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HOW ETHNOBIOLOGY CAN CONTRIBUTE TO FOOD SECURITY

Harriet V. Kuhnlein, Ph.D.¹

Food insecurity is a compelling global problem with compound causation in population expansion, industrialization of agriculture and food marketing, and environmental deterioration. The United Nations system has addressed the need for food and nutrition security from a foundation of human rights law and expressed the requirement for all people to be food secure with sustainable food systems and diets. Food biodiversity is a component of the sustainable food systems that are practiced by Indigenous Peoples living in intact ecosystems. This paper describes the evolution of the principles of food and nutrition security within the United Nations, explores current issues, and highlights a program with Indigenous Peoples’ food systems that includes health promotion interventions using biodiverse local foods. Highlighted are the roles of ethnobiologists in understanding the principles and concepts underlying food and nutrition security, in promoting food biodiversity and healthy food systems, and in contributing to policies protecting food biodiversity and food and nutrition security.

Keywords: ethnobiology, food security, food and nutrition security, Indigenous Peoples, biodiversity, food systems

Introduction

Food security is a contemporary topic that is seriously considered by global policy makers, academicians, and public health practitioners. The absence of food security (food insecurity) affects all aspects of life for individuals, households, communities, or nations; when chronic, it can undermine human and ecological health and political stability. Roughly one in eight people in the world today suffer from chronic food deprivation (FAO et al. 2013). Major efforts within the United Nations (UN) consistently address this form of food insecurity because it countervenes basic human rights (Damman et al. 2008). Indeed, food insecurity has momentous economic and environmental effects within a complex web of global conditions and circumstances, including increasing global population of more than 10 billion by the year 2100 (Sullivan and ClimateWire 2013).

This paper highlights how the discipline of ethnobiology specifically can improve global food security by contributing to our understanding of how food sovereignty and food and nutrition security are linked to culture- and environment-specific food systems. Food systems are the sum of all processes and actions that culminate to feed us, including the holistic contributions of nutritional, social, economic, and political circumstances. A food system of a particular culture includes food from the local environment that is situated within its sociocultural meanings, acquisition/processing techniques, use, composition, and nutritional consequences (Kuhnlein and Receveur 1996). The principles of ethnobiology (Lepofsky and Feeney 2012) provide an ethical and

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productive framework for exploring the knowledge and wisdom contained within these food systems, so that this knowledge can in turn be shared in the world literature.

The paper begins with a review of how the global nutrition situation and food biodiversity are positioned in the UN concept of food and nutrition security, how they are measured, and how they are threatened by global environmental change. I highlight throughout the paper how indigenous and other subsistence-oriented peoples and their food systems are seriously and increasingly challenged by this global context. I also explore the ways that ethnobiology, including ethnonutrition, can advance and extend knowledge about how to document and to improve food biodiversity and food and nutrition security and health. To illustrate this, I describe the global health program of the Centre for Indigenous Peoples’ Nutrition and Environment (CINE) where 12 ethnobiological case studies of Indigenous Peoples in different ecosystems documented food biodiversity; nine of these then implemented food and nutrition interventions to improve health. These case studies exemplify some of the many ways Indigenous Peoples use the knowledge, wisdom, and expertise encompassed with their food systems to promote health within their own communities. Documenting biodiverse food systems of Indigenous Peoples and creating policies that protect these food systems will contribute to food and nutrition security and well-being among all peoples of the planet (Kuhnlein and Erasmus et al. 2013a).

The Global Nutrition Situation

More than 800 million people are estimated to regularly not get enough food to conduct an active life, and an additional 2 billion have undernutrition and micronutrient deficiencies (FAO et al. 2013). At the same time, about 1.5 billion experience being overweight or obese—the other side of the unhealthy diet continuum that is created by excess energy consumption (Popkin et al. 2011; WHO 2013). This latter number is growing and is part of the “nutrition transition,” the shifting prevalence from undernutrition with high rates of infectious diseases, to that of overnutrition characterized by excess consumption of highly processed food and dominance of chronic diseases (obesity, cardiovascular disease, cancer, etc.).

