

## EarthTrends: Featured Topic

Title: Unappreciated Gifts: Recognizing the Value of Drylands

Author: Robin White

Source: An Ecosystem Approach to Drylands: Building Support for New Development Policies

Date Written: January 2003

The world's drylands are remarkable ecosystems. Encompassing grasslands, agricultural lands, forests, and urban areas, they make up about 40 percent of the world's land area. Popular misconceptions hold that drylands are empty, barren places. However, while the hardships for humans living in drylands are rarely disputed, drylands have supported people's

but drylands are most extensive in Africa (nearly 13 million km<sup>2</sup>) and Asia (11 million km<sup>2</sup>). Commonly recognized drylands include the African Sahel, Australian Outback, South American Patagonia, and North American Great Plains.

The climate and variable water supply in drylands present challenges to plant and animal survival, but many species have evolved with special adaptations

livelihoods of those most dependent on natural resources. These people are frequently among the poorest in the world, with many subsisting on less than US\$1 per day. And, living in regions of highly variable rainfall and periodic drought, they experience high food insecurity. Unfortunately, policies thus far have not been as effective as possible or

uniquely focused in their attempts to address poverty and inequity issues in drylands.

Dryland assessment and management initiatives to date have failed to generate adequate interest and funding, largely because investors, development agencies, and the public have an incomplete understanding of the full range of valuable goods and services drylands have offer.

Traditionally, such

livelihoods for thousands of years. Today, drylands are home to approximately two billion people worldwide and support many modern cities, such as Cairo, Cape Town, Mexico City, Phoenix, and Teheran. Many dryland dwellers make their living as livestock herders and small-scale farmers.

The United Nations Convention to Combat Desertification (UNCCD 1999) has defined drylands as ecosystems within the arid, semi-arid, and dry sub-humid aridity zones (Box 1). Every continent contains land within these zones,

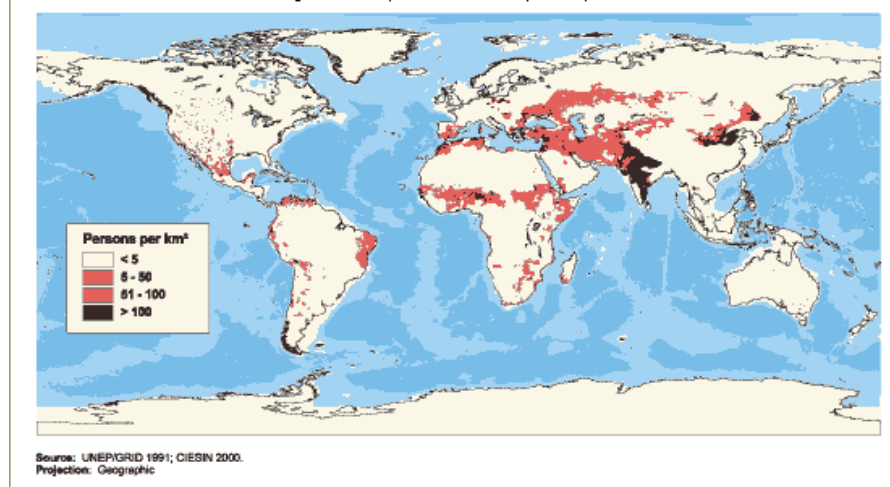
that allow them to cope in that environment. One common plant adaptation is the development of deep and extensive root systems. Some animals adapt by becoming inactive, using shade, and taking cover underground during the hottest times of the day.

For decades, national and international policy makers have been concerned that drylands are at risk of irreversible degradation, that is, loss of their long-term capacity to supply goods and services to human populations. Such ecosystem degradation in drylands would exacerbate the conditions of poverty and threaten the

initiatives as the Land Degradation Assessment of Drylands (LADA) or the UN Convention to Combat Desertification (CCD), have emphasized the damage that dryland ecosystems have incurred due to human activities. Support for these programs has the potential to grow significantly if they called more attention to the diverse productive capacities of drylands, while simultaneously incorporating the optimization of dryland resource use into their objectives.

### Drylands Support Billions of Lives

Figure 1: Population Density in Drylands



## Goods And Services Provided By Drylands

In this article, we identify and examine a selected set of dryland goods and services that programs can consider for this purpose. These include forage and livestock; food production; biodiversity conservation; freshwater; carbon storage; energy production; and tourism and recreation.

### Forage and Livestock

More so than any other use today, people rely on drylands to provide forage for the production of domestic livestock. Some of the highest livestock densities in the world are in the drylands of Asia, Africa, the Middle East, and South America. From cattle, sheep, and goat herds, to horses and camels, drylands support large variety of domestic animals, which become the source of meat, milk, wool, and leather products for humans.

For example, in West Africa (home to 20 percent of all cattle and 30 percent of all sheep and goats in sub-Saharan Africa), well over half of the region's 175 million head of livestock are raised in arid/semi-arid rangelands and mixed cropping areas (Table 1). Drylands also support large numbers of wild herbivores that depend on the ecosystem for year-round habitat and share the land with domestic herds.

