Food Security: 10 Critical Needs

A Summary of Cornell’s report to the United Nations’ Committee on World Food Security
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Overview

Cornell researchers will guide the next steps toward global food security when the United Nations’ Committee on World Food Security meets in Rome in mid-October. The committee’s High Level Panel of Experts (HLPE) contacted President David Skorton in January to ask for Cornell’s help in defining the most pressing challenges in food and nutrition security today.

“We were one of three U.S. universities invited,” explained ACSF’s faculty director of economic development Wendy Wolford. “A group of 12 of us came together to decide on and define the key issues.”

The team pinpointed 10 critical food security needs, from broader access to food markets to strategies to reduce agriculture’s climate impact. These urgent challenges are a focus for immediate research and action—to guarantee sustainable access to safe, nutritious food for all of the world’s people. The following is a summary of Cornell’s report.
1) Locally relevant food and nutrition recommendations

By Rebecca Nelson (Plant Pathology and Plant-Microbe Biology) and Jonathan Miller (Homelands Productions)

Inclusive and locally relevant food and nutrition interventions are a pressing need. Emerging technologies for collecting and sharing information on agriculture, food systems, and nutrition offer new opportunities to engage marginalized communities and help them to thrive.

The Way Forward

- Develop and deploy tools and approaches for analysis, prioritization, and problem solving that engage communities in addressing key problems in agriculture and nutrition.
- Implement grassroots innovation, such as farmer research networks, data sharing using mobile networks, and experimental community gardens.
- Disseminate tools that allow for highly localized data collection and analysis.

“Mainstream approaches in agricultural research remain top-down and largely ineffective, in large part because they fail to account for the heterogeneity of local conditions. With low-cost information and communications technologies now widely available, there is an opportunity to engage otherwise marginalized communities in assessing and addressing the causes of food insecurity and malnutrition. . . . Any recommendations, no matter how place-specific or democratically generated, are only as good as our understanding of complex social and ecological processes.”

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2) Equitable access to food, land, and other resources

By Wendy Wolford (Development Sociology) and Marygold Walsh-Dilley (Development Sociology postdoc)

Access to the resources needed to address food and nutrition security is intimately tied to broader processes of exclusion and marginalization. Inequality must be addressed on household, regional or national, and global scales and take into account multiple categories of difference, including gender, race/ethnicity/caste, age, and ability.

The Way Forward
Addressing entrenched patterns of inequality will require a multidimensional set of interventions aimed both at feeding and empowering vulnerable, excluded, and marginalized populations. Important steps will include

- Ensuring vulnerable populations’ access to food within a broader social safety net of clinical health services and education, such as through mobile clinics and school lunches.
- Democratic reforms toward inclusion and enfranchisement. All members of society should be able to hold their representatives accountable.
- Ensuring equitable access to land and other resources, establishing equitable ownership rights, and redistributing land and other resources.
- Establishing and protecting rights to basic needs and resources, such as food, water, land, education, and democratic participation.

“Differential access to power, including the institutional relations that concentrate power in few hands, is the principal structural contributor to vulnerability. Access to land, the larger political economy that structures the relations between farmers and the national and global economy, war, conflict, civil strife, and disease all play a role in distributing—or concentrating—power, and hence, in shaping vulnerability. . . . We must pay attention to how vulnerabilities are generated and patterned to adequately understand and address inequalities in the global food system.”

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3) Broader access to food markets

By Miguel Gómez (Applied Economics and Management) and Mark Milstein (Johnson Graduate School of Management)

Lack of access to food markets—for producers and consumers—and missing markets essential to the performance of food value chains put certain communities at risk of food insecurity and malnutrition.

The Way Forward
- Conduct a systematic analysis of food value chains in several regions and for several products worldwide. This analysis will collect data to assess the interdependencies between food value chain efficiency and equity (including the markets associated with production and distribution, such as financial markets, and post-harvest services) and food security and nutrition outcomes.
- Explore the business innovations that are taking place to incorporate poor farmers into value chains, as well as to reach underserved consumers and populations.

“Food systems in developing countries have changed dramatically since the Green Revolution, yet malnutrition still represents a challenge. Malnutrition is now understood to encompass the three simultaneous dimensions of undernourishment, micronutrient deficiencies, and overnutrition. These changes in food systems and in our understanding of global malnutrition necessitate fresh thinking about strategies to reduce malnutrition. A systematic analysis of food value chains and how producers and consumers participate in them will shed light on the design of appropriate public and private interventions to improve food value chain performance, which would ultimately alleviate poverty and malnutrition.”

