

# FEEDING CITIES: FOOD SECURITY IN A RAPIDLY URBANIZING WORLD

**CONFERENCE REPORT**  
Eugénie L. Birch with Alexander Keating

## OVERVIEW

This report stems from the *Feeding Cities: Food Security in a Rapidly Urbanizing World* conference held at the University of Pennsylvania March 13–15, 2013 and convened by Penn IUR and The Rockefeller Foundation. Part I of this report is a concept paper by Eugénie L. Birch outlining the relationship between urbanization and food security throughout the world, Part II constitutes the conference proceedings assembled by Alexander Keating, and Part III reports on the photography exhibit that accompanied the international conference.

### ACKNOWLEDGMENTS

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Penn IUR Project Manager Alexander Keating coordinated the conference with help from students Catherine Brinkley and Brian Agnes.

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### IN MEMORIAM: FREDERICK SCATENA

We would like to recognize the many contributions of Dr. Frederick Scatena, Chair, Department of Earth and Environmental Sciences, University of Pennsylvania, whose unfortunate death greatly impacted the entire Penn community. As a core member of the *Feeding Cities* Steering Committee, Dr. Scatena's guidance was central to all aspects of the *Feeding Cities* conference programming.

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# EXECUTIVE SUMMARY

Promoting *urban* food security is a critical twenty-first century concern. Today's rapid urbanization in Asia and Africa is producing major demographic and spatial transformations in human settlement patterns while existing land use practices in Europe, the Americas, and other highly urbanized places put pressure on the land/water/energy nexus. These phenomena have dramatic effects on the global food system. As the world's population rises to three-quarters urban by 2050, new, city-centric approaches to understanding global and local food systems are needed to ensure the production, distribution, and delivery of food to the growing number of urbanites. Strategies must focus on the measurement of urban food security issues and ways to increase food availability, access, and nutritional quality in cities of both the developing and developed world. Part I of this report is a concept paper by Eugénie L. Birch outlining the relationship between urbanization and food security throughout the world, Part II constitutes the conference proceedings assembled by Alexander Keating, and Part III reports on the photography exhibit that accompanied the international conference. ►

An appreciation of the connections among urbanization, employment and income, and natural resource consumption must underlie any work toward feeding the world's cities. Fostering multi-disciplinary cooperation (among fields ranging from agricultural production to nutrition to urban planning to veterinary medicine) and encouraging public, private, and non-governmental sector cooperation are essential to achieving a healthy and well-fed global population. Any work in this area must recognize the field-to-table synergies of the world's multiple food systems, which exist in a continuum that extends locally and globally. Needed improvements aim to support efficient, sustainable production, distribution, and consumption from the farm to the city. Ultimately, achieving urban food security will require crafting better measures of food security and attending to specific, spatially defined aspects of availability, access, and utilization. The way forward will come through building better knowledge networks.

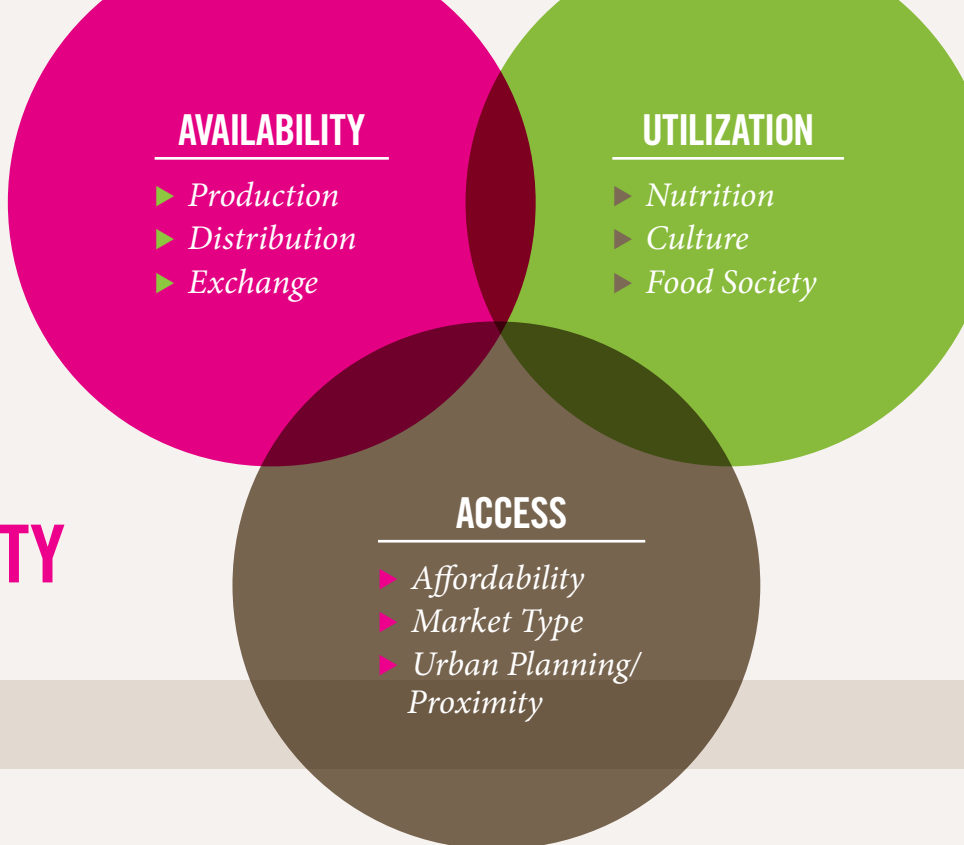
**AS THE WORLD'S POPULATION RISES TO THREE-QUARTERS URBAN BY 2050, NEW, CITY-CENTRIC APPROACHES TO UNDERSTANDING GLOBAL AND LOCAL FOOD SYSTEMS ARE NEEDED TO ENSURE THE PRODUCTION, DISTRIBUTION, AND DELIVERY OF FOOD TO THE GROWING NUMBER OF URBANITES.**

# PART I: *FEEDING CITIES: FOOD SECURITY IN A RAPIDLY URBANIZING WORLD*

## INTRODUCTION

Promoting food security began as a twentieth-century global imperative. Promoting *urban* food security in particular is a twenty-first-century global imperative.

