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Nutrition and The Environment

**TIMOTHY JOHNS AND
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Rapid environmental changes are profoundly altering the relationships between humans and the ecosystems in which they live. These changes include overpopulation, loss of biological resources, ecosystem destruction associated with industrial and commercial development, climatic change, urbanization, modern agriculture employing pesticides and other inputs, and erosion of food crop diversity from years of genetic engineering focused on a few crops.

Such disruptions in environmental integrity can affect patterns of human health, disease, and nutritional status. In its preamble the Convention on Biodiversity recognizes that "... conservation and sustainable use of biological diversity is of critical importance for meeting the food, health and other needs of the growing world population, for which purpose access to and sharing of both genetic resources and technologies are essential." The Intergovernmental Panel on Climatic Change specifically discusses nutritional status as an outcome of climatic change in Africa.

An understanding of these links offers guidance on nutrition-relevant actions that provide sustainable solutions to environmental changes. At a time of unprecedented climatic and environmental change,

nutrition knowledge becomes vital in enabling individuals and populations to adapt in the most positive manner possible. The nutritional status of populations, as a recognizable and measurable outcome, should help direct other scientific disciplines and intervention programs in identifying sustainable solutions to the environmental and economic problems facing global communities.

The Environment-Nutrition Connection

As community development priorities merge with those of environmental conservation, it becomes increasingly clear that unless human populations meet their basic survival needs they cannot afford to conserve. At the same time unless local communities protect the environments around them they have limited hope to thrive beyond the short term. As nutrition represents the most fundamental of human needs, it provides a useful perspective from which to address this paradox.

Nutrition research provides essential information on how environmental degradation can lead to major nutrition-related health problems such as malnutrition, infectious disease, and contamination. When people have reduced access to and intake of crucial bioresources, they may suffer from protein-energy

malnutrition and micronutrient deficiencies. Diabetes and coronary heart disease that reflect reduced intake of nutrients and non-nutrients protecting health underscore the cost of increased reliance on processed foods or a narrow species base by industrial societies and urban populations. Major public health problems of global importance such as tuberculosis, gastrointestinal diseases, measles, and respiratory disease all reflect the interaction of nutritional and environmental factors.

Environmental contamination from industrial and agricultural chemicals such as heavy metals, organochlorines, and radionucleotides may compromise people's nutritional status and health either directly or through changes in diet. Herbicides and pesticides eliminate uncultivated food sources from agroecosystems; other chemicals may make them unfit for consumption. Persistent organic pollutants (POPs) transported in the atmosphere can have adverse effects on traditional food systems far removed from major sites of pesticide use.

Seeking Sustainable Solutions

Food-based strategies are key to addressing global hunger and malnutrition as well as enabling vulnerable populations to adapt to environmental and socio-economic changes.

While modern technology-based farming is essential for producing food for the growing world population, concerns about crop quality and production seldom include nutrition, or if they do, tend to focus on protein. Similarly,

acknowledgments that loss of biodiversity and other environmental changes affect diet and health are usually limited to general considerations of food security without attention to the complexity of nutrition-health relationships.

Some research and intervention programs have focused on providing micronutrients such as vitamin A or minerals through genetic improvement, crop diversification, and soil management. More attention needs to be applied, however, to identifying crop varieties and minor crops with selective nutritional assets such as micronutrients, soluble fiber, or antioxidants and to analyzing the nutritional content of indigenous fruits and vegetables and wild edible species. Programs should give greater importance to maintaining the genetic diversity of plant species within home gardens and local agroecosystems. Where they can be exploited sustainably, uncultivated resources can also improve nutrition indirectly by contributing to economic livelihood.

Genetic modification and other strategies that target single nutrients promise selective improvement of plant nutrient composition. Although genetically modified organisms are subject to considerable scrutiny for their potential adverse effects on human health, this technology also has potential ecological and social effects that require careful evaluation.

While institutional approaches are essential to address problems of a global magnitude, national efforts, particularly those involving local communities, are also important. Local multidisciplinary activities that combine nutrition research, ethnobotany, and ecosystem and resource management with health care activities, and that embrace participatory models of empowerment and initiative, offer real hope for addressing problems at the levels where people are directly affected.

Researchers have documented ways in which populations with traditional life-styles (often populations identified as indigenous) satisfy their nutritional needs

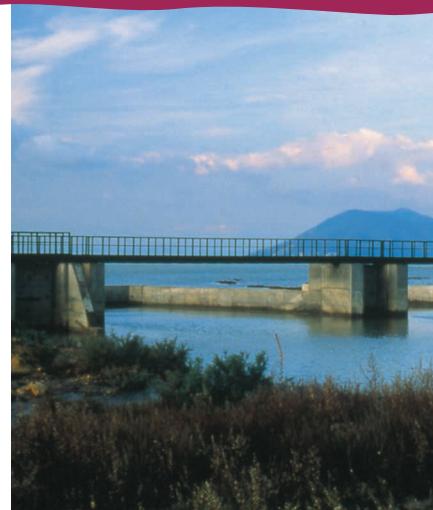
through unique human-environment relationships. For example, rice, pulses, and milk products provide a balance of amino acids for subsistence farmers in India. In situations where animal protein and fat are the primary energy sources, such as among Arctic hunters and dryland pastoralists, populations have adapted specialized preparation techniques and used wild plants to ensure that essential vitamins and minerals are consumed. Nutritional sciences can help determine whether these traditional systems can be adapted for use elsewhere. Coupled with knowledge about the role of nutrition in contemporary health problems, traditional knowledge and resources can guide environmental efforts to identify sustainable solutions.

In turn, adequate nutrition increases options for conservation, or at least reduces pressure on people to use resources unsustainably in the effort to meet their basic needs.

Traditional values of conservation, encompassing relationships to land, spiritual dimensions, and concepts of health, are fragile and vulnerable to modern forces of change. Nonetheless, cultural values can be important components in programs of public health education and ecological recovery. Integrating the biological, social, and cultural dimensions of human-environmental relations is as essential to the present and future sustainability of human health as it has been throughout history.

Conclusion

Major health problems of the 21st century include nutritional deficiencies and dietary changes in both rural and urban settings. Nutritional analyses, combined with an understanding of traditional systems and resources, can help identify the biological and sociocultural components of solutions to dietary and health problems associated with dietary change and adaptive strategies for the future. Addressing nutritional needs offers a primary rationale for the preservation of traditional knowledge and life-styles, the conservation of wild and



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cultivated resources, and the sustainable use of the environments in which they are located.

Suggested Reading

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