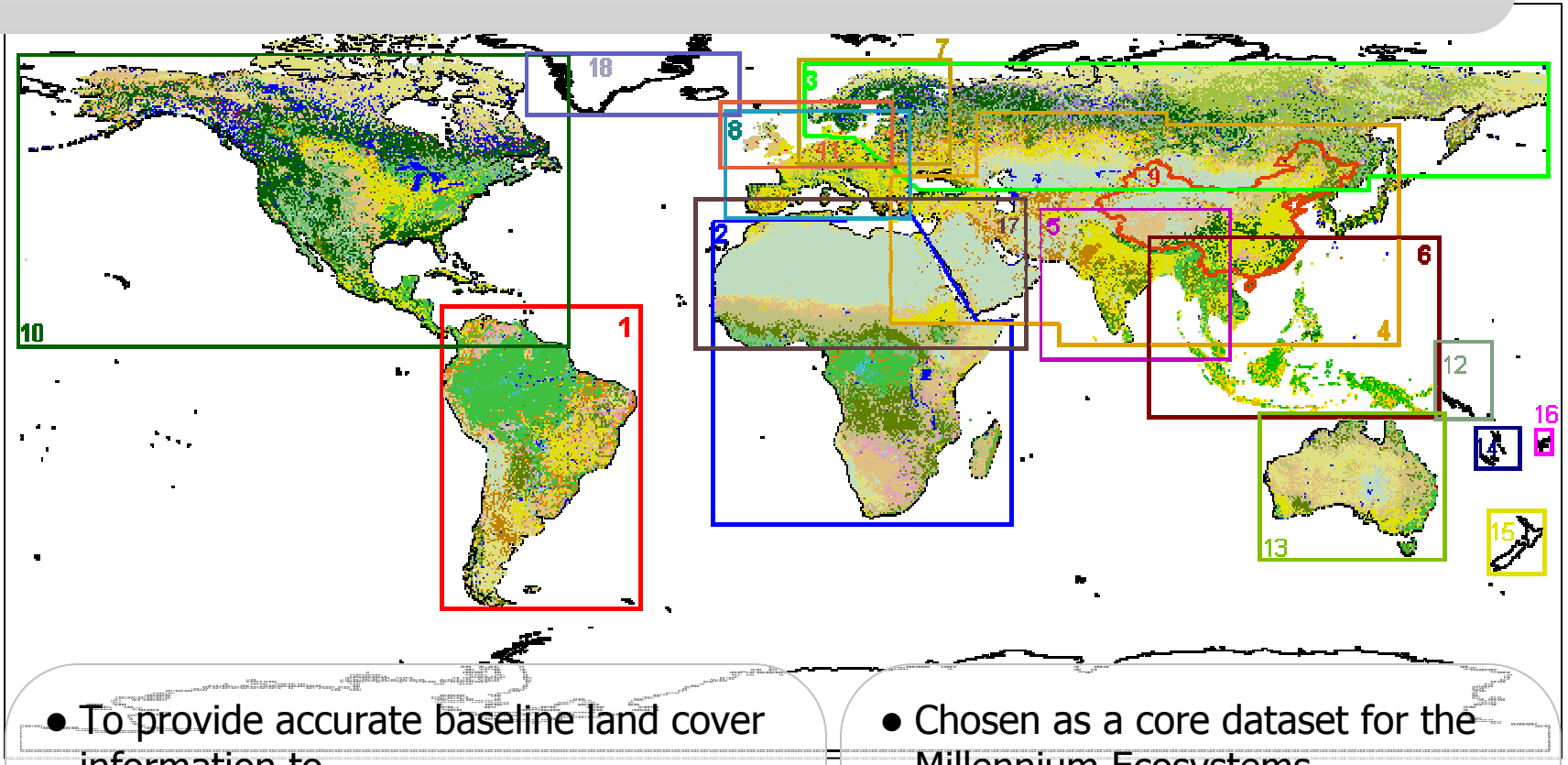
**Countries partially mapped with LCCS**
Algeria, Brazil, Bulgaria, Chile, Indonesia, Madagascar, Tunisia

**Countries where maps were officially translated into LCCS**
Afghanistan, Burkina Faso, Cambodia, Lao People's, Democratic Republic, Lebanon, Malaysia, Myanmar, New Zealand, South Africa, Thailand, Viet Nam

