

LAND USE CHANGE		
Land	Land use and status	

1. **INDICATOR**

- (a) **Name:** Land use change.
- (b) **Brief definition:** Change with time of the distribution of land uses within a country.
- (c) **Unit of Measurement:** Proportion of change of each category of land use to another land use per unit of time.
- (d) **Placement in the CSD Indicator Set:** Land/Land use and status.

2. **POLICY RELEVANCE**

- (a) **Purpose:** The purpose of this indicator is to highlight changes in the productive or protective uses of the land resource to facilitate sustainable land use planning and policy development.
- (b) **Relevance to Sustainable/Unsustainable Development (theme/sub theme):** Information on land use change is critical for integrated and sustainable land use planning. Such information is useful in identifying opportunities to protect land uses or promote future allocation aimed at providing the greatest sustainable benefits for people.

Changes in arable and permanent crop land and wooded areas give important information about a country's endowment in agricultural and forest resources, both from an economic and an environmental perspective. Economically, changes in land use will, for example, result in changes in the volume of produce available and influence employment opportunities. From an environmental point of view, unsustainable land use is an important factor in land degradation, may pose a threat to ecosystems, and lead to natural habitat loss and landscape changes. Changes which lead, for example, to inappropriate farming and grazing practices, or to environmentally insensitive construction or mining activities are significant from a sustainability viewpoint. This indicator acts as a synoptic measure for the myriad of more specific environmental and natural resource changes significant to sustainable development.

- (c) **International Conventions and Agreements:** Not available.
- (d) **International Targets/Recommended Standards:** Generally, international targets for this indicator do not exist. However, certain minimal contiguous limits or proportions of total land area have been established for certain need or desirable land uses, for example protected areas.

(e) **Linkages to other indicators:** The interpretation of this indicator is significantly improved if it is considered with land quality. It is also closely linked to many other social, economic, environmental, and institutional indicators, such as those related to population (for example, population growth rate, rate of growth of urban population, population density, population dynamics in mountain areas), energy and mineral reserves, land affected by desertification, sustainable use of natural resources in mountain areas, arable land per capita, wood harvesting intensity, protected areas as a percent of total land area, and sustainable development strategies.

3. METHODOLOGICAL DESCRIPTION

(a) **Underlying definitions and concepts:** The underlying concepts and definitions for land use classifications are widespread. Work coordinated by the United Nations Food and Agriculture Organization (FAO) is currently underway to harmonize classification systems and databases to improve national and international land use information. This includes the development of definitions and protocols, computerized land use database structure, and broadly accepted structure of land use classifications.

(b) **Measurement method:** Land use change data can be derived from periodic mapping and monitoring, partly on the basis of land cover information; from remote sensing, supported by ground truthing; and the use of land use aspects from agricultural census. It is essential to use a uniform classification of land use and cover. The Land Degradation Assessment in Drylands (LADA) approach is recommended (see <http://lada.virtualcentre.org/pagedisplay/display.asp?section=method>). The Global Land Cover Network (GLCN) is actually developing a software which would be able to indicate changes in broad land use classes over the last twenty years in addition to complement the existing Land Cover Classification System (LCCS). Use of these tools will lead to the production of uniform results and statistics.

(c) **Limitations of the Indicator:** The indicator by itself does not identify the causes or pressures leading to the change in land use. At the international level, sufficient harmonization of land use classification has yet to be achieved. Georeferenced land use change data are generally not available.

Generally, inferences regarding sustainability of land management would depend on the degree of characterisation of land uses (obviously the more detail the better). If land-use characterisation is limited (e.g. restricted only to socio-economic purpose, as is the case for many countries), areas of “no change” may give rise to misleading inferences regarding sustainability.

(d) **Status of the Methodology:** A methodology has not been agreed to by any intergovernmental fora.

(e) **Alternative definitions/Indicators:** Not available.

4. ASSESSMENT OF DATA

(a) Data needed to Compile the Indicator: The data required includes updated statistics and remote sensing coverage, dependable agricultural census data on land uses, and dependable land use maps, all updated at regular intervals. Broad land use statistics are available for most countries. However, variable definitions, and the lack of consistent land use change data which is spatially referenced are serious impediments to, for example, temporal analysis and international comparisons.

(b) National and International Data Availability and Sources: Times series of land use data (related to agriculture and forestry) aggregated at the national level are available in FAOSTAT for all countries since 1961. Some time-series data related to livestock as well as modelled livestock distribution maps are also available in GLIPHA.

(c) Data References: Not available.

5. AGENCIES INVOLVED IN THE DEVELOPMENT OF THE INDICATOR

(a) Lead Agency: The Food and Agriculture Organization of the United Nations (FAO).

(b) Other Contributing Organizations: The United Nations Environment Programme is a partner in the development of this indicator. National experts from governments and institutes, for example the International Institute for Aerospace Survey and Earth Sciences and the Institute for Terrestrial Ecology, have also contributed.

6. REFERENCES

(a) Readings:

United Nations Environment Programme and Food and Agriculture Organization. Report of the UNEP/FAO Expert Meeting on Harmonizing Land Cover and Land Use Classifications. Geneva November 23-25, 1993. GEMS Report Series No. 25. Nairobi. March 1994.

(b) Internet Sites:

<http://lada.virtualcentre.org/>