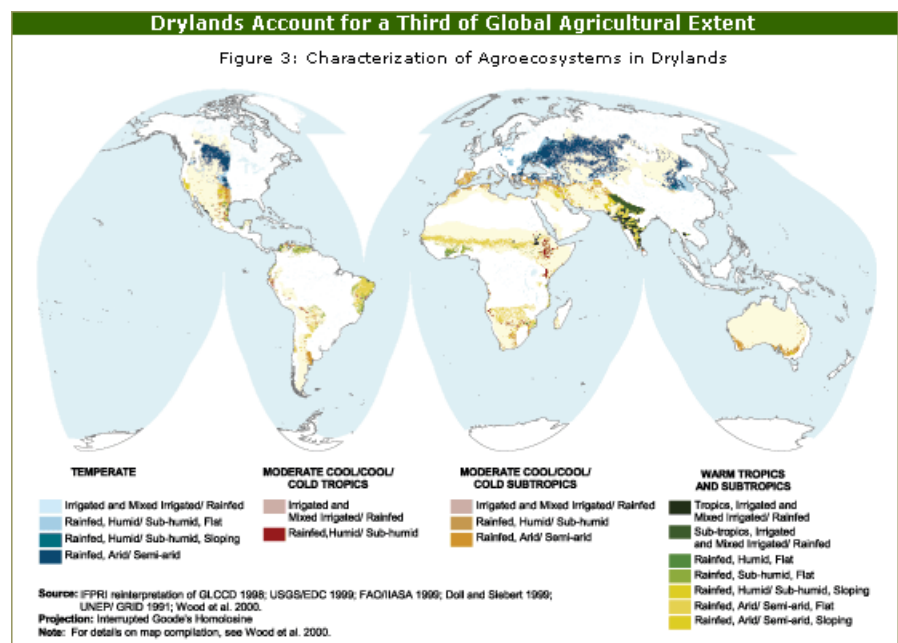
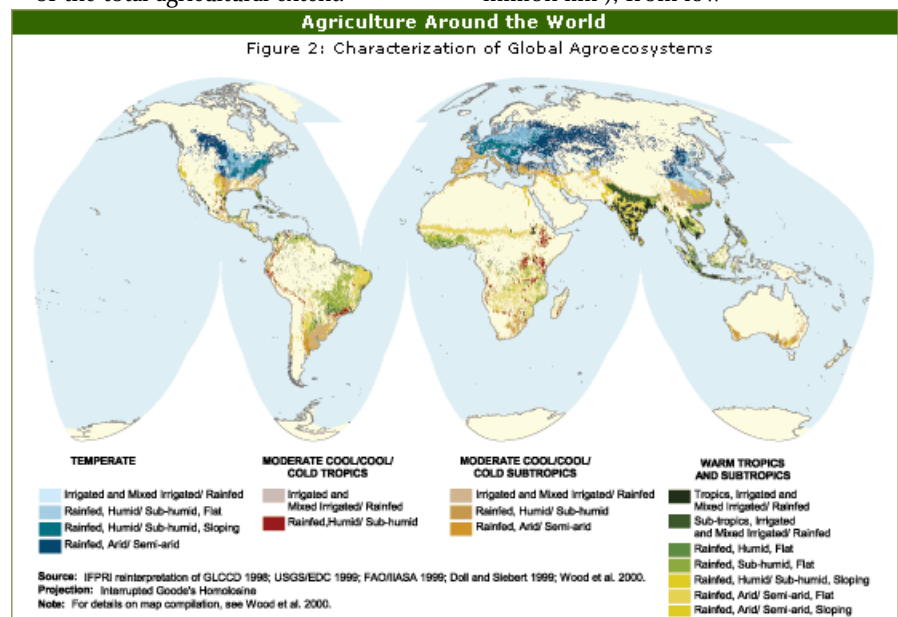
### Food Production

Dryland ecosystems are also used extensively for the production of food. Many of our major food crops, such as wheat, barley, sorghum, and millet originated in drylands. Today, wild varieties from these centers of origin serve as sources of genetic plant material for developing drought-resistant crop varieties.

The two maps below depict the diversity and distribution of the planet's agroecosystems, which are ecosystems managed by humans for the primary purpose of producing food and other socially valuable goods and services. The first map shows the extent of agroecosystems for all climates, while the second isolates drylands from the global data. Drylands can be seen to comprise over one third of the total agricultural extent.

### Freshwater

Freshwater resources in drylands, often limited and variable in availability, are important water sources for drinking, irrigating crops, and supporting wetland flora and fauna. Water basins in drylands are found on every continent, ranging from small (52 thousand km<sup>2</sup>) to very large (3 million km<sup>2</sup>), from low



population densities (1 person/km<sup>2</sup>) to high population densities (nearly 400 people/km<sup>2</sup>). While the number of wetlands in these basins in drylands is generally low, many contain wetlands listed as international important.