**Countries where translations are in progress**
Bangladesh, Cameroon, Ghana, Guinea, India, Iran, Mali, Mauritania, Mongolia, Nepal, Niger, Nigeria, Philippines, Senegal, Togo

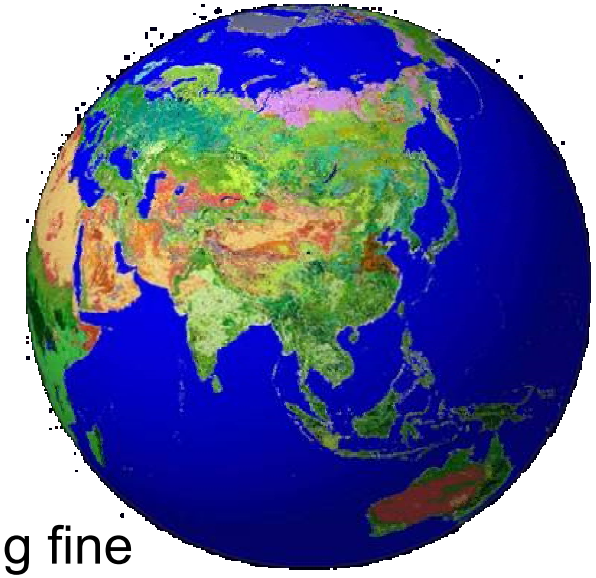
**Countries where mapping initiative is nearly approved**
Canada, Mexico, USA

# GLC 2000: The Global Land Cover results




- To provide accurate baseline land cover information to
  - the International Conventions on Climate Change
  - the Convention to Combat Desertification
  - the Ramsar Convention
  - the Kyoto Protocol

- Chosen as a core dataset for the Millennium Ecosystems Assessment.
- The GLC2000 dataset is a main input dataset to define the boundaries between ecosystems such as forest, grassland and cultivated systems.



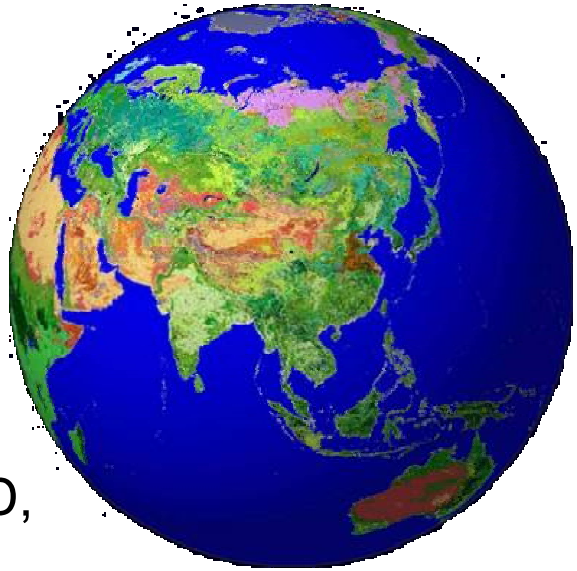
## Objective of Globcover:

- Produce a global land-cover map using fine resolution mode (300m) data acquired over the full year 2005 and early 2006 by the MERIS sensor onboard the ENVISAT satellite.

## Product:

- Will update, complement and improve (due to its better resolution) other existing comparable products.

GLOBCOVER



## Thematic legend:

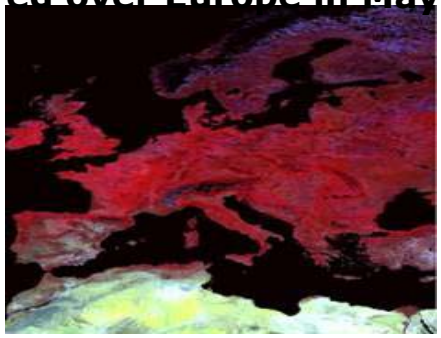
– Developed using the FAO Land Cover Classification System (LCSS).