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Gómez, Miguel I., and Katie D. Ricketts (2013). “Food Value Chain Transformations in Developing Countries: Selected Hypotheses on Nutritional Implications.”
4) Solutions to chronic water scarcity

By Rebecca Schneider (Natural Resources)

Chronic water scarcity impacts one quarter of the world’s population and will increase with climate change and population growth. Mismanagement of water contributes to the global water crisis, with direct but preventable impacts on food availability, disease, ecosystem decay, and conflict.

The Way Forward
We believe that, with good guidance and cross-border collaboration, the vast amount of freshwater around the planet can be managed to sustain both the earth’s ecosystems and its people, and provide a powerful strategy to buffer the impacts of climate change.

- There is an imperative need for a concerted, international program focused on the rapid adoption of sustainable, integrated approaches to surface water and groundwater management.
- The overall strategy should be to manage all freshwater within watersheds, at regional and local levels: to save rainfall when and where it occurs, minimize pollution, and avoid losing freshwater through inefficient irrigation or unintended stormwater runoff.
- We need to develop strategies to take advantage of the high intensity rainfalls and associated river floods, capturing and storing the excess water for later usage or for collaborative sharing with drier regions.
- Groundwater use needs more informed, aquifer-wide, and longer-term planning, including protection of recharge areas, regular monitoring of water table levels, and a system of rule curves linked to pumpage rates to avoid overdraft.
- Dam and reservoir operations, whether for hydroelectric power, water supply, or flood control, must mimic or restore natural environmental flows.
- Irrigation currently accounts for about three-quarters of global water usage, which will continue to rise given increasing population size and demands and the impacts of more uncertain rainfall. Therefore, a multipronged program should be developed which includes more drought-resistant genetic varieties, highly efficient drip irrigation, and reclamation of salinized lands, as well as thoughtful balancing of water-energy interactive impacts.
- Water needs to be priced fairly, using tiered systems that ensure basic water needs are met but which also account for externalities and protect the basic ecosystem needs.

“Chronic water scarcity is becoming a global concern, limiting drinking water supplies, contributing to diseases associated with contaminated water, and impacting irrigation and crop yields. . . . The real problems for improving water management are: a) limited knowledge of equitable water pricing schemes that account for water’s true value, b) strategies to accurately include the balance of
externality costs of water pollution and drought against costs of improved watershed management, and c) how to successfully educate policymakers and all stakeholders to increase adoption of improved water resource management.”

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5) Action to stop land loss and soil degradation

By Robert Howarth (Ecology and Evolutionary Biology)

The expected rise in demand for food, fiber, and fuel will increase the pressure on our land resource base. Land loss and soil erosion are exacerbating food and nutritional insecurity.

The Way Forward
Combining consumption-oriented measures—such as improving diets to enhance efficiency in biomass use and its substitutes, delinking biofuels and food markets, reducing food loss and waste, and controlling biomaterials consumption—with improved land management and restoration of degraded land may allow us to save 161 to 319 million hectares of land by 2050. Addressing healthy diets and soil health and sustainability simultaneously is critical to food and nutrition security.

“In conjunction with the negative effects of climate change, land and soil degradation is one of the greatest threats to food security. . . . The major causes of soil degradation include overgrazing, deforestation, and mismanagement of arable land. Although technological innovations have allowed agricultural productivity to increase, the costs have included salinization, soil erosion, eutrophication, and agrochemical contamination.”

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6) Sustainable animal-source foods

By Alexander Travis (Baker Institute, Biomedical Sciences) and Daryl V. Nydam (Population Medicine and Diagnostic Sciences)

Animal-source food consumption is too high by some individuals and too low by others, with socioeconomic, environmental, and health consequences. Solutions must be developed to improve both small and large-scale production and reduce environmental impact.

The Way Forward

- Enhance needed local capacities to improve sustainable production and access to animal source foods.
- Launch education campaigns to better animal-source food consumption practices in order to reduce environmental impacts and advance public health globally.
- Innovate production methods that are more efficient economically and environmentally at both smallholder and intensified production levels.
- Protect water resources.
- Improve the sustainability of harvesting practices for wild marine and bushmeat resources through engagement with industry and consumers.
- Replace the need for wild marine and bushmeat resources with sustainable aquaculture and livestock production.
- Identify forward-looking solutions to the impacts of climate change on crop and livestock production strategies.

“Many interventions have been performed and much has been published on trying to increase smallholder animal-source food production. Very little has been published that links improved production with increased consumption by those households. Aquaculture and its relation with the local marine environment is an area where much work remains to be done.”

