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Central Afghanistan rangelands

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Introduction Afghanistan, encompassing 63 million hectares, is a little larger than the states of Arizona and New Mexico combined and has a long history of human occupation. It is a culturally diverse country peopled by tribes of Turkish, Persian and Mongolian descent. The northern foothills of the Hindu Kush, the major mountain range of Afghanistan, are within the historic range of the domestication of wheat and barley and sheep and goats some 10 to 11,000 years ago. The grazing of small flocks of closely herded sheep and goats over the last 4-5000 years has been an important factor in shaping the development of Afghan plant communities. Today rangelands comprise between 60 to 75% of the land area depending on the source of the information. These rangelands are critical for supplying Afghanistan with livestock products, fuels for heating and cooking, building materials, medicinal plants and habitat for wildlife. Rangeland watersheds feed the springs, streams and rivers; the lifeblood of the country that nourishes nearly 4 million hectares of irrigated lands.

Methods The author spent four months in central Afghanistan in 2006 on a USAID funded project to train Afghan Ministry of Agriculture employees in rangeland management. This project and subsequent study yield an introduction into the character of the rangelands of Central Afghanistan.

Results The climate of central Afghanistan is continental with cold winters and hot, dry summers. Moisture comes as snow in the winter and rain in the spring. Kabul, at 1800 meters elevation, 34 degrees north latitude and with 270 mm of annual precipitation has vegetation that looks remarkably similar to that of the hills around Reno, Nevada. Rangelands in the central region occur across the Hindu Kush at elevations from 1000 to 4000 meters and with mean annual precipitation ranging from 150 to 500 mm. The natural vegetation across most of this region is sagebrush steppe with large areas capable of supporting open woodlands of juniper or pistachio. The soils are nearly all calcareous; primarily as a result of secondary enrichment by carbonates from wind-blown dust. The soil moisture regime is xeric and temperature regimes range from thermic to frigid (at the higher elevations). Shallow to moderately deep (25 to 60 cm) coarse textured soils occur on hill-slopes. They are classed as haplocambids or haplocalcids. Deep soils occur in valleys and appear to be mixtures of loess and gravely stream alluvium. Textures are silty; gravel content is variable. They are calcareous, yellow in color and classified as haplocambids. Plant communities across the region appear simplified in areas close to cities and villages. Intense human use of these lands during the last 23 years of war, drought, lawlessness and population increase has resulted in the loss of shrub and tree cover and in plant communities dominated by annual grasses and forbs. But, upon closer inspection, many are surprisingly diverse, especially the plant communities of rocky hill sites. Existing plant communities are well adapted to heavy utilization as livestock grazing has occurred for 4-5000 years. Perennial grass and grass-like species and herbs exhibit many adaptations to close grazing. Bulbs, rhizomes, rootstocks, dormant seed, awns and barbs are common. Hundreds of herbaceous annual species occur in these plant communities. Shrubs tend to be well armed with thorns or spines or have high levels of toxic substances or essential oils like alkaloids and terpenes. Several species of juniper and two species of pistachio occur in this region. These low trees presently exist in isolated areas but formerly had much more extensive ranges. Sagebrush or *Artemisia* species fill a dominant niche in these xeric and grazing intense environments. The essential oils in sagebrush (terpenes) inhibit rumen microflora and greatly reduce the digestion of cellulose. Many species are not grazed at all during the growing season. Shrub cover is extremely important to provide soil protection, trap snow on the land, shade the soil surface, as wildlife habitat, to develop rooting structure and break up soil compaction. The present day utilization of sagebrush for fuel is not sustainable and is one of the most pressing problems in rangeland management in Afghanistan.

Conclusions Rangelands in central Afghanistan are very similar to the sagebrush and juniper rangelands of the Great Basin of the western United States. Overgrazing and overharvest of shrubs for fuel threaten these ranges.