## Project partners:

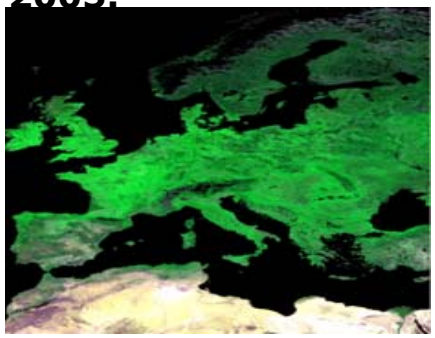
– Project partners: ESA, FAO, GOFC-GOLD, GTOS, IGBP, JRC and UNEP.

**The images show different colour composites for all data acquired over Europe in May 2005.**

**Red=7 Green=5 Blue=2**

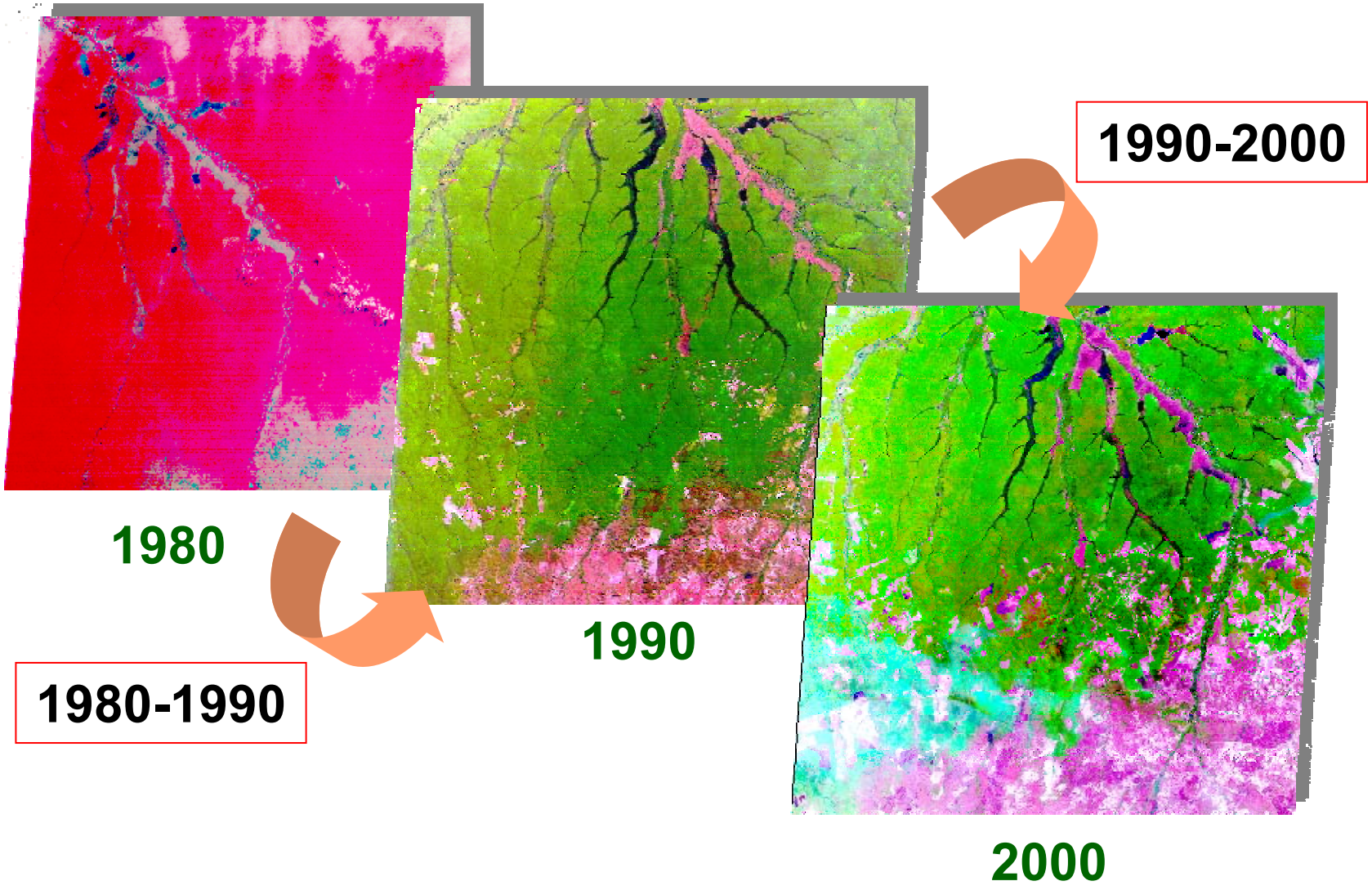


**Red=13 Blue=7 Green=2**



**Red=7 Green=13 Blue=5**

# Multi Epoch remote-sensing survey
# Three date time series – arable land change



# Land registers

- Land registration & Cadastral systems are sources of information on land ownership and rights.
- But-many developing countries do not have registration systems that cover their entire jurisdiction(may cover main urban areas only)
- Data in registration systems may not be easily extracted for use in computerized information system(registration systems not computerized,data may be arranged for transactions,not for analysis).

# Land registers

- Data in some registration systems may not be updated(to cover new development such as spread of settlements)
- Ownership may not be updated when owner dies or sells the land.

# Land Tenure

- Country specific
- Aspects considered for collecting information on land tenure
  - ownership
  - right to use
  - security of tenure
- International comparison
  - Owned or rented
  - Ownership: legal or non-legal
  - Other
    - reference page 80 of WCA 2010

# Land Tenure

- Land tenure refers to the arrangements or rights under which the holder operates the land making up the holding.
- legal and non-legal ownership
- tenure security.

# Land Tenure

- Land tenure is the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. (For convenience, “land” is used here to include other natural resources such as water and trees.) Land tenure is an institution, i.e., rules invented by societies to regulate behaviour. Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. In simple terms, land tenure systems determine who can use what resources for how long, and under what conditions.

