

USE OF FERTILIZERS		
Environmental	Land	Agriculture

### 1. INDICATOR

- (a) **Name:** Use of Fertilizers.
- (b) **Brief Definition:** Extent of fertilizer use in agriculture per unit of agricultural land area.
- (c) **Unit of Measurement:** kg/ha.
- (d) **Placement in the CSD Indicator Set:** Environmental/Land/Agriculture.

### 2. POLICY RELEVANCE

- (a) **Purpose:** The purpose of this indicator is to measure the intensity of fertilizer use in agriculture (crop husbandry).
- (b) **Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** The challenge for agriculture is to increase food production in a sustainable way. This indicator shows the potential environmental pressure from agricultural activities. Extensive fertilizer use is linked to eutrophication of water bodies, soil acidification, and potential of contamination of water supply with nitrates. The actual environmental effects will depend on pollution abatement practices, soil and plant types, and meteorological conditions.
- (c) **International Conventions and Agreements:** Not available.
- (d) **International Targets/Recommended Standards:** Targets should be based on national situations.
- (e) **Linkages to Other Indicators:** This indicator is closely linked to others in the agricultural, water, and atmospheric groups, such as pesticide use, biochemical demand in water bodies, algae index, and emissions of greenhouse gases.

### 3. METHODOLOGICAL DESCRIPTION

- (a) **Underlying Definitions and Concepts:** The concepts are available. Data on the quantities of fertilizers used are converted into the three basic nutrient components and aggregated. The three components are nitrogen (N), phosphorous (P<sub>2</sub>O<sub>5</sub>), and potassium (K<sub>2</sub>O). Factors for chemical breakdown are standardized. Agricultural land is the sum of arable and permanent crop land and land under permanent pastures and meadows. However, due to the limitations discussed in section 4(d) below, this indicator should be regarded as interim for sustainable development purposes.

(b) **Measurement Methods:** Data on fertilizers are compiled from industry sources and non-traditional sources. Data for developing countries generally refer to domestic disappearance based on imported products. The derived figures in terms of nutrients are then divided by the agricultural land area.

(c) **Limitations of the Indicator:** Environmental impacts caused by leaching and volatilization of fertilizer nutrients depend not only on the quantity applied, but also on the condition of the agro-ecosystem, cropping patterns, and on farm management practices. In addition, this indicator does not include organic fertilizer from manure and crop residues, or the application of fertilizers to grasslands. The indicator assumes even distribution of fertilizer on the land.

(d) **Status of the Methodology:** Not available.

(e) **Alternative Definitions/Indicators:** A more relevant and sophisticated indicator would focus on *nutrient balance* to reflect both inputs and outputs associated with all agricultural practices. This would address the critical issue of surplus or deficiency of nutrients in the soil. This would need to be based on agro-ecological zones.

#### 4. ASSESSMENT OF DATA

(a) **Data Needed to Compile the Indicator:** Data on fertilizer use for N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O; and agricultural area.

(b) **National and International Data Availability and Sources:** Data for all countries exist at the national level only. The data are updated on a regular basis. At the international level, the Food and Agriculture Organization of the United Nations (FAO) is the primary source.

(c) **Data References:** see 6(a).

#### 5. AGENCIES INVOLVED IN THE DEVELOPMENT OF THE INDICATOR

(a) **Lead Agency:** The lead agency is the Food and Agriculture Organization of the United Nations (FAO). The contact point is the Assistant Director-General, Sustainable Development Department, FAO; fax no. (39 06) 5705 3152.

(b) **Other Contributing Organizations:** The International Fertilizer Association is associated with the development of this indicator.

#### 6. REFERENCES

(a) **Readings:**

FAO. 1998. *Food and agricultural sector profiles. Country tables 1997*. Statistics Div.; FAO, Rome (Italy). Agriculture and Economic Development Analysis Division, 427 pp.

FAO. 1996. *Fertilizer use by crop*, 3. International Fertilizer Industry Association, Paris (France); International Fertilizer Development Center, Muscle Shoals, AL (USA); FAO, Rome (Italy). Statistics Division, 49 pp.

(b) **Internet sites:**

FAO Statistical Databases. <http://apps.fao.org/>

International Fertilizer Association. <http://www.fertilizer.org/>