Health disparities for both undernutrition and overnutrition are coincident with disparities in education and income that precede poor food availability, access and choice, and use. In both developing and developed countries, more than 50% of national populations have been economically attracted to urban areas, removing people from their local ecosystems and cultures, and exacerbating food insecurity among the poor. Disparities experienced by Indigenous Peoples are especially revealing as they are often lowest on the economic ladder, but retain great knowledge of sustainable food systems practices in rural ecosystems that are gradually lost upon moving to cities.

It is in this context of urbanization and economic, cultural, and ecosystem deprivation that diets for so many people, including Indigenous Peoples, have become unhealthy and monotonous with excessive intake of refined, sweet, fatty, and salty industrially derived foods. Circumstances are created from the
provisioning of food from global agricultural and food businesses that is as cheap as possible, while still driving profit; these same foods lack the nutrient density and cultural meanings of the indigenous diets known within intact rural ecosystems. At the same time, urban “modern” lifestyle and technology shifts people to less physical movement and exertion, thereby setting the stage for increasing body weight, reduced physical fitness, and more chronic degenerative disease.

World food supplies are increasingly dominated by a limited number of plant and animal food species, limiting the markets of biodiverse foods that can enhance nutrition and other aspects of human diets. This decline in the nutritive value of crops commercially grown per acre is directly linked to the loss in local knowledge of ecosystem sustainable food systems practiced by indigenous, tribal, and other subsistence-oriented peoples (Barthel et al. 2013; Tudge 2013). Deforestation driven by modern agriculture, along with climate change, are negatively affecting natural ecosystems everywhere; this in turn has negative effects on local and naturally derived food systems and on the local people whose well-being is dependent upon them. Deforestation for the imperative of more agricultural land to supply profit for the international food industry markets with unhealthful food (and limited essential nutrients), or crop-based fuels, is now recognized as unsustainable (Tudge 2013).

What is Food and Nutrition Security and How is it Measured?

The concept of food security has evolved considerably since it was first introduced in the UN Food and Agriculture Organization (FAO) in 1974 at the World Food Summit to recognize the need for “availability at all times of adequate world food supplies.” In the 1980s, the terminology expanded to include the need of “physical and economic access to food.” In 1996, the World Food Summit adopted the commonly used definition that, “Food security exists when all people at all times have physical and economic access to food that is sufficient, safe and nutritious to meet dietary needs and food preferences for an active and healthy life” (FAO 1996). The 2013 State of Food Insecurity in the World (FAO et al. 2013) reports the concept of “nutrition security,” as the requirement of care, health, and hygiene practices in addition to food security. The most current and encompassing definition, that of “food and nutrition security,” has been proposed (pending adoption) by the FAO Committee on World Food Security to exist “when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for an healthy and active life” (Committee on World Food Security 2012). All of these definitions are founded in the 1948 Universal Declaration of Human Rights and the 1966 International Covenant on Economic, Social and Cultural Rights, both of which are important in situating the right to food within international human rights law (Damman et al. 2008).

The entire UN system has foundations in protecting human rights such as the right to access food, and ensuring that all food systems are sustainable (Ki-moon 2012). Concerning Indigenous Peoples, specifically, the UN Declaration on the Rights of Indigenous Peoples (United Nations 2008) includes the rights of...
Indigenous Peoples to many things, including, “to be sure in the enjoyment of their own means of subsistence and development” (Article 20); “the right to enjoy the highest attainable standard of physical and mental health” (Article 24.2); the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise acquired (Article 26.1) (United Nations 2008). This declaration implicitly recognizes the connections of food and nutrition security among Indigenous Peoples and the preservation of cultural and biological diversity. Acknowledging these connections is foundational to the CINE projects described in detail below.