# Land Tenure

- Land tenure refers to the arrangements or rights under which the holder operates the land making up the holding.
- legal and non-legal ownership
- tenure security.

# Land Tenure

- Land tenure is often categorised as:
- Private: the assignment of rights to a private party who may be an individual, a married couple, a group of people, or a corporate body such as a commercial entity or non-profit organization. For example, within a community, individual families may have exclusive rights to residential parcels, agricultural parcels and certain trees. Other members of the community can be excluded from using these resources without the consent of those who hold the rights.
- Communal: a right of commons may exist within a community where each member has a right to use independently the holdings of the community. For example, members of a community may have the right to graze cattle on a common pasture.
- Open access: specific rights are not assigned to anyone and no-one can be excluded. This typically includes marine tenure where access to the high seas is generally open to anyone; it may include rangelands, forests, etc, where there may be free access to the resources for all. (An important difference between open access and communal systems is that under a communal system non-members of the community are excluded from using the common areas.)
- State: property rights are assigned to some authority in the public sector. For example, in some countries, forest lands may fall under the mandate of the state, whether at a central or decentralised level of government.

# Environmental issues

- land tenure can promote land use practices that harm the environment or it can serve to enhance the environment.
- Unsuitable rules (either formal or informal) for acquiring access to land can lead to environmental degradation
- Insecure land tenure is linked to poor land use which in turn leads to environmental degradation.