The concept of food security encompasses three components: availability (supply of food), access (ability to secure food, based in part on the price of food), and utilization (the nutritional quality of food). *Urban* food security includes the same concepts but overlays a second analytical dimension: the socio-economic and spatial characteristics of cities. As a result, it stands as an identifiable, specialized domain within food security studies and practice. It tends to focus especially on issues of access and utilization but, as will be seen later, the field must also consider availability. Figure 1 illustrates many of the concerns associated with the field of urban food security. ►



**Figure 1:**  
**URBAN FOOD SECURITY**

- ## 1 SITES OF PRODUCTION

**URBAN FOOD SUPPLY ORIGINATES IN:**

<p>Rural and International Imports (Mainly Staples)</p> <ul style="list-style-type: none"> <li>▶ Represent majority of food supply</li> <li>▶ Highly vulnerable to climate variation and international trade/policy</li> <li>▶ International imports challenge local “food sovereignty”</li> </ul>	<p>Urban and Peri-Urban Production (UPU)</p> <ul style="list-style-type: none"> <li>▶ High value commodities, i.e., fresh vegetables, fish, meat/dairy</li> <li>▶ Represents 15–20% of world food supply</li> <li>▶ Critical for shock management</li> </ul>
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- ## 2 PROCESSING & PACKAGING

Presence of processed and packaged foods higher in urban areas due to:

  - ▶ Ease of transport, shelf life
  - ▶ Impact carbon footprint, health
- ## 3 DISTANCE TRAVELED

Majority of urban food supply travels long distances to consumers, presenting challenges of food safety, as well as carbon footprint
- ## 4 SITES OF ACQUISITION

  - ▶ Increasing presence of supermarket retail chains in urban areas alters procurement and distribution
  - ▶ Slum areas less likely to have markets
- ## 5 PRICING ISSUES

Urban good supply costs more than rural
- ## 6 FOOD PREPARATION

  - ▶ Urban populations rely more on pre-prepared food (street vendors, etc.) due to relative costs of shopping, cooking (fuel, etc.) and storage) than their rural counterparts
  - ▶ Employment type/location/income affects this decision as well
- ## 7 CLIMATE VARIATION & DEGRADATION

  - ▶ Temperature/rainfall changes lower rural agricultural yields impacting production
  - ▶ Increase in human diseases impacting utilization
  - ▶ Groundwater and aquifer depletion critical for agriculture
- ## 8 FOOD TYPE

  - ▶ Urban population more likely to consume “modern” highly processed food
  - ▶ Increased meat and dairy consumption
- ## 9 WATER & SANITATION INFRASTRUCTURE

Key to utilization due to issues of increased infectious disease and waterborne illness in urban areas of developing world
- ## 10 FOOD/HEALTH CULTURE

  - ▶ More advertising, influences
  - ▶ More sub-optimal food choice
  - ▶ More sedentary lifestyles, obesity
- ## 11 EMERGENCY FOOD NETWORKS

  - ▶ Public food banks are more common in urban areas, but community networks are often weaker than in rural
  - ▶ Cash incomes make urban populations vulnerable (shock more likely due to accessibility in urban and availability in rural)

While food security is a subject of the global development agenda—the United Nation’s Millennium Development Goals (MDGs) established in 2000 called for halving the portion of hungry people by 2015—*urban* food security has not garnered the same worldwide attention. Why not? Even though city dwellers comprise one-half of the world’s population, a figure that is expected to rise to three-quarters by 2050 (when the number of urbanites will likely number 7 billion) and the number of poor urbanites (now a billion) is expected to double within a generation, the transformative power of urbanization is widely under-appreciated. Further, current international practices in assessing food security leave the unique conditions of urban food security unstudied and neglected.

Other factors also contribute to the gap. Within the urban advocacy community such issues as community empowerment, housing, water, and sanitation seem more urgent than food. Within the food studies domain, academic and NGO researchers naturally drill into their respective disciplines, with each group focusing on a single issue even though solving urban food insecurity requires multi-disciplinary approaches. Urban planners, for example, pursue research into food deserts or land policy, while veterinarians tend to animal husbandry issues, and health professionals investigate diet and nutrition. An arena in which to combine resources to attack urban food insecurity holistically is absent.

Urban food security issues affect all city-dwellers but hit low-income groups the hardest. Furthermore, current settlement patterns—60 percent of urbanites live in environmentally vulnerable areas—exacerbate urban food security issues in light of global warming and the likelihood of more frequent and destructive natural disasters that threaten sustainable urban development in the future. Addressing these issues calls for new analytical approaches that take into account such key urban features as population size and density as well as the complex spatial, social, and economic arrangements within cities. These new approaches must also consider

the unique qualities of urban household dynamics in food procurement, including the roles of both the formal and informal sectors in supplying and distributing food.

## FOOD SECURITY OVERVIEW

The concept of food security encompasses the production, distribution, safety, and nutritional value of what people eat. An understanding of the inter-relationships among all aspects of the global food system and how they play out at national, regional, and local levels provides the foundation for the pursuit of appropriate ameliorative policies. Of utmost importance is developing future policies and programs with strong reference to their contextual and spatial dimensions.

### THE “PDD” FOOD SYSTEM

The “PDD” Food System model, illustrated in Figure 2, provides a general conception of food systems that can be applied to specific places. The model conceives of food systems as starting with production, moving to distribution, and following with delivery. Each level has multiple functions and involves multiple actors. Production, for example, encompasses issues related to natural and human resources; distribution covers logistics and wholesale and retail markets; and delivery includes price, safety, and nutrition considerations. As illustrated, waste occurs at each level.

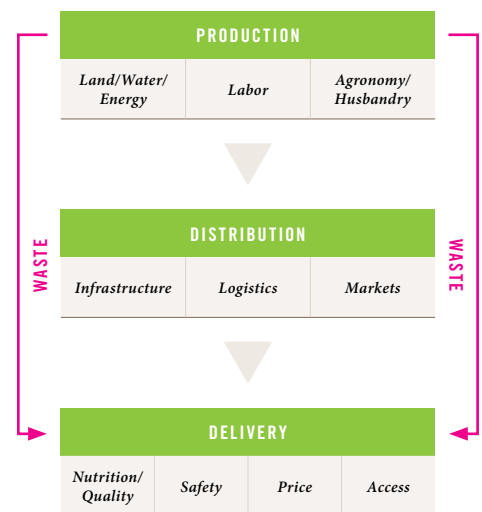
Production takes place in many locales: the rural hinterlands, peri-urban regions, and even within the bounds of cities. Producers range from large multi-national corporations to small-holder farmers to urban gardeners. Distribution occurs through many means, ranging from highly computerized logistical systems incorporating refrigerated ships, trains, and trucks to primitive modes involving delivery on the back of a mule or via a human walking to market. Delivery takes many forms as well: supermarkets, corner stores, open farmers markets, and street vendors. A blend of public and private factors (ranging from regulations to price supports to market-driven

investment decisions to community activism) influence various aspects of production, distribution, and delivery.

Globalization affects patterns of food production, distribution, and delivery. Global trade in food is growing and will be increasingly important in feeding cities. China, for example, now imports almost 60 percent of its soybeans from overseas as it cannot meet demand from its own resources. And China is not alone; even the United States, rich in agricultural resources, imports substantial amounts of food, especially fruit, fish, vegetables and tropical products (coffee, tea, and sugar) (USDA 2014).

**Figure 2:**

The “PDD” Food Systems Structure



Source: Catherine Brinkley 2013.

