Natural Resource Management

Natural resource management is a systems approach to managing our natural resources: land, water, air, minerals, forests, fisheries, wild flora and fauna, and the corresponding ecosystems. It recognizes that these are the resources that underpin human life; we rely on the productivity of our landscapes, and our actions as stewards of the land play a critical role in maintaining the health and welfare of our global communities.

With the world population expected to reach 8.2 billion by 2030, the planet will need to feed an additional 1.2 billion people, 90 percent of whom will be living in developing countries. Arid regions are especially vulnerable, as more than 1.2 billion people live in areas of severe water scarcity and about 1.6 billion people live in areas where human capacity or financial resources are insufficient to develop adequate water supplies. An estimated 250 million people have already been affected by desertification and nearly one billion more are at risk, putting sustainable natural resources management of these arid regions in jeopardy.

Natural resource management addresses three key concerns that are particularly relevant in developing countries:

1. Renewable natural resources are often utilized beyond their regenerative capacities. Depletion of these resources is particularly problematic in poor rural areas as poverty restricts the ability of local populations to make resource-enhancing or soil-conserving investments.

2. Nonrenewable natural resources – such as water and other mineral resources – often are depleted, but their exploitation may not translate into real investment in human capital or infrastructure. Typically only very minor residual benefits accrue to local populations.

3. The resilience of ecosystems is often overwhelmed by pollution, erosion, habitat fragmentation, and the depletion of water, which in turn negatively affects the livelihoods and health of rural communities that are dependent on the utilization of natural resources.

The IALC supports research that informs sustainable natural resource management. IALC projects have investigated ways to increase production, make efficient use of resources and sustain ecosystem function and services. By coordinating efforts between multiple networks and partners, the IALC is helping to inform natural resource policy and decision-making.

See the reverse side for detailed examples of these IALC Natural Resource Management Projects:

1. Ecosystem Consequences of Cheatgrass Invasion in the Great Basin (2002).

2. Dryland Vegetation Dynamics and Landscape Vulnerability to Wildfire (2006).

3. Predicting Seed Bank Germination in Semiarid Rangelands Under Grazing (2002).

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Read more about IALC Natural Resource Management Projects on our website: http://ialcworld.org.

1. Ecosystem Consequences of Cheatgrass Invasion in the Great Basin (2002).
University of Illinois, Desert Research Institute, Weizmann Institute of Science, Environmental Sciences and Energy Research (Israel)
Evan DeLucia (Principal Investigator)

Propelled by overgrazing and fire, the transformation from diverse shrub-perennial grass steppe to annual grassland dominated by cheatgrass is well underway in western Nevada. The objective of this research was to quantify the ecosystem-level consequences of cheatgrass invasion, and remediation practices, on carbon and water resources in the Great Basin Desert. Results indicate that the conversion of native sagebrush to post-fire communities disrupts seasonal patterns of carbon and water exchange, and alters both the seasonal availability and spatial distribution of soil water, which may impede the establishment of native perennials. The capacity of Great Basin Desert ecosystems to uptake carbon and the regional water balance may be severely affected by this landscape transformation.

2. Dryland Vegetation Dynamics and Landscape Vulnerability to Wildfire (2006).
University of Arizona, Universidad de Alicante (Spain), Technion Israel Institute of Technology, USDA Forest Service, University of Haifa (Israel)
Barron Orr (Principal Investigator)

Drought, wildfire and precipitation events can have a devastating impact on the sustainable use of dryland resources. The primary objectives of this research were to integrate seasonal and geospatial vegetation and climate data sources with erosion plot data to assess land degradation and recovery after wildfire events. A geospatial land degradation information system was used to develop seasonal assessments of post-fire land degradation potential for sites in Israel, the USA and Spain. The outcomes of this project create the opportunity for land managers to generate seasonally representative maps of land degradation and erosion risk at the regional scale, and to assess the relative importance of factors contributing to land degradation.

3. Predicting Seed Bank Germination in Semiarid Rangelands Under Grazing (2002).
Hebrew University of Jerusalem (Israel), Brigham Young University, USDA Forest Service, Agricultural Research Organization of Israel, Ben-Gurion University of the Negev (Israel)
Jaime Kigel (Principal Investigator)

A better understanding of the dynamics of the seed bank and temporal patterns of germination is particularly important for dryland grazing systems in semiarid regions, where annual plants are the main biomass producers for forage. The main goal of this project was to achieve a better understanding of the relationships between the seed-bank and the ensuing annual vegetation as affected by interannual variation in climatic conditions. An improved understanding of seed bank dynamics will substantiate future models dealing with the effects of climate change on vegetation.

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