# Environmental issues

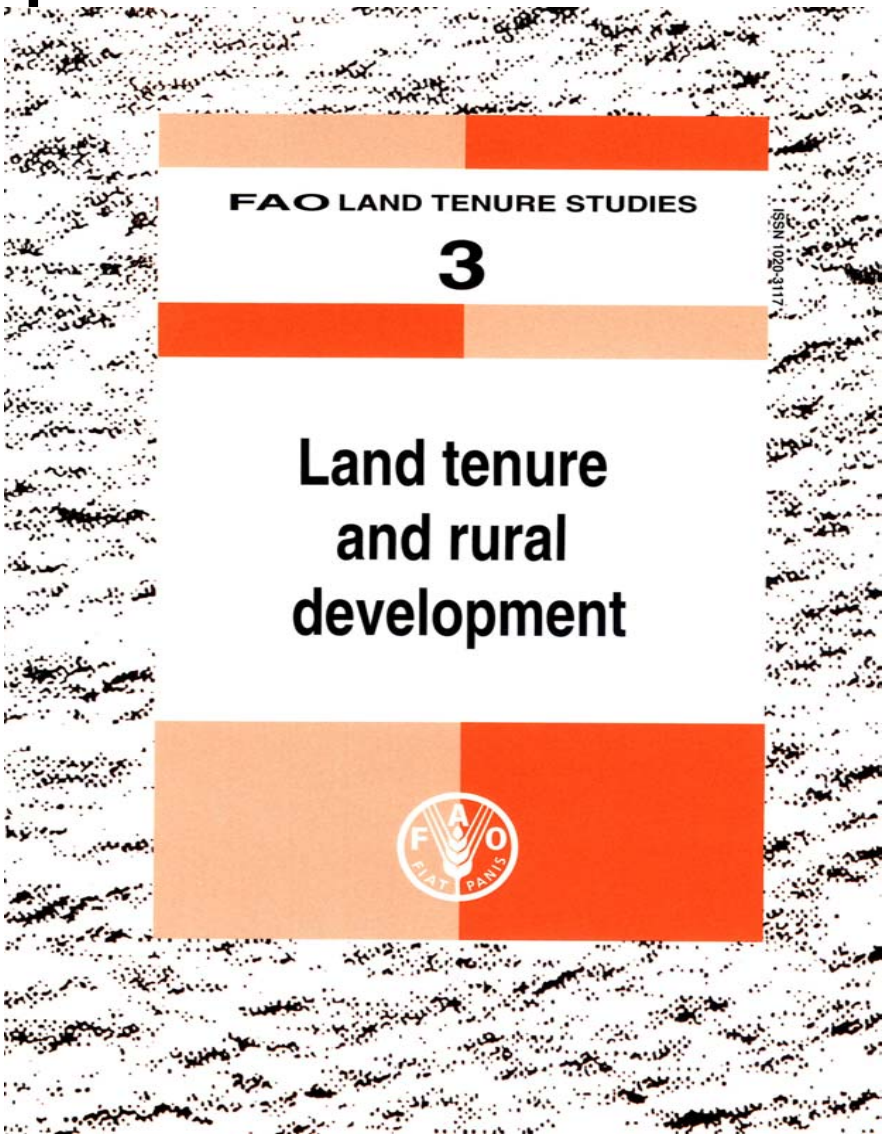
- Inappropriate tenure arrangements on state lands can also lead to environmental degradation
- In contrast, well-adapted land tenure rules can promote sustainable land use.

# Land Tenure and Rural Development

- **FAO LAND TENURE STUDIES**
  **3**

  **FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS**

  **ROME, 2002**



# Land Tenure and Rural Development


- **FAO LAND TENURE STUDIES 3**

**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS**

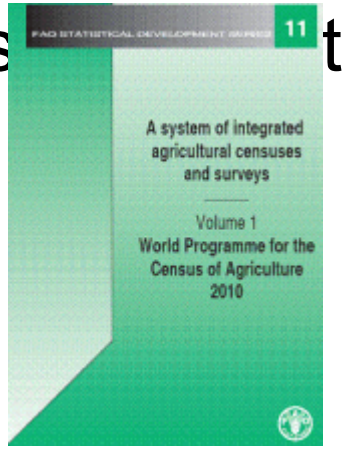
**ROME, 2002**

# FAO Land Tenure Studies http://www.fao.org/sd/LTdirect/ltstudies_en.htm

- 1. Cadastral surveys and records of rights in land
- 2. Good practice guidelines for agricultural leasing arrangements
- 3. Land tenure and rural development
- 4. Gender and access to land
- http://www.fao.org/sd/2003/IN0501_en.htm

# Land Tenure Data aspect

- http://www.fao.org/es/ess/census.asp




**Volume 1**
**World Programme for the Census of Agriculture 2010**
Food and Agriculture Organization of the United Nations
Rome, 2005

The latest World Programme for the Census of Agriculture (WCA 2010), presented in the publication *"A System of Integrated Agricultural Censuses and Surveys, Volume 1, World Programme for the Census of Agriculture 2010"*, (SDS No. 11) provides countries with a flexible approach to the collection of structural agricultural data on a variety of subjects