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7) Strategies to reduce agriculture’s climate impact

By Robert Howarth (Ecology and Evolutionary Biology)

Climate change will increasingly threaten food security, yet paradoxically agriculture is a major driver of climate change. How can greenhouse gas emissions from agriculture be reduced?

The Way Forward

- Characterize emissions for greenhouse gases—particularly methane—from agricultural systems, emphasizing animal agriculture and rice cultivation because of their importance as sources of methane.
- Develop best management practices for reducing greenhouse gas emissions from agriculture.
- Explore policy options for encouraging reduced greenhouse gas emissions from agriculture, including provisions for reducing global production of meat and meat products.

“Agriculture is the major source globally of methane emissions, particularly from animal agriculture, but also from rice culture. However, these emissions remain poorly characterized and therefore uncertain. Knowledge gaps include better characterization of methane emissions from animal agriculture and rice culture and appropriate management practices for reducing methane emissions.”

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8) Action to save marine life and environments

By Drew Harvell (Ecology and Evolutionary Biology) and Ruth Richardson (Civil and Environmental Engineering)

Marine environments and resources are being degraded and lost by human activity. The biggest concerns are rising seawater levels, coastal pollution from sewage, agriculture runoff and aquaculture, overfishing, and large dam construction. These all lead to reduced marine life that negatively impacts livelihoods and nutrition.

The Way Forward

- Integrate land and water development to break the cycle of segmented pollution, where agricultural runoff pollutes marine areas, which causes fishing communities to intensify agriculture.
- Regulate fishing across borders with multi-stakeholder and integrated ecology/livelihood development approaches.
- Educate consumers as to the most sustainable marine resources.
- Develop innovative new sanitation systems that will prevent human waste from entering marine territories.
- Develop less damaging forms of aquaculture production that better mimic the marine environment.

“Knowledge gaps include how to better treat human sewage and develop best practices of aquaculture.”

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9) Strategies to reduce food waste

By Christopher Watkins (Horticulture, Cornell Cooperative Extension)

Food wasted in consumption, production, storage, and distribution needs to be reduced, recycled, and reused. A majority of food waste occurs in rich countries at the retail or consumption stage. Food waste in poor countries tends to occur at the post-harvest processing and storage stages, with improperly stored food being a leading cause of disease.

The Way Forward

• Get better information to farmers making production decisions so they can match supply to demand.
• Communicate with consumers to discourage waste.
• Recycle nutrients in more integrated farm/food systems.
• Improve storage facilities to prevent mold and spoilage.
• Improve transportation systems and refrigeration capacity in developing countries.
• Work with plant breeders to develop food targeted to reduce waste: food that spoils slowly or is resistant to rot and toxins or is more uniformly appealing to consumers.

“According to World Bank’s February 2014 Food Price Watch, cereals represent more than half of all food lost or wasted: 53 percent by calorie content. By weight, fruits and vegetables represent, at 44 percent, the largest share of global food loss and food waste. . . . Overall, some 56 percent of total food loss and food waste occurs in the developed world, and the remaining 44 percent across developing regions.”

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World Bank (February 2014). “Food Price Watch.”
10) Ensuring healthier diets, especially for vulnerable people

By Rebecca Stoltzfus (Nutritional Sciences) and Sera Lewise Young (Nutritional Sciences)

People need more than adequate calories—they need healthy diets. Current food systems do not ensure healthy diets for many vulnerable populations, such as pregnant and lactating women or people living with chronic diseases. Although calories are often abundant, healthy and diverse diets rich in micronutrients and fiber are rare.

The Way Forward

- Link household food security interventions to social and behavior change interventions to address nutrition security for households’ vulnerable persons, especially pregnant and lactating women, children under two years, people living with chronic diseases, and the elderly.
- Develop agricultural and market interventions to make diverse and micronutrient-rich diets accessible to vulnerable households. Interventions may include crop diversification, agroecological practices, livestock interventions, improved markets and value chains for fruits and vegetables, targeted food fortification (especially for infant foods), and biofortification.
- Create social safety net programs for vulnerable populations that focus on healthy diets, rather than mere caloric sufficiency.

“We know that in many places, calories are often overabundant; obesity is increasingly associated with poverty. Yet the increasing availability of calories has not been accompanied by an increase in healthy diets. . . . There is also evidence to suggest that globally, current food systems do not ensure healthy diets for vulnerable populations. . . . We also know that food insecurity is associated with poor nutritional status, disease, and psychosocial health outcomes among these same vulnerable populations.”

Read More
Olson, Christine M. (1999). “Nutrition and Health Outcomes Associated with Food Insecurity and Hunger.”