Waste occurs throughout the food system. Recent research emphasizes the seriousness of the problem: one-third (or 1.3 billion tons per year) of all food produced is wasted worldwide (Guftason 2011: 4). This amounts to one in four calories produced for human consumption (Lipinski et al 2013: 2). As illustrated in Figure 3, the most severe losses occur in Asia. The problem of waste not only includes food losses but other losses as



well. It arises at each level of the PDD food system model. For example, in production, improving crop yields without wasting resources through the over-application of water or fertilizer is a challenge. In distribution, food losses often occur due to poor refrigeration, a chronic problem in many cities in developing countries. In delivery, diminishing waste involves re-using urban water and recycling nutrients from urban human waste for fertilizer in agricultural production.

Figure 3 illustrates how food losses can be understood as occurring at five stages: production, handling and storage, processing and packaging, distribution and market, and consumption. Notably, 80 percent of losses occur in three stages: 24 percent at production, 24 percent in handling and storage, and 35 percent in consumption. The developed world is responsible for 56 percent of the losses, with distribution, marketing and consumption representing a third of the total wastage. In the developing countries, 29 percent of the losses occur at the post-harvest processing and distribution stages. (Guftason 2011: 6; Lipinski et al 2013: 8).

Despite the complexity of the PDD Food System, decision-makers can work on its many discrete parts with an understanding of their inter-relationships. The fundamental need is to focus food security research and decision-making on food availability, access, and utilization at every scale: global, national, regional, and local.

**DEFINING AND MEASURING FOOD SECURITY**

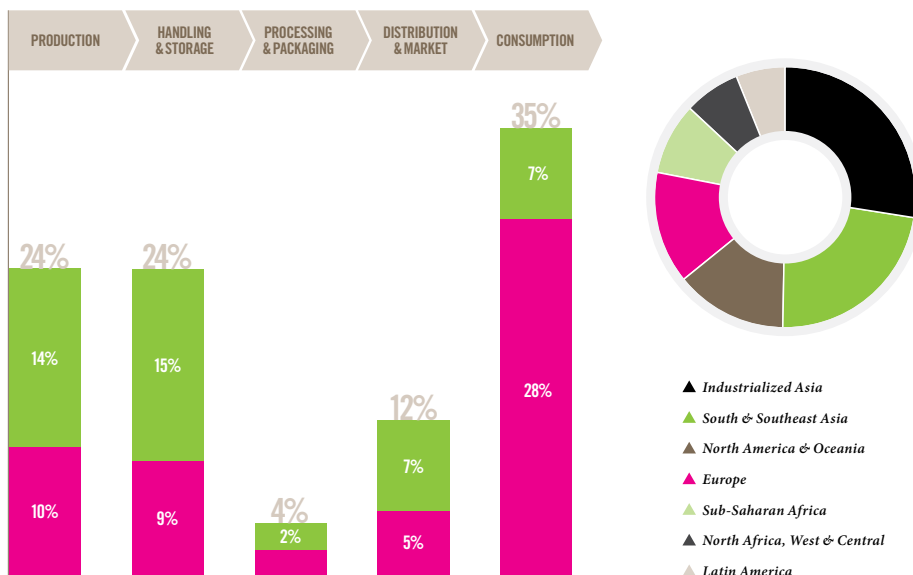
The commonly accepted definition of food security is: “Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, which meets their dietary needs and food preferences for an active and healthy life” (FAO 2009).

Though seemingly a simple topic, in reality, food is a complicated subject, entwined with a wide range of development issues. These include: adapting to the pace and effects of globalization and climate change; promoting universal minimum health standards; providing employment for all workers regardless of race, ethnicity, and gender; enhancing livable, human settlement patterns with adequate infrastructure;

**CURRENT SETTLEMENT PATTERNS—60 PERCENT OF URBANITES LIVE IN ENVIRONMENTALLY VULNERABLE AREAS—EXACERBATE URBAN FOOD SECURITY ISSUES IN LIGHT OF GLOBAL WARMING AND THE LIKELIHOOD OF MORE FREQUENT AND DESTRUCTIVE NATURAL DISASTERS THAT THREATEN SUSTAINABLE URBAN DEVELOPMENT IN THE FUTURE.**

protecting natural resources (especially water and soils); and furthering good governance. Providing food security requires the involvement of international, national, and subnational government officials as well as non-governmental organization leaders and experts in disciplines ranging from agronomy to veterinary medicine, city planning, energy provision, ecosystems management, health, law, logistics, marketing, real estate, and business. In sum, food security depends on a complex interplay of knowledge, people, and scales—global to local.

**Figure 3:**  
The Regional Allocation of Waste and the Level of Loss Within the Food System



Source: WRI analysis based on FAO 2011.

The United Nations’ Food and Agricultural Organization (FAO) is the world authority that measures food security. It makes this complicated problem understandable to public and private decision-makers by monitoring a single metric: undernourishment. Officially labeled the “minimum daily energy requirement,” this metric is a statistical assessment of the caloric intake sufficient to support an active lifestyle over the course of a year.<sup>1</sup> While the concept of undernourishment is clear, its measurement is age- and gender-neutral and dependent on several judgments in the assumptions involved in its calculations. FAO computes and reports the national rates of undernourishment in its annual publication, *State of Food Insecurity in the World* (SOFI).

Undeniably, undernourishment is a serious worldwide problem: 12 percent or 840 million people are reported in this state across the globe (United Nations 2013). But calories alone do not provide a complete picture of the quality of the food consumed. Protein intake, for example, is another key measure of nutrition (Brown 1974). Protein may come from meat, fish, nuts, grains, and legumes. Lack of protein can lead to malnourishment, weakness, and disease.

According to the FAO, the largest number of food-insecure people reside in the Asia-Pacific region, and the highest concentration of food-insecure people is in Sub-Saharan Africa (see Figure 4). In these places, food is in short supply due to a combination of factors: natural disasters, poor distribution systems, and low productivity (Millstone and Lang 2013: 13).

Today, as defined by the undernourishment metric, food insecurity is primarily, but not exclusively, a rural concern: 80 percent of the reported hungry live in the countryside and 20 percent live in cities. Without ameliorative action to increase food availability, the number of undernourished people will increase—with the urban portion likely to continue to grow in absolute number (and possibly proportion) as urbanization rates accelerate.

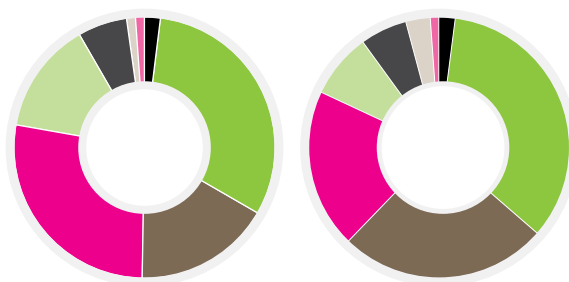
The FAO extends some hope for alleviating undernourishment, citing evidence that 2.5 million food insecure people achieved more stable diets every year in the past two decades. Yet, the FAO also declares that this figure is not high enough to achieve its goal, set at the 1996 World Food Summit, of reducing the *total number* of food insecure people to 400 million or less by 2015.