These international documents, now endorsed by most states (nations) in the UN system, define the human rights approach to food as well as the concept of food sovereignty. Food sovereignty is broadly understood as the right of nations and peoples to control their own food systems, including their own markets, means of production, environments and food cultures, which in essence assures access to their foods of choice (Wittman 2011). Food sovereignty is therefore important to ensure food and nutrition security. This is particularly so among Indigenous Peoples who have food systems based in their cultures and local environments, and which may be threatened by land grabs and other ecosystem insults for economic gain (Turner et al. 2013).

The measurement of food security is intrinsically part of the converse—food insecurity. Understanding the extent of food and nutrition insecurity is often through reported data that give the numbers or proportion of populations that are food insecure. This is measured in various ways, such as the percentage of national populations that do not meet per capita energy needs calculated from agricultural and population statistics reported by national governments (FAO et al. 2013). With other measures, individual or household surveys derive food insecurity as the percentages that do not meet dietary energy or other nutrients needs, or of not having “enough food” or “enough money to buy food” (Jones et al. 2013). It is of special note that while food insecurity may coincide with being overweight and obesity (Metallinos-Katsaras et al. 2012), or with undernutrition (being underweight and/or small stature), there are as yet no internationally agreed indicators that define overnutrition as a consequence of food insecurity.

At this point, the UN development goals for improving food security continue to rest with reducing hunger and the degree of undernourishment (insufficient energy) or undernutrition within countries. While undeniably important, these goals address only part of the food and nutrition insecurity picture. It is here that ethnobiology can have the greatest impact. From its interdisciplinary and holistic perspective, ethnobiology offers insights into food biodiversity situated within culture-specific contexts, as well as the impacts of food and nutrition insecurity in food systems. From this holistic vantage point, the ways to address food and nutrition security become more evident to those who seek ways to improve community health.

**Biodiversity and Sustainable Food Systems and Diets**

Biodiversity is a central concept in thinking critically about food resources for healthful diets, and is often linked to cultural practices (Burlingame 2010).
Promoting biodiversity is a tenet of sustainable food systems, sustainable diets, dietary adequacy, and food and nutrition security (FAO 2008). As our populations expand and become more productive economically, and increasingly urbanized, it is clear that the world’s natural resources that produce food systems must become not only more efficient but also equitable in their use. Sustainable diets are created by nutrition-sensitive and climate-smart agriculture and food systems that are driven by nutritional need rather than profit (Burlingame 2010).

The supply and consumption of animal source foods serves to illustrate this connection between biodiversity and sustainable food systems among indigenous and other subsistence-oriented people. Globally, the poor, especially in developing countries, need the protein and associated nutrients provided by animal foods. However, rich countries and the wealthy in developing countries have increased the global appetite for animal foods, with excess consumption that contributes consequently to obesity and chronic disease. This excess, driven by intensive livestock production and marketing, fosters deforestation for grazing lands and decreases plant food diversity. Furthermore, the increased production of market meats creates livestock-generated methane and other greenhouse gasses that contribute to climate change; as well, other environmental contaminants result from manure disposal.

Redistributing animal foods from rich to poor populations, especially to children, is a complex problem rooted in global market inequities. While there is no single solution, an important strategy is increasing the number of small-holder farmers who produce animal foods. These small-holder farmers are herders or pastoralists who also have small holdings of plant crops, both wild and cultivated. Not only does this increase income in rural areas, but it reduces emphasis on the massive production of industrialized agriculture and marketing, including excess meat production and consumption, that is actually food “waste”—food that is unnecessary and produced with excess agricultural resources. Finding solutions to the inequities in the distribution and consumption of animal food lies, again, in interdisciplinary understanding, education, collective will, and multi-sectoral cooperation within and between governments, civil society, and the private sector. Accordingly, ethnobiologists can contribute to this understanding and discourse on the values of biodiversity and equity in food systems.

An Ethnobiological Approach to Food Systems: The Centre for Indigenous Peoples’ Nutrition and Environment (CINE)

Researchers with CINE based at McGill University, Montreal, have worked with Indigenous Peoples and food and nutrition security for more than 30 years. Established in 1992 in response to the call from Canada’s Aboriginal leaders, CINE developed community based participatory research and education about Indigenous Peoples’ food, nutrition, and environment. A significant component of the Centre is research on the threats faced from environmental deterioration and its effects on health and lifestyles of rural-dwelling Indigenous Peoples; especially on their food, food traditions, and health. The CINE team consists...
of interdisciplinary professors, their students and trainees, Aboriginal leaders, and many international collaborators.

A large program was established in 2001, and continued for more than ten years, to address Indigenous Peoples’ food systems and well-being in international settings. Using a methodology developed by CINE with five groups of Indigenous Peoples in Asia (Bhil, Dalit, Karen, Miao, and Mogh) (Kuhnlein et al. 2006), teams worked in partnership with 12 indigenous communities in unique rural ecosystems to improve their food and nutrition security (including three – Bhil, Dalit, Karen- that contributed to the methodology) (Figure 1). The program received encouragement and support from UN agencies, particularly the Food and Agricultural Organization and the Permanent Forum on Indigenous Issues because it addressed the many similar concerns and needs for food and nutrition security and well-being of the close to 400 million Indigenous Peoples in the world today.

Teams in the 12 areas were consolidated with interdisciplinary colleagues, and each team had an academic leader and a community partner leader. Overall leadership for the 12 teams was provided by Professor Harriet Kuhnlein (academic leaders) and Chief Bill Erasmus (community leaders; Figure 2). The
teams met annually for eight years to cross-stimulate ideas and share the successes and challenges of their projects. The overall objectives were to document the local foods, their scientific qualities and patterns of use, and then to implement food and health improvement programs using the local foods and the information pertaining to them. More than 40 collaborators were engaged, many in basic ethnobiological research. In the 12 case study communities collectively, the program had direct impact on several thousand Indigenous Peoples. To date, 18 university graduate students have been trained, and capacity building within communities engaged hundreds of students and trainees in actual community settings. The overall academic productivity has also been notable, with more than 200 published works, over 270 presentations in various settings at local, national, international conferences and UN events and side events, and more than 120 public media reports and audiovisual documents (Kuhnlein and Erasmus et al. 2013b; www.indigenousnutrition.org).

The first major product from the program was the documenting of the food systems of the 12 communities, and in particular, the treasures of food biodiversity that evolved from these unique cultures and patterns of living in distinct ecosystems (Kuhnlein et al. 2009). Ethnobiologists, nutritionists, and community researchers documented the extensive array of food species and varieties/cultivars in these food systems, with many still needing scientific
identifications and nutrition composition analysis (Figure 3). This scientific work describes and defines the food diversity, cultural meanings, and surrounding circumstances that collectively are a window into the diversity in Indigenous Peoples’ food systems everywhere.

The numbers of food species/varieties varied depending on the ecosystem. For example, there were 35 species in the drought-prone ecosystem of the Kenya Maasai and more than 380 species/varieties for the Pohnpei culture in the Federated States of Micronesia and the Karen in western Thailand. One of the first data treatments was to address the extent of use and energy contributions of the local traditional species/varieties in contrast to use of imported market food. Extent of total dietary energy as traditional food varied from a low in the Maasai area (6%) to a high of over 90% for the Peruvian Awajún and Nigerian Igbo. The other cultures were shown to have a variable erosion of dietary energy as traditional food was replaced with refined, purchased, or donated food (Kuhnlein 2009).

In all case study areas, people recognized the value of using knowledge about local biodiversity as a platform to build health promotion interventions. These interventions are based on local awareness and education, and include ways to empower local people to conduct their own programs for health improvements based in the local food system. The indigenous communities were universally supportive of the research and the efforts made to return the results in understandable ways, such as in posters in community meeting places, community learning workshops, photo books, and school materials. In many
community areas, incentives were developed to continue program activities to increase access to local foods and thereby to improve food security and well-being.

**Fostering Food and Nutrition Security and Well-Being among Indigenous Peoples: Lessons from the CINE Program**

In nine of the original 12 communities (Figure 1) health promotion intervention programs were initiated to increase access to local foods and improve food and nutrition security and well-being (Kuhnlein and Erasmus et al. 2013b). The communities were chosen based on available funding and local infrastructure. Case studies provided several lessons about best practices for conducting and implementing ethnobiological and ethnonutrition programs among indigenous communities. A goal of these studies was to improve holistic health in many of the dimensions appreciated by Indigenous Peoples that encompass the physical, mental, social, and spiritual aspects of individuals and the community more broadly, and recognizes the connections of these aspects from the past to the present and into the future.

A crucial first step in all of the intervention projects was to recognize the basic inventory of available resources that was documented in the original research. Team members realized early on that many people no longer know what their food resources are, or recognize their potential to improve food and nutrition security. It was therefore important to reinforce community-based knowledge sharing of the foods available and how they can be harvested or purchased locally, their nutrition and health potential, symbolic values, and associated cultural knowledge necessary for rendering foods acceptable to the different age and gender groups (Kuhnlein et al. 2009).

Also fundamental to these interventions was recognizing that, as in the industrial world, education and income are important determinants of food security in these communities of Indigenous Peoples; however, education and income are more associated with knowledge of resources and how to use them for building health and livelihoods, not as academic accomplishment and money. In the CINE projects, the interventions were especially appreciated by communities when outside experts valorized their local foods and practices right in the communities where they are experienced. This reinforced the importance of maintaining the vital cultural links to the ecosystems which affirmed identity and led to meaningful ways to use the local resources in their health improvement efforts (Kuhnlein and Burlingame 2013). Within this context, the “Western” scientific principles of good nutrition from food could be introduced and combined with traditional knowledge for building interventions activities. This also included incorporating foods purchased from markets, often from industrial globalized outlets, as these foods are also part of these food systems today. However, the dichotomy of the benefits and risks of “traditional food and market food” that form the daily diet was part of the education efforts.

Building trust and commitment among the community residents and their leaders was essential in planning the health promotion programs in each area. Research agreements were created to ensure equitable decision-making and
benefits, and that the project goals could be accomplished to meet the community’s own priorities and values. Each of the case studies demonstrated that mobilization of local leaders who were committed to improving food and nutrition security ultimately created capacity and encouraged self-determination. For example, the Awajún leaders trained 28 community assistants to teach in distant communities how to prepare some of the local foods, particularly for young children (Creed-Kanashiro et al. 2013).

The intervention activities and policies for improving health and well-being within the nine communities are case-specific and as diverse as the traditional food systems and the ecosystems and cultures from which they are derived. Successes developed from the “bottom-up,” with the local perspective deciding what would work and why. Interventions based in local cultural knowledge, especially focusing on children’s and women’s health, had universal appeal. For example, in the Micronesia case study (Figure 4), school classes emphasized the local traditional foods; in the Inuit case study, elders’ stories were recorded for radio and on video and were shared with youth in school classes to stimulate discussion about food, health, and climate change. Elders in the Gwich’in area demonstrated drying caribou meat to youth in schools, and the youth, in turn, prepared several boxes of dried meat for distribution to homebound elders (Egeland et al. 2013; Kuhnlein and Goodman et al. 2013).

Government assistance also contributed to the success of the intervention efforts (Kuhnlein 2013): the ability of the Ingano to develop the “Inga Life Plan” was supported by the Colombian constitution, and the Orito-Ingi Ande
Medicinal Flora Sanctuary and the Indi-Wasi National Park were created so the Inga could access their culturally important forest resources (Caicedo and Chaparro 2013); the state and national government leaders in the Federated States of Micronesia recognized the valuable work of the “Let’s Go Local” campaign for traditional food use, and declared that all official functions would serve only “local” food (Englberger et al. 2013); and, the crown princess of Thailand, Princess Sirindhorn, herself firmly committed to improving nutrition and quality of life for disadvantaged children, gave valuable personal support and credibility to the Karen project (Sirisai et al. 2013).

Including multidisciplinary and multisectoral stakeholders in community areas also had benefits for some of the communities. For example, the Pohnpei project garnered strong support from many national and state government agencies (education, health, land and natural resources, agriculture extension service, heritage, and media), which mobilized many people to support the “Let’s Go Local” team (Englberger et al. 2013). In contrast, the Awajún faced government allocation of their lands for development for mining and oil exploration, but this was later rescinded by the President after pressure from activist organizations (Damman et al. 2013).

Several types of evaluations were conducted to judge success of the interventions. Usually, pre- and post-assessments were conducted with emphasis on dietary change and qualitative assessments. There was resistance to the collection of biological samples (blood, urine, etc.) in some areas, due to fear of discomfort or beliefs of harm. Furthermore, dietary assessments were challenging in some areas because of some missing values in the food composition database (laboratory work had not yet been done and substituted values made), and wide variability in food use within small populations. Overall, the best indicators of success were based in improvements in local food availability and its use, using both qualitative and quantitative methods, and relying on community advice and perspectives (Kuhnlein 2013).

**Putting Food and Nutrition Security of Indigenous Peoples into Policy**

Policies that have promise to stimulate sustainable efforts for food and nutrition security for Indigenous Peoples need to be in place at the international, national, and local levels. To this end, the UN Permanent Forum on Indigenous Issues established the International Decades of the World’s Indigenous Peoples and the Declaration on the Rights of Indigenous Peoples of September, 2007. Many nations have since ratified their support of these declarations, which are grounded in international human rights, the right to food, and the imperatives for food and nutrition security and sustainable food system. In addition, the UN Food and Agriculture Organization has a Policy on Indigenous and Tribal Peoples that ensures that the organization protects, preserves, and promotes Indigenous Peoples’ issues, including their food systems and knowledge (Kuhnlein and Erasmus et al. 2013a). Other UN agencies, including the World Health Organization, the World Bank, the Pan American Health Organization, the United Nations Educational, Scientific and Cultural Organization, the International Fund for Agricultural Development, and the Convention on
Biological Diversity, also have development policies designated specifically for the benefit of Indigenous Peoples (Kuhnlein and Burlingame et al. 2013). These policy documents underscore and frame the special rights of Indigenous Peoples to enjoy their specific cultures, including their right to enjoy their traditional food (Damman et al. 2008). At the national and local levels, policies are most successful when representatives of the people directly involved are included in decision-making (Kuhnlein and Burlingame et al. 2013).

A mark of intervention success is the scaling-up of local project activities to include surrounding broader areas, thus moving the food sovereignty and food and nutrition security agendas into the broader region. This broadening to a wider community can be accomplished through electronic networks, school curricula, and word of mouth. Englberger et al. (2013) describe an excellent example of this broadening in the Pacific region as a result of innovation and progress with the CINE case study in Pohnpei. In general, policies have evolved from increasing public awareness of Indigenous Peoples’ knowledge of their local foods, that this knowledge can benefit not only Indigenous Peoples, but the broader public, and also can contribute to a global understanding of food system sustainability.

Closing Reflections

The grim portrait of global stresses on our human and planet health relates to the ever shifting economic, environment, and sociological ethics and values of humanity. We must find a sustainable transition from profit-centered thinking to Gaia-centered thinking for planet well-being. As the CINE work clearly shows, we all stand to benefit from a better, broader understanding of the vast biodiversity, wisdom, and knowledge encompassed within Indigenous Peoples’ traditional food systems (Erasmus 2013).

Ethnobiologists play essential roles in recognizing, documenting, valorizing, and publicizing the unique and diverse food resources in local cultural and ecological settings. In today’s world, this documentation is compelling because it can stimulate small entrepreneurs and consumers to expand their dietary repertoire for the benefits of unique taste exploration and health consciousness (e.g., Nabhan 2012). Pending local approval, this knowledge should be publicized for the benefit of the original knowledge holders and the community at large. There is much to be gained by ethnobiologists working with public health professionals in developing areas who are committed to promoting improved dietary diversity and health. There is a particular need to promote such health initiatives among women and children (Arimond and Ruel 2004), since women and children are most at risk for food and nutrition security, and women are most likely to appreciate and use new food knowledge to benefit their children and families.

Increasingly, ethnobiologists, and other interdisciplinary scientists, are documenting underutilized biodiverse foods within unique ecosystems. While these foods may not contribute a large measure of energy in the diet, and may not be part of the national agricultural statistics that form the FAO food balance sheet data on food security, these foods are certainly valuable and can be promoted to enhance and improve health and well-being in local settings. For example, Powell et al. (2013) have shown that while wild foods from farms and forests in
rural Tanzania contributed only two percent of dietary energy, they also contributed important amounts of daily needs for vitamin A (31%), vitamin C (20%), and iron (19%). The increased production, availability, and use of these wild foods by the local populations can be used to improve food and nutrition security.

The interest and attention generated by documenting local foods and food systems can create many avenues for unique market niches for expanding dietary diversity. The Slow Food Ark of Taste projects give excellent examples on how to use local knowledge to promote biodiversity and to stimulate expanding livelihoods (Slow Food 2013). Similarly, the recent attention to sharing breadfruit saplings throughout Hawaii (Zielinski 2013), and the earlier documentation of breadfruit varieties and their nutrient values from the Federated States of Micronesia (Englberger et al. 2003), are additional examples of the connection between local knowledge, biodiversity, and food security.

The key to ensuring food and nutrition security with more sustainable and healthy food systems is the careful management of the world’s natural resources. These must be adapted to the necessities of modern life with well-tried and trusted methods, such as those known among Indigenous Peoples. Our CINE experience is that Indigenous Peoples are best served by their own indigenous ecosystem knowledge, and that the role of science is to help to understand how and why they are sustainable, and how to use this knowledge to contribute to solutions of the problems of our global food and nutrition security. It is past time to listen seriously and in earnest to the indigenous voice, and to include Indigenous Peoples in the highest-level policy meetings on the values of global food sovereignty and food and nutrition security.

Ethnobiologists have much to contribute to promoting food and nutrition security of Indigenous Peoples. We can share stories not only of unique foods and sustainable biodiverse food systems, but also on successful health promotion efforts inspired by long-term dwellers in local ecosystems. These in turn contribute to solutions to provision humanity today and in the future. With our interdisciplinary colleagues and perspectives, we can unlock important knowledge of animal and plant food diversity, as well as its enjoyment and other benefits. We can facilitate, mobilize, and encourage the sharing of values and wisdom on the international stage to provide useful new direction for global policies. Ethnobiologists can document the newly recognized and unique species and the ways they are prepared and served, and the interesting patterns of cultural meaning given to such foods. With our scientific training and sensitivity to the needs of social justice and equity, we can help to “begin at the beginning” of food and nutrition promotion programs by documenting what is actually in place, or has previously been in place, in the local food ecosystems. But as the CINE program participants clearly recognized: “We can’t stop there. We have to encourage and support the use of this very credible information at the community level to improve everyday diets, health, and well-being” (KP-Studios 2008). We can help to share this information within communities, and also more broadly. Ethnobiologists can promote food and nutrition security not only for Indigenous Peoples but for all humankind using the interdisciplinary and holistic principles learned in our studies and collaborations with populations grounded in local ecosystems and cultures.
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