# http://www.fao.org/es/ess/census/wcares/default.asp

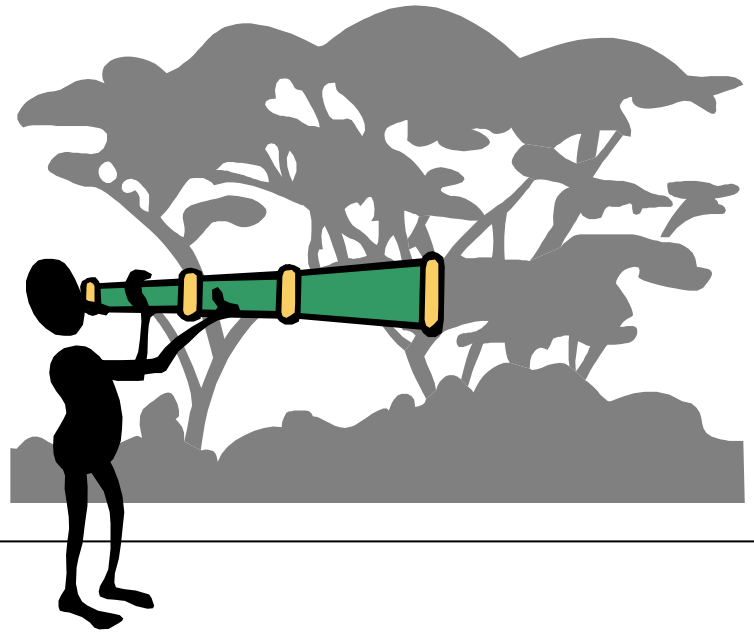
- Results by country are aimed at disseminating main National Agricultural Census Results referring to the 1980, 1990 and 2000 rounds. Relevant information about Number, Size and Fragmentation of Holding, Legal Status of Holders, Land Tenure, Farm Population, Employment, Land Use, main Crops and main Livestock species is reported.

# African countries that may have some information

**Africa**

| | | | | |
|---|---|---|---|---|
| Algeria | Libyan Arab Jam. | Uganda | Côte d'Ivoire | São Tomé and Pr. |
| | Madagascar | Zambia | Djibouti | Senegal |
| Benin | Malawi | | Egypt | Seychelles |
| Botswana | Mali | | Ethiopia | Sierra-Leone |
| Burkina Faso | Mauritania | | Gambia | South Africa |
| Cameroon | Morocco | | Guinea | Swaziland |
| Cape Verde | Mozambique | | Guinea-Bissau | Tanzania, Un. Rep. of |
| Central African Republic | Namibia | | Kenya | Togo |
| Comoros | Niger | | Lesotho | Tunisia |
| Congo, Rep. of | Réunion (Fr) | | Congo, Dem. Rep. of | Rwanda |

- The end



# Thank you

***Email:dominic.ballayan@fao.org***

# Thank you

***dominic.ballayan@fao.org***

Statistics Division

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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  - Then use the **Logon button** with the following user name: *(Your email address as supplied for the subscription)*;
  - Click on button "**Send Password**" to receive your new password at the supplied email account.
- As a returning user **with an email address and a password**:
  - Please click on the following address: http://faostat.fao.org/site/584/default.aspx in order to go the logon page (or by clicking in the footer of the page on "Logon");
  - Then use the Logon button with your email address as supplied for the subscription and your password in order to access the full portal.
- **Please note: if you have forgotten your password, just restart with step 1) like a new user.**
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  b. the multi-dimensional queries within and across domains
  c. bulk downloading of data in CSV format
- The increased or unlimited number of records downloadable is available automatically in each subject domain.
- To access the multi-dimensional query and bulk downloading features on the other hand you must go to All Data on the top Menu Bar.
- Once you are in All Data you may go to individual domains which will appear in the lower menu (all Core, ProdSTAT, TradeSTAT, and ResourcesSTAT data) for multi-dimensional queries.
- You may download data in the subject domains also in Excel, CSV or XML format by clicking the download box under the query boxes.
- If you wish to use the bulk download facility you should go to bulk downloads which appear in the lower menu which appears in All Data.
- **WARNING**
- Please be aware that this is a very large database with a total of over 3 billion records. You should therefore refrain from performing unlimited multi-dimensional queries and downloads.
- Large sized queries and downloads not supported by the memory or CPU of your machines may result in long times of executions but also may crash your browser at some point.
- We recommend using multiple queries or the bulk downloading feature for queries with more than 4000 records at a time.