**THE FOOD SECURITY-POVERTY NEXUS**

At its root, undernourishment is an economic development challenge. Poverty, in all its dimensions, prohibits rural populations from producing sufficient food and limits urban populations’ purchasing power. Upwards of 40 percent of household spending (per person per week) in Kenya, for example, goes to food while that number shrinks to just over twenty percent in China and diminishes further to roughly 7 percent in the United States (see Figure 5). The urban poor in the developing world, especially, spend considerably more of their total household incomes on food than do similar populations in the developed world and, in many instances, than the figures for the total populations in their own countries show. For example, Figure 5 shows the average South African food budget expenditure is just under 25 percent of the total but recent research in the slums of Capetown reports food expenditures of 53 percent of household income (Battersby 2012: 150).

Beyond its effects on the affordability of food, poverty has other health implications. The shorter life expectancy of urban residents of low-income nations compared to their counterparts in wealthier countries is well documented: today, for example, a child born in Lusaka, Zambia will live to age fifty-two while one born in New York City will live twenty-seven years longer (CIA 2014). The affordability of food and nutrition plays an important role in these statistics but is not the only explanation; the incidence of disease transmitted between animals and humans (referred to as zoonotic disease) is another. This issue is related to lack of resources and knowledge in the raising, slaughtering, and marketing of livestock and poultry and in the cultivation, preparation, and distribution of fruits, nuts, and vegetables. More than 250 pathogens and toxins can be transmitted by food; the most well-known

**Figure 4:**  
Food Insecurity  
by Region, 1990–1992  
and 2011–2012



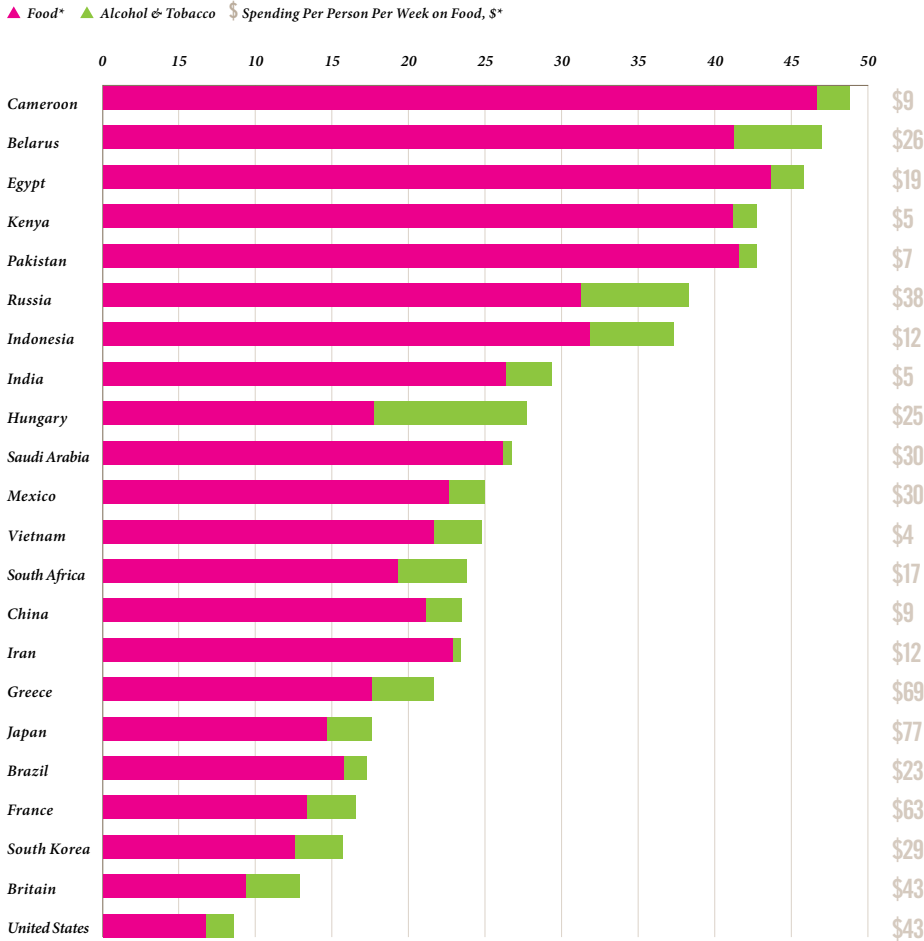
	NUMBER (MILLIONS)		REGIONAL SHARE (%)	
	1990–1992	2011–2013	1990–1992	2011–2013
▲ Developed Regions	20	16	2	2
▲ Southern Asia	314	295	31	35
▲ Sub-Saharan Africa	173	223	17	26
▲ Eastern Asia	279	167	27	20
▲ Southeastern Asia	140	65	14	8
▲ Latin America & the Caribbean	66	47	6	6
▲ Western Asia & Northern Africa	13	24	1	3
▲ Caucasus & Central Asia	10	6	1	1
▲ Oceania	1	1	0	0
<b>TOTAL</b>	<b>1015</b>	<b>842</b>	<b>100</b>	<b>100</b>

Note: The areas of the pie charts are proportional to the total number of undernourished in each period. All figured are rounded. Source: FAO 2013.

<sup>1</sup> The FAO-devised measure of food insecurity is percent of undernourished (PoU), “the PoU is the probability that, after randomly selecting one individual from the population, (s)he is found to be consuming an amount of dietary energy that is insufficient to cover his or her requirement for an active and healthy life. This probability is taken as an estimate of the likely proportion of people that are undernourished in the population. An estimate of the number of undernourished (NoU) is then produced by multiplying the estimated PoU by the population size. The PoU and NoU have been adopted as indicators used to monitor progress towards the targets set by the Millennium Development goals (in particular, the hunger target of MDG 1) and at the World Food Summit, respectively. It is worth emphasizing that the probability distribution used to draw inference on the habitual levels of dietary energy consumption in a population,  $f(x)$ , refers to a typical level of daily energy consumption during a year. As such,  $f(x)$  does not reflect possible implications of insufficient food consumption levels that may prevail over shorter periods of time” (FAO 2013). Many criticize the undernourishment measure as being inadequate. Some food security experts question the FAO caloric metric as being an insufficient measure for its assumptions about the level of calories noting that it unrealistic; they also question the use of a year-long time span as not accounting for food price spikes. The FAO defends the metric measuring chronic hunger. The critics point out that the cited improvements were highly concentrated with China and Vietnam accounting for 91 percent of the gains in Asia and Brazil and Peru, 93 percent in Latin America (Framing 2013).

