LAND USE CLASSIFICATION: CONCEPTS & METHODS-Towards an improved information basis

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1. INTRODUCTION

- UNCED 1992 laid emphasis on environmental indicators for sustainable development

- a number of Organizations made suggestions for compiling environmental indicators

- Inadequate progress due to lack of data

- data collection process suffered due to lack of resources and non-availability of statistical concepts, definitions and classification

- the present paper concentrates on concept, definition and classification of land use for collection of environment statistics

2. CONCEPT OF LAND

- Agenda 21 has defined Land as a physical entity in terms of its topography and spatial nature thus including natural resources like the soil, minerals, water and biota existing on the land. These components provide a variety of services essential to the maintenance of life-support systems and the productive capacity of the environment.

- Measurement problem in Agenda 21 definition

- UN System of National Accounts has given a statistical definition of land to facilitate its measurement

- Concept of land in SNA is linked to the ownership by institutional units and so to the economic activities

3. Functions of Land

1. Production Function
2. Space function for socio-economic and infrastructural development
3. Human settlement space function
4. Biotic environmental function
5. Climate regulative function
6. Hydrologic function
7. Waste and pollution control function
8. Storage function
9. Archive or heritage function

4. Classification of Land Area

- **Land Cover Classification** - physical appearance,

- **Agro-Climatic / Agro-Ecological Classification** - technical attributes like soil profile, soil texture agro-climatic conditions etc.

- **Land Use Classification** - purpose for which it is being used

5. Land Use Classification

- To measure land and its impact on ecosystem land use classification is required

- The traditional nine-fold land use classification as well as the UN ECE classification are available

- These classifications do not fully meet needs of integrated land use planning and creation of environmental indicators

6. land use nine-fold classification: to reveal vegetation status

1. Forests
2. Land put to non-agricultural uses
3. Barren and unculturable land
4. Permanent pastures and other grazing lands
5. Miscellaneous tree crops and groves, not included in the net area sown
6. Culturable waste
7. Fallow land, other than current fallows
8. Current fallows
9. Net area sown

7. UN ECE Classification

- To meet needs of different users and to monitor the environment a detailed classification of land use is required

- To meet this need Economic Commission for Europe (ECE) released a Standard Statistical Classification of land use mixing some categories of land cover and taking into account additional economic activities like mining, industrial land, land used for public services, etc.

8. SNA Classification

The SNA asset classification distinguishes four types of land for collection of data on land in physical unit and in monetary value according to the services it is providing:

- Land underlying buildings and structures
- Land under cultivation
- Recreational land and associated surface water
- Other land and associated surface water.

9. Why another classification

1. Global concerns about food security, the quality of life of future generations, growing awareness about environmental degradation, are posing penetrating questions to the world of science
2. To link the economic benefits with its impact on ecosystem need more detailed quantitative data is required
3. Existing classification could not get universal acceptance because of problem in collecting data.
4. The existing work has been motivated by keeping in view the specific final objectives with little consideration for comprehensiveness
5. Classification does not distinguish land under active economic use to the other land not in use
6. The classifier boundaries are not well defined
7. The type of information collected depends on the technique used for collecting the data

10. Framework for integrated land use classification

1. The classification should cover the total area of land that needs to be classified irrespective of the fact if it is being used for any economic activity. For this purpose we need to define land

2. The categories of the classification should not overlap

3. The classification should cover all activities

4. The classification systems should not be confused with legends

5. In segments having multiple activities, each activity should be included

6. Very often land use data base need to be linked with policy relevant information

11. The Classification

1. Total Area (Total area of the country including area under water, etc.)

1.1 Area not in use (excluding areas that were in use once, but are no longer in use due to degradation, etc.)

1.1.1 Land area

    Land under glaciers and perpetual snow and other land (not elsewhere classified)
    Land under vegetation (closed forest areas)
    Land under desert

1.1.2 Land under water (Area under tidal water)

1.2   Area in use for undertaking economic activities

1.2.1 Land area and *1.2.2 Land under water (Area under water)*

Land under single use (details as per concepts given by ISIC)

Land under multiple use

    Net land area under use
    Gross land area under use (Details as per concepts given by ISIC)
    Intensity of use [(b)/(a)]

Land not in use due to degradation

Other land area (not elsewhere classified)

12. Compiling the Land Use data

			Example on Land Use Data					
		Plot Size	Crop & Animal Husbandry	Forestry	Fishing	Non - Agricultural activities	Gross Area under use	Intensity of Use
Crop & Animal Husbandry	Plot 1	100	150	-	-	-	150	1.50
	Plot 2	50	50	-	50	-	100	2.00
	…							
Forestry	Plot 1	200	30	200	-	-	230	1.15
	Plot 2	500	-	500	40	30	570	1.14
	…							
Fishing	Plot 1	250			250	-	250	1.00
	Plot 2	200			200	20	220	1.10
	…							
Non - Agricultural activities	Plot 1	300	-	-	-	400	400	1.33
	Plot 2	150	-	-	-	150	150	1.00
	…							
Area under use		1750	230	700	540	600	2070	1.18

Diagonal cell will give net area under primary activity

13. Advantage of the System

- Fully compatible with ISIC. As many users are familiar with ISIC, the system would be simple to understand and flexible to incorporate needs of different stake-holders.

- Fully compatible with FAO's land cover classification and could be used for projecting changes in land cover vis-à-vis land use.

- Independent of legend required by different stake-holders. It would be possible to aggregate data on different scales and mapping units.

- Able to facilitate analysis of impact of different economic activities as well as impact of nature's vagaries on areas under land and water.

- To meet the specific needs of any users other details can be superimposing at the second level

- provide a correspondence between land and labor, capital, and goods & services produced

14. The work ahead

It would be necessary to undertake further inter-disciplinary work to define appropriate classes and guidelines for deciding boundary line issues keeping in view issues relating to concepts and definitions and capabilities of data collection tools.