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Land Degradation: Definition and Global Importance

Land degradation refers to the deterioration or total loss of the productive capacity of land for present and future use. Such loss occurs mainly because of various forms of soil erosion (by wind and water) and of chemical and physical deterioration.

Desertification is defined as land degradation in arid, semi-arid and dry sub-humid areas resulting mainly from adverse human impact (and climatic variations), and is therefore a sub-set of land degradation in countries thetarest hectaresve additional climate zones. Both land degradation and desertification are part of overall ecosystem degradation (which in addition to loss of productive capacity includes loss of biodiversity, damaged ecosystem functions, and loss of resilience).

The extent of soil degradation induced by human activity since 1945 was evaluated as approximately 2 billion hectares, or 17 percent of Earth's vegetated land, in a recent study sponsored by the United Nations Environment Program (UNEP). Of this,

- about 750 million hectares (38 percent) are classified as lightly degraded (defined as exhibiting a small decline in agricultural productivity and retaining full potential for recovery)
- about 910 million hectares (46 percent) are moderately degraded (exhibiting a great reduction in agricultural productivity, amenable to restoration only through considerable financial and technical investment)
- about 300 million hectares (15 percent) are severely degraded (offering no agricultural utility under local management systems, reclaimable only with major international assistance)
- about 9 million hectares (0.5 percent) are extremely degraded (incapable of supporting agriculture and not reclaimable).

The direct causes of these forms of degradation (and estimates of the relative importance of each) are overgrazing (35 percent), deforestation (30 percent), other agricultural activities (28 percent), overexploitation for fuel wood (7 percent), and industrial activities (1 percent). Global rates of change in soil degradation are unknown. Estimates vary commonly between 5 and 12 million hectares lost annually.

The total desertified dryland area amounts to about 3.6 billion hectares, or 70 percent of global dryland area (excluding hyperarid regions). Roughly 2.6 billion hectares thereof exhibit no soil degradation, but have ecosystem degradation reflected in reduced crop yields, livestock forage, and woody biomass for fuel and building material.

Of rangelands, which make up 88 percent of the dryland area, 1.223 billion hectares (27 percent) are degraded slightly or not at all; 1.267 billion hectares (28 percent) are moderately degraded; 1.984 billion hectares (44 percent) are severely degraded; and 72 million hectares (1.6 percent) are very severely degraded.

Degradation classes are roughly comparable with those defined in the soil degradation survey above, and the principal direct causes of degradation are the same. The rate of abandonment of drylands due to degradation is probably 9 to 11 million hectares per year. Rates of degradation seem to be accelerating, particularly in developing nations.

Land degradation in tropical moist forest afflicts about 427 million hectares. The present global annual rate of tropical forest clearing (defined as depletion of forest cover to less than 10 percent in all types of tropical forest) is about 15.4 million hectares per year and is projected to accelerate. In addition, an area of roughly equal size is disrupted, but not cleared outright, through selective logging and shifting cultivation.

The extent to which clearing and disruption precipitate land degradation is unknown, but significant, especially on sloping land. Rates of abandonment of recently cleared areas, especially in hilly or mountainous regions, of as high as 75 to 100 percent are indicative of one extreme. In general, probably only about 50 percent of the tropical forest land cleared each year expands the area yielding agricultural benefits, whereas the other hectares replace abandoned lands.

As a crude but conservative estimate of the total degraded area, one can use the sum of

- areas affected by soil degradation
- drylands with vegetation degradation but no soil degradation
- degraded tropical moist forest lands, the total is, about 5.0 billion hectares or 43 percent of Earth's vegetated surface

Rehabilitation of the world's degraded lands is important for several reasons.

- First, increasing crop yields is crucial to meeting the needs of the growing human population for food, feed, biomass energy, fiber, and timber (in the absence of a massive increase in the equity of global resource distribution).
- Second, anthropogenic changes in land productivity have deleterious impacts on major biogeochemical cycles that regulate greenhouse gas fluxes and determine Earth's total energy balance.
- Third, biodiversity preservation depends, in part, on increasing yields on human-dominated land to alleviate pressure to convert remaining natural habitat.
- Fourth, land is frequently a limiting factor of economic output, and its degradation threatens to undermine economic development in poor nations and social stability globally. Rehabilitation of degraded land in PRC is particularly important not only because of its own population pressure on scarce land resources, but also because of its global significance