**Figure 5:**

Spending on Food and Drink, Selected Countries 2011 (Percent of Total Spending)



Source: U.S. Department of Agriculture. \*Includes Non-Alcoholic Beverages

**AT ITS ROOT, UNDERNOURISHMENT IS AN ECONOMIC DEVELOPMENT CHALLENGE. POVERTY, IN ALL ITS DIMENSIONS, PROHIBITS RURAL POPULATIONS FROM PRODUCING SUFFICIENT FOOD AND LIMITS URBAN POPULATIONS' PURCHASING POWER.**

are the bacteria *e.coli* and salmonella but parasites and viruses are also problems (Russell 2013: 2). According to the World Bank, ingestion of contaminated food is particularly perilous for the young and elderly in the developing world, where 70 percent of deaths among children under five are the result of unsafe food (Unnevehr and Hirschorn 2000: 9). And, this is a problem in the developed world as well. Between 1998 and 2008, contaminated plant commodities caused 46 percent of acquired food-borne illnesses in the United States (Russell 2013: 1). The results, according to other research, are 37.2 million illnesses, 228,744 hospitalizations, and 2,612 deaths each year in the United States (Hansen

2012). In response, the U.S. Congress passed in 2011 the Food Safety Modernization Act, which tightens controls on domestic and imported food at all stages of the PDD food system.

**OVERNUTRITION: A GROWING CONCERN**

Overnutrition, a measure of the number of overweight and obese adults, is an unhealthy condition at the other end of the scale. Overnutrition exceeded 1 billion globally in 2010. Experts point to urbanization as a central driver of this phenomenon, noting that people are less physically active and more prone to eat diets high in fats and sugars in cities (Crush and Frayne 2010: 30). Among the urban poor in the developing countries, a high dependence on street foods contributes to the latter tendency (Battersby 2012: 154). In fact, the World Health Organization (WHO) observes: “Many low and middle income countries face a double burden. While they continue to deal with the problems of infectious disease and under-nutrition, they are experiencing a rapid upsurge in noncommunicable disease risk factors such as obesity and overweight, particularly in urban settings” (WHO 2013).

In 2012, non-communicable diseases (including all forms of diet-related diseases) caused 63 percent of all deaths worldwide. Figure 6 illustrates the per capita prevalence of diabetes—the most commonly used bellwether for diet-related diseases.

Prosperous, highly urbanized nations such as the United States and many European countries exhibit much higher rates of diabetes than middle-income countries, which, in turn, tend to have higher rates than low-income countries. For example, the United States’ diabetes rate is near the top of the scale (75–82.5/1000 people) as is its per capita income (\$51,700) and urbanization rate (82 percent). In contrast, the Democratic Republic of the Congo’s (DRC) diabetes rate is at the bottom of the scale (less than 7.5/1000) as is its per capita income (\$400) and urbanization rate (34 percent). Life expectancy and obesity rate data comparisons are equally dramatic: the U.S. life expectancy is 79 while the DRC’s is 56. However, the U.S. obesity rate is 33 percent while the DRC’s is 1.7 percent. An examination of the

causes of death in each country, as recorded by WHO, reveals that the majority of deaths in the United States are from non-communicable disease while in DRC they are from communicable disease. However, as urbanization and related income increases continue to spread in developing countries, so too will diet-related diseases. For example, South Africa is in the middle range of all the characteristics: per capita income is \$11,300; urbanization rate is 62 percent; life expectancy is 49; obesity is 31 percent and diabetes is 15–22.5/1000 (CIA 2014; WHO 2009).<sup>2</sup> WHO states that of all chronic disease-deaths worldwide, 80 percent occur in the low- and middle-income countries (WHO 2013). WHO predicts that by 2030 such diseases will be the number one killer of poor people globally.

#### LIMITS OF THE UNDERNOURISHMENT METRIC

As can be seen in the discussions above, the metric on undernourishment offers a serviceable but limited indicator for establishing a worldwide

food security standard. It sets a minimum level for food availability and is useful as a base for goal-setting and measuring progress toward alleviating hunger. In fact, the United Nations has used the metric in the implementation of one of its MDGs and will likely employ it again in the successor programs, the upcoming Sustainability Development Goals (SDGs) to be adopted in 2015. But the measure does little to illuminate the other food security issues: access and utilization. It misses obvious health conditions like overnourishment as well as lack of protein, stunting, and anemia.

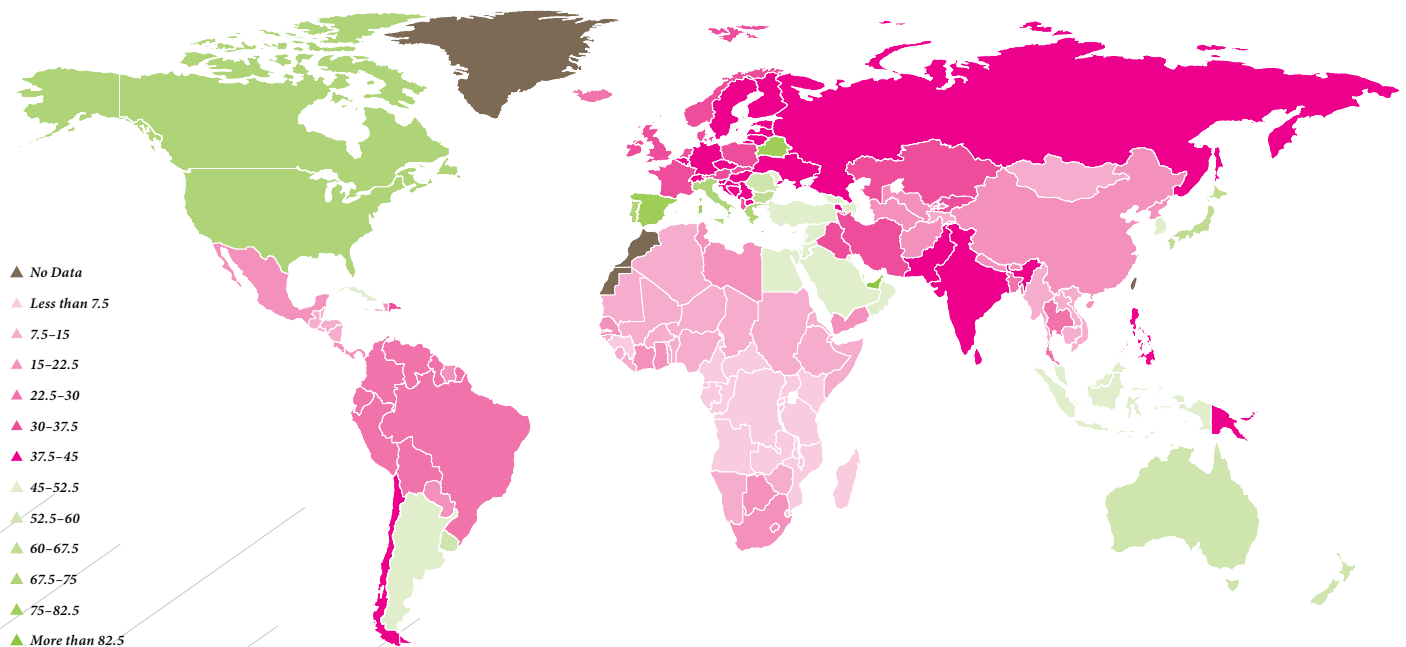
Undernourishment is a “state” indicator that describes a condition. It does not reflect any causal factors or “pressure” indicators that capture conditions that create the state (for example, levels of food insecurity by income, residential location, or gender) nor does it offer any “response” measures that indicate actions taken to improve the state (for example, amount of micro-nutrients or fresh foods,

number of nearby food stores) (Pinter, Zahedi and Cresswell 2000).<sup>3</sup> In 2014, in an attempt to provide a consolidated analysis of food security, Oxfam released the “Good Enough to Eat Index,” which scored food security in four categories (undernourishment, price, quality, and incidence of diet-related disease) using eight indicators in 125 countries (Oxfam 2014). More of an advocacy document than a research piece, the work offers a model for thinking about how to capture the varied aspects of food security simply. Supplementary data on food prices and dietary composition (amount of protein or grains) published by FAO also contributes to a broader conceptualization of food security that better describes the differences between urban and rural food insecurity.<sup>4</sup>