#### *Biodiversity*

Drylands also provide habitat for species uniquely adapted to variable and extreme environments. Dryland species range from micro-organisms, to ants, grasshoppers, and snakes to large carnivores such as cheetahs and leopards. Some areas have been identified as especially important to the survival of these uniquely adapted plants and animals. For example, The IUCN-World Conservation Union, and World Wildlife Fund (WWF) have identified 234 Centers of Plant Diversity (CPDs) worldwide, of which 39 are located in drylands. These are areas with high levels of plant diversity, where conservation practices could safeguard a great variety of species. In addition, the World Wildlife Fund-US has identified 232 ecoregions as “outstanding examples of the world’s diverse ecosystems and priority targets for conservation actions.” Of the 138 terrestrial ecoregions within this “Global 200,” 31 can be characterized as dryland ecoregions, containing some of the most important dryland biodiversity in the world today.

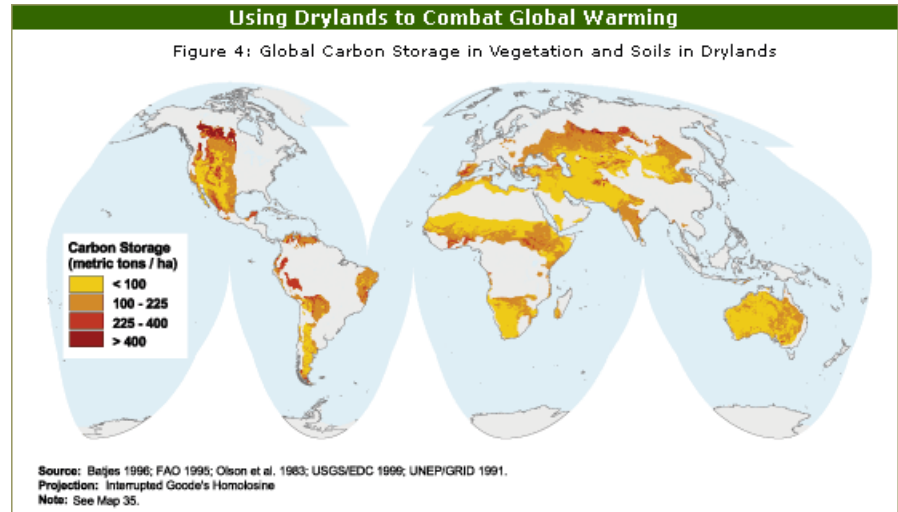
#### *Carbon Storage*

Over time, human activities have altered the amount of carbon that flows through and is stored in various reservoirs. To offset the global warming caused by climbing carbon concentrations in the atmosphere, countries actively are seeking ways to reduce atmospheric CO<sub>2</sub> by

increasing carbon storage capacity on land. Drylands, as an ecosystem with extensive surface area across the globe, can store large amounts of carbon, most of it in the soil rather than in vegetation. They have thus been suggested as potential candidates for major carbon storage efforts.

#### **Conclusion**

Dryland ecosystems, although providing a wide array of goods and services, are not always recognized as fully as other terrestrial ecosystems on the planet. Drylands support flora, fauna, and people in important



#### *Energy*

Additionally, drylands provide energy resources to local populations as well as global markets. These resources include woodfuels and a variety of fuel minerals. In some cases, energy resources supply local people with daily heating and cooking fuels. In fact, in Africa, households use more woodfuel than the industry or commercial sectors.

#### *Tourism*

Drylands have become major tourist destinations. Tourists may be attracted by the open, vast, and picturesque landscapes. Others may rely on dryland areas for hiking and camping, hunting, wildlife-watch, or photography. Specific dryland sites are considered culturally and spiritually important.

and often unique ways.

Enhancing awareness of these benefits can do much to raise the support that dryland initiatives need to function more efficiently. Programs would then be more capable of sustainably managing and protecting dryland resources, insuring that humans can enjoy and profit from drylands for generations to come.

**Box 1.**

The United Nations Convention to Combat Desertification (CCD) has identified the world's drylands by determining the extent and distribution of aridity zones. The aridity zones are delineated based on an aridity index, which is determined by the ratio of precipitation to potential evapotranspiration (PE). PE is the amount of moisture that, if it were available, would be removed from a given land area by evaporation and transpiration (UNEP 1997). Based on this index, the world can be divided into six aridity zones. The term "drylands," as used by the CCD and discussed by UNEP (1997), encompasses the arid, semi-arid, and dry sub-humid zones (excluding polar and sub-polar regions). In these zones, ratios of mean annual precipitation to mean annual potential evapotranspiration range from 0.05 to 0.65. (Other aridity zones include hyperarid environments [ratios less than 0.05] and humid areas [ratios are greater than .65] Globally, drylands account for about 40% of total land area. Drylands also can be defined using criteria based on soil moisture and agricultural production systems.

**REFERENCES**

White, Robin. 2003. *Drylands, People, and Ecosystem Goods and Services: A Web-based Geospatial Analysis*. Washington, D.C.: World Resources Institute. To be released online in February 2003.