

Humans Trading Short-Term Food For Long-Term Environmental Losses

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Your breakfast this morning came at a cost not only to your wallet. Your bowl of Cheerios and cup of coffee and all the other meals for the other 6 billion people in our world cost the Earth a bit of its water, a bit of its ecological diversity, contributed to its pollution and may one day cost us our livelihood.

In the July 22, 2005 issue of the journal Science, co-author Terry Chapin, professor of ecology at the University of Alaska Fairbanks (UAF) Institute of Arctic Biology (IAB), and colleagues point out that modern land-use practices may be trading short-term increases in food production for long-term losses in the environment's ability to support human societies. Part of the solution, according to Chapin, is the students in UAF's Regional Resilience and Adaptation Program (RAP).

Local land-use practices such as clearing tropical and boreal forests, practicing large-scale agriculture, expanding urban centers and intensifying farmland production are so pervasive their effects are now observed globally. Fertilizer use, which has increased 700% in the past 40 years, and human-caused atmospheric pollution now negatively affect water quality and coastal and freshwater ecosystems.

Biodiversity is lost due to modification, fragmentation and loss of habitats, soil, and water, and exploitation of native species. Land-use practices play a role in changing the global carbon cycle, and possibly, the global climate.

The key to resilient and sustainable land use, according to the paper's authors, is closer collaboration between scientists and practitioners - linking, for example, ecologists and land-use planners, climatologists and architects, and entomologists (insect scientists) and physicians - and the development of land-use strategies that recognize both short- and long-term needs.

Such collaboration and long-range planning is at the heart of UAF's RAP. "We need manager and policy makers who understand the ecological, economic, political, and social connections and unintended consequences of land-use decisions," said Chapin, RAP's director. The program trains students to be scholars, policy-makers and resource managers able to address issues of regional and global sustainability.

"All of the changes in local land-use are driven by human activities to meet local needs or create economic profits, but these changes have global consequences," Chapin said. "We need to be aware of the local and global consequences of land-use change so that the true costs are considered when land-use planning and development take place. It's not to say there shouldn't be any land-use change, but it must be in context."

RAP graduate student Nancy Fresco's work on carbon sequestration in boreal forests is an example of this new approach to land-use decisions.

"Crossing between academic fields and taking a global perspective on local issues can be daunting, because linked social and ecological systems are innately complex," Fresco said. "But global land-use problems are too serious to be ignored. Here in Alaska, we can see some of these problems first-hand, and we have the resources to find workable solutions."

"Alaska has many of the properties of a third-world economy," Chapin said. "An extractive economy subject to changes in the world economy,

tremendous amounts of natural resources, diversity of cultures - and we've got the money and the wealth to solve the problem if we know what to do," he said.

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