While these data sources can help create an evidence-based foundation for a new approach to urban food security, measurement issues are endemic in the global development policy domain; few national censuses systematically

## Figure 6:

Prevalence of Diabetes Worldwide in 2000 (per 1,000 inhabitants)



Source: Data: WHO ([http://www.who.int/diabetes/facts/world\\_figures/en/index.html](http://www.who.int/diabetes/facts/world_figures/en/index.html)). Map: LokalProfil, 2009.

produce disaggregated urban data on any topic, much less information on the multiple aspects of food security. Nonetheless, some nations, with FAO technical assistance, do record differential rates in urban and rural undernourishment. While national governments go no further to explore other indicators (such as stunting or protein composition of diet) that impact urban food systems and security, researchers in the academic and NGO sectors are advancing knowledge in the area. Examples are PolicyMap ([www.policymap.com/maps](http://www.policymap.com/maps)) by Philadelphia's The Reinvestment Fund, an advocacy/intermediary entity that has mapped U.S. food deserts and prices, and the work of the African Food Security Urban Network (AFSUN), a partnership between the University of Capetown (South Africa) and Queen's University (Canada) that in the past ten years has undertaken important household surveys in cities in nine Sub-Saharan countries, producing cases studies for Capetown, Harare, Lusaka, Maputo, Gabarone and others ([www.afsun.org](http://www.afsun.org)).

## URBAN FOOD SECURITY

Conceptualizing food insecurity solely as undernourishment results in both the underestimation of true food insecurity and the promotion of imperfect solutions. The absence of disaggregated spatial data confounds any urban food insecurity diagnosis that attempts to drill deeply into place-based causes (such as those derived from land use, food distribution, and household income consumption practices) and so prevents important new understandings on which to build targeted, city-centric remedial measures. While differing in degree and extent among places according to their levels of development and the character of their food systems, these qualities are constant in some form in all cities. The scenarios that follow demonstrate their manifestation in two types of cities: rapidly urbanizing and already highly urbanized.

### MULTIPLE EFFECTS OF RAPID URBANIZATION ON FOOD SYSTEMS

Asian and African cities are now experiencing annual population growth rates of 2 and 3 percent respectively. If today's experience becomes tomorrow's reality, land consumption rates will exceed the demographic rise, formal employment will not keep up with population increases, and poverty will be ever-growing (Angel 2011; Glaeser 2013). Uncontrolled urban expansion will induce: 1.) the loss of nearby agricultural land that once supplied food, 2.) stresses on already weak transportation and logistics systems that will strain to bring food to market, and 3.) inefficient urban distribution systems that will exacerbate issues of access and utilization of food. These features, combined with high levels of poverty, will contribute to food price volatility that will deeply affect the poor who will either go without or will substitute cheap, less nutritious food (Battersby 2012). Further, the increasing frequency and scale of natural disasters that disproportionately impact dense urban populations in coastal regions will continue to interrupt food systems and will exacerbate urban food insecurity.

Figure 7 offers an example of how these trends are playing out now. It maps urban land coverage in Accra, Ghana between 1985 and 2000 where, in

**PROSPEROUS, HIGHLY URBANIZED NATIONS SUCH AS THE UNITED STATES AND MANY EUROPEAN COUNTRIES EXHIBIT MUCH HIGHER RATES OF DIABETES THAN MIDDLE-INCOME COUNTRIES, WHICH, IN TURN, TEND TO HAVE HIGHER RATES THAN LOW-INCOME COUNTRIES.**

the short span of fifteen years, the city footprint became three times larger, density declined by nearly 4 percent in built-up areas, and agriculture in the peri-urban areas disappeared. The 153 percent increase of built-up areas featured expansion along the vulnerable coastline and inland. (Angel 2012: 157–9; Angel 2012: 16; Gough and Yankson 2000: 2489). At the same time, the city experienced a 50 percent population spurt as residents increased to 2.7 million from 1.8 million and poverty rates moved to 23 percent from 9 percent (Angell 2011: 39; Maxwell 2000: 4, 5). In the mid-1990s, authors of the *Urban Livelihoods and Food and Nutrition Security Study* in Greater Accra, Ghana measured undernourishment and discovered that 40 percent of the population was food insecure. Among the poorest quintile, the figure rose to 70 percent. The researchers also found some causal relationships, notably unemployment and gender, that helped explain the situation. However, due to the limitations of the study, they did not explore spatial issues in depth.

### FOOD SECURITY IN HIGHLY URBANIZED PLACES

In American and European cities, urban food security challenges are two-fold; as in the developing world, they relate to concentrated poverty and to sprawl. Regarding concentrated poverty: many center cities have pockets of deprivation where access to healthy foods is limited, fast food is omnipresent, and obesity and obesity-related disease rates are reaching epidemic proportions. In the United States, findings from the *American Community Survey* reveal that concentrated poverty has increased by 58 percent in the past decade (Jargowsky 2013). Linking this data with health outcome information reveals some important implications. For example, the New York City Department of Health and Mental Health reports that, since 1990, the portion of diabetes-related deaths has nearly doubled, and now constitutes 11 percent of the city's total. The city's analysts also document dramatic health

<sup>2</sup> The low life expectancy in South Africa is likely associated with the high rates of HIV/AIDS. South Africa is fourth in the world in prevalence of the disease and number one in deaths.

<sup>3</sup> The conceptualization and methodology for distinguishing among metrics or indicators as pressure, state, and response indicators originated in the environmental literature but has transferability in the food security arena especially when delineating access and utilization.

<sup>4</sup> In 2014, the United Nations discussed the incorporation of some of these items in the Sustainable Development Goals to be issued in 2015 (SDSN February 14, 2014: 9).

outcomes differentials according to a constellation of race/ethnicity, income level, and neighborhood characteristics. The highest mortality rates (measured in persons/100,000) are among Blacks (116) and in low-income neighborhoods (177 in Brownsville, the very poorest NYC neighborhood). Comparable figures for Whites are 45 (mortality rate) and for an exemplary moderate-income neighborhood, 19 (neighborhood rate of Murray Hill) (New York City Department of Health and Mental Hygiene 2013).

