Box 1.7 Linking People and Ecosystems: Human-Induced Pressures

Thousands of used tires are shipped into the United States from Asia for retreading and resale every year. Some have contained larvae of the Asian tiger mosquito. Already the mosquito has established itself in 25 states, feeding on mammals and birds. Some of the mosquitos carry the equine encephalitis virus, often fatal to horses and people.

Behind all the pressures impinging on ecosystems are two basic drivers: human population growth and increasing consumption.

A logging concessionaire in Gabon clear-cuts areas in its assigned tract, paying the government a sizable permit fee. Its contract with the government, which owns the tract, allows it to harvest timber at below market rates if it replants the area. The concessionaire plants seedlings but does nothing to stop the ensuing erosion of topsoil, the siltation of nearby streams, and the migration or loss of wildlife that depended on the mature forest.

Small-scale, artisanal miners from Venezuela illegally cross the unmarked border into Brazil deep in the Amazonian rainforest. Although they have no legal right to mine there for gold, they can eke out a living for their families if they keep their operation small and move frequently from place to place. To increase their chances of extracting gold, they add mercury to the sluice, although the toxic metal is technically banned. Like thousands of other independents in the area, they let the mixture run off directly into a tributary where it poisons local fish.

Primary Human-Induced Pressures on Ecosystems

Ecosystem	Pressures	Causes
Agroecosystems 	■ Conversion of farmland to urban and industrial uses ■ Water pollution from nutrient runoff and siltation ■ Water scarcity from irrigation ■ Degradation of soil from erosion, shifting cultivation, or nutrient depletion ■ Changing weather patterns	■ Population growth ■ Increasing demand for food and industrial goods ■ Urbanization ■ Government policies subsidizing agricultural inputs (water, research, transport) and irrigation ■ Poverty and insecure tenure ■ Climate change
Coastal Ecosystems 	■ Overexploitation of fisheries ■ Conversion of wetlands and coastal habitats ■ Water pollution from agricultural and industrial sources ■ Fragmentation or destruction of natural tidal barriers and reefs ■ Invasion of nonnative species ■ Potential sea level rise	■ Population growth ■ Increasing demand for food and coastal tourism ■ Urbanization and recreational development, which is highest in coastal areas ■ Government fishing subsidies ■ Inadequate information about ecosystem conditions, especially for fisheries ■ Poverty and insecure tenure ■ Uncoordinated coastal land-use policies ■ Climate change
Forest Ecosystems 	■ Conversion or fragmentation resulting from agricultural or urban uses ■ Deforestation resulting in loss of biodiversity, release of stored carbon, air and water pollution ■ Acid rain from industrial pollution ■ Invasion of nonnative species ■ Overextraction of water for agricultural, urban, and industrial uses	■ Population growth ■ Increasing demand for timber, pulp, and other fiber ■ Government subsidies for timber extraction and logging roads ■ Inadequate valuation of costs of industrial air pollution ■ Poverty and insecure tenure
Freshwater Systems 	■ Overextraction of water for agricultural, urban, and industrial uses ■ Overexploitation of inland fisheries ■ Building dams for irrigation, hydropower, and flood control ■ Water pollution from agricultural, urban, and industrial uses ■ Invasion of nonnative species	■ Population growth ■ Widespread water scarcity and naturally uneven distribution of water resources ■ Government subsidies of water use ■ Inadequate valuation of costs of water pollution ■ Poverty and insecure tenure ■ Growing demand for hydropower
Grassland Ecosystems 	■ Conversion or fragmentation owing to agricultural or urban uses ■ Induced grassland fires resulting in loss of biodiversity, release of stored carbon, and air pollution ■ Soil degradation and water pollution from livestock herds ■ Overexploitation of game animals	■ Population growth ■ Increasing demand for agricultural products, especially meat ■ Inadequate information about ecosystem conditions ■ Poverty and insecure tenure ■ Accessibility and ease of conversion of grass-