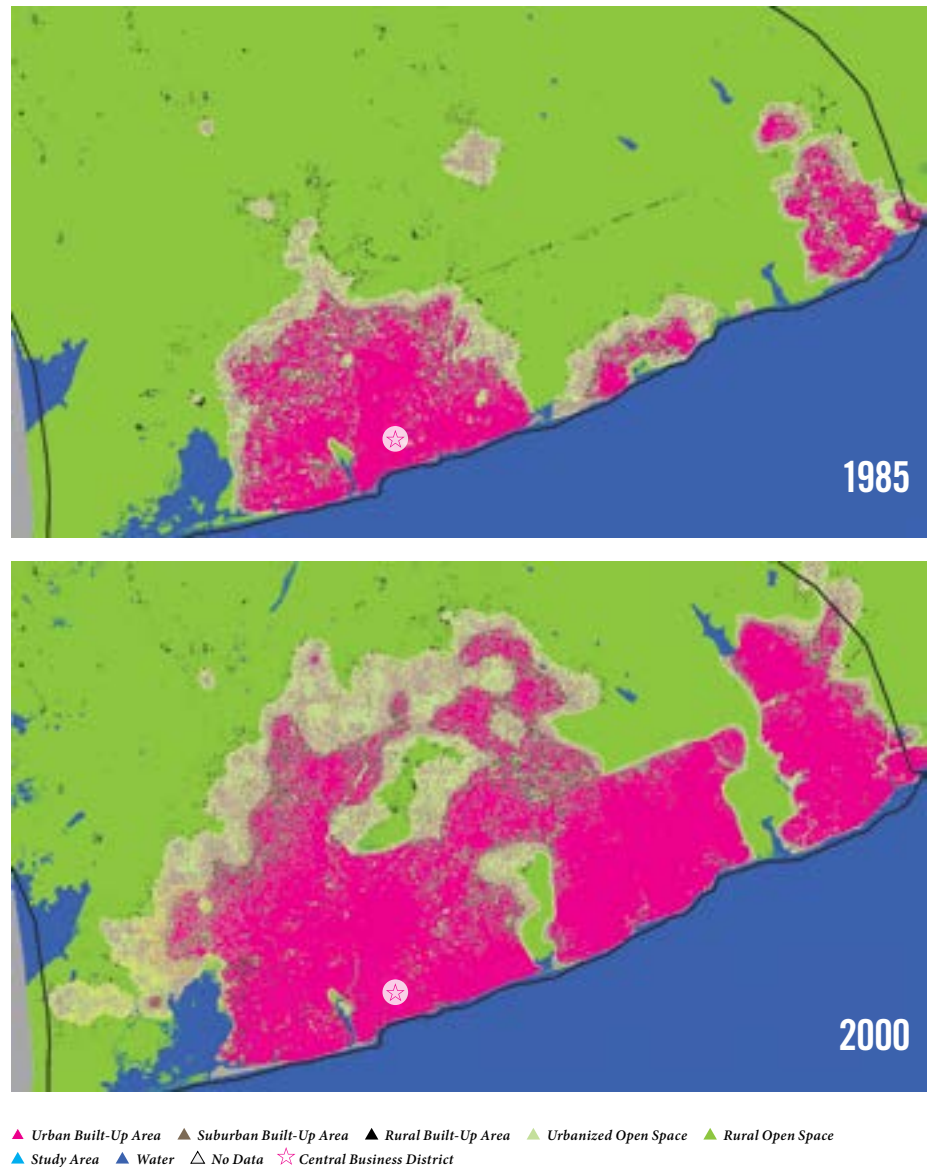
Serious food security issues also emerge from sprawling development patterns. In many countries, prime farmland is near cities. In the United States, for example, 30 percent of farms are within metropolitan boundaries; in France the number is 42 percent. Rising land values caused by city expansion put pressure on farmers to either sell or convert to high-value activities (such as planting orchards, herb gardens, or vineyards, and tending nurseries). In addition, the collision of non-farm and farm uses results in strict regulation of noise, waste, and odors that discourages farming (Daniels 1998). Between 1980 and 2000 land consumption rates (2 percent) exceeded population growth rates (1 percent) (Theobald 2005: 32). Notably, large urban and built-up areas (ten acres or more) increased by 83 percent over the same period (U.S. Department of Agriculture 2013: 8). Figure 8, which shows that the United States experienced a 58 percent increase (about 43 million acres) in land permanently reduced from agriculture, illustrates one impact of sprawling development in the United States. The effects on the food supply are predictable: more costly locally produced goods and heavier reliance on more distantly grown products.

#### DEEPENING RESEARCH ON URBAN FOOD SECURITY ISSUES

Recent scholarship supports recognition of a specialized domain that acknowledges that city dwellers worldwide experience food-related problems that range from hunger to malnutrition to overnutrition: urban food security studies and practice. Scholarly findings revolve around 1.) regional and city planning and the exploration of the spatial implications, from the region to the

**Figure 7:**

Built-Up Areas of Accra, Ghana



Source: Angel, *Making Room for a Planet of Cities* 2011: 39.

neighborhood, of urbanization on food security, and 2.) sociological investigations into urban household behavior in food procurement. While a description of these two research areas provides a broad outline of the parameters of urban food security, additional cross-disciplinary studies that involve such fields as agronomy, business, education, nutrition, public health, social

work, veterinary medicine, and others fill out many important details that this brief overview acknowledges but cannot cover.

#### *Regional and City Planning*

At the regional and city levels, researchers are illuminating how structural and service changes affect urban food insecurity. In particular, the

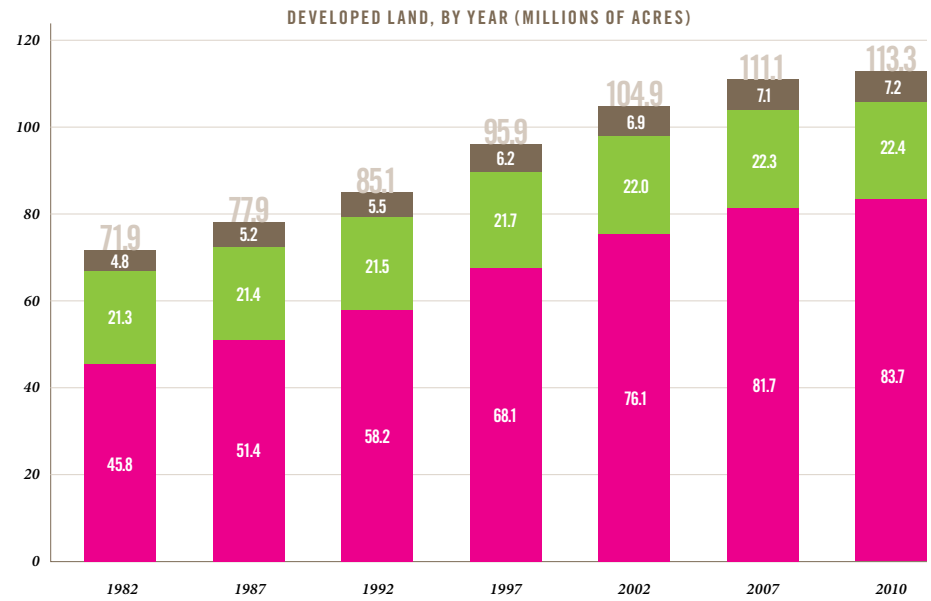
so-called “supermarket revolution,” the rapid spread of supermarkets that is accompanying the rise of the middle class that has swept the developing world since the early 1990s, is a major transforming force in agricultural production and distribution for millions of urbanites in Asia and Africa (Reardon, Timmer, and Minten 2010; Crush and Frayne 2010). Driven by urbanization on the demand side and by globalization on the supply side, regions feel its effects differently depending on their existing food systems.

Regardless of regional differences, supermarkets need large quantities of standardized, reliable quality foodstuffs, specifications that can disadvantage small-scale farmers (defined as those farming up to 2 hectares) who might be unable to fulfill these requirements. Three key adaptations are arising in response, all of which have implications for regional planning: the increase in Farmer Producer Organizations (FPO), in contract farming for small-holder farmers, and in the increasing proliferation of “super farms.” (Trebbin 2014; Will 2013; World Bank 2014).<sup>5</sup> FPOs aggregate products, negotiate prices, and supply information to the small-scale farmers while selling output to wholesalers or supermarkets directly. Contract farming, sometimes called “outgrower agreements,” also involves small-holder farmers who agree to produce a specified volume and quality of products to purchasers who guarantee prices. This practice is becoming more widespread in Africa and Asia, resulting in greater financial security for individual farmers (Will 2013). At the other end of the scale, the creation of super farms of 10,000–15,000 hectares has been occurring since the 1990s; from 1990 to 2007 the agricultural expansion rate caused by super farms was 1.9 hectares annually, for a total increase of 1.5 billion hectares. Sub-Saharan Africa, Latin America and the Caribbean, and Southeast Asia are the sites of the greatest number of expansions where production centers on vegetable oils, rice, maize, livestock and their feeds (Deininger, K. and D. Byrlee 2011).

**Figure 8:**

Increase of Developed Land in US 1982–2010 and Uses

▲ Large Urban and Built-Up Areas ▲ Rural Transportation ▲ Small Built-Up Areas



Source: U.S. Department of Agriculture, 2013.

The supermarket phenomenon, and the associated changes in agricultural production, is controversial. Advocates of small-holder farms that provide employment face off against advocates of large-scale farms that offer efficiencies. While supermarkets can create vitally important economies of scale and leverage emerging technologies, careless industrial-like large farm operations can also wreak havoc on the environment, resulting in, for example, inefficient water consumption and the eutrophication of water bodies, soil degradation, and the spread of zoonotic pathogens associated with poor management of livestock production. In addition, absorbing or retraining the people displaced by farm consolidations and associated urban expansion creates new educational and employment pressures in cities and small towns. The World Bank weighs in on the discussion with the following observation: “it is clearly too early to brand super farms a solution to hunger and the world’s increasing food demand. The stakes are

**WHILE SUPERMARKETS CAN CREATE VITALLY IMPORTANT ECONOMIES OF SCALE AND LEVERAGE EMERGING TECHNOLOGIES, CARELESS INDUSTRIAL-LIKE LARGE FARM OPERATIONS CAN ALSO WREAK HAVOC ON THE ENVIRONMENT, RESULTING IN, FOR EXAMPLE, INEFFICIENT WATER CONSUMPTION AND THE EUTROPHICATION OF WATER BODIES, SOIL DEGRADATION, AND THE SPREAD OF ZOOONIC PATHOGENS ASSOCIATED WITH POOR MANAGEMENT OF LIVESTOCK PRODUCTION.**

<sup>5</sup> FPOs exist in many countries including China, Vietnam, Honduras, El Salvador, Peru, Ecuador, Nicaragua, Kenya, Uganda, and India (Trebbin 2014: 36).

too high, however, to rule out any potential source of agricultural productivity growth, production, or income” (World Bank 2013: 7).

In the developing world, to accrue benefits from these new arrangements requires instituting a planning framework that addresses issues of land and ecosystem conservation, infrastructure investment, and employment. The reorganization of the supply chain caused by the supermarket revolution stimulates demand for better transport networks, new spaces for storage, processing, and packaging at the sites of production, and storage and distribution terminals close to consumers or at ports (in the case of exported farm goods). Additionally, integrating planning with legal, financing, and regulatory programs to maintain farming in the face of urbanization-induced land price increases will also be necessary (Trebbin 2014).

In the developed world, regional issues also center on production—especially the environmental and ecosystem effects of current agricultural practices. In the United States, for example, crop cultivation in warm, water-scarce places like California, which produces roughly half of U.S. fruits and vegetables, strains water systems that are especially sensitive to seasonal fluctuations. The current drought in California is resulting in lower production and higher prices, which have deleterious effects on low-income consumers. Agricultural production around important waterbodies also presents problems. For example, agricultural runoff from animal wastes and fertilizers is the largest contributor to the impairment of the Chesapeake Bay, the most sizable estuarine system in the United States, whose watershed covers six states and encompasses more than 85,000 farms (U.S. EPA 2010). In short, regional issues center around planning for environmental sustainability.

#### **Urban Households and Food**

Recently, researchers from the African Food Security Urban Network (AFSUN) examined food security in several African cities at multiple scales (household, community, and city) and geographies (retail, residential and employment location patterns), studying behavioral patterns

of urban households in food procurement and consumption and how urban form and structure affect these practices (Crush and Frame 2010; Battersby 2012). They focused their work in the slums. Their findings build a credible case for identifying access and utilization, not availability, as critical urban food security issues.

**U.S. RESPONDENTS SAY THEY ARE UNWILLING TO SPEND MORE THAN 20 MINUTES ON AVERAGE IN COOKING FOOD, AND MAY LIVE IN PLACES WHERE NUTRITIOUS FOOD IS UNAVAILABLE DUE TO LACK OF STORES OR HIGH COST. AS A RESULT, THEY TEND TO RELY ON PROCESSED OR PREPARED FOODS BOTH AT HOME AND OUTSIDE, CONSUMING DIETS HIGH IN REFINED GRAINS, SUGARS, AND FATS AND LOW ON FRESH FRUIT AND VEGETABLES.**

First, they verified that poor urban households spend 60 to 80 percent of their income on food. Second, they discovered that these households purchase (not home cook) 90 percent of their food in formal and informal markets, so any rise in food prices is catastrophic. In one city, 88 percent of the respondents reported going without food in the previous six months due to high costs (Battersby 2012: 154). Third, they found that the majority of poor households borrow food from their neighbors as a key coping strategy during times of budgetary stress. Fourth, they traced how formal market outlet (including supermarkets and small neighborhood stores) practices affect purchasing. For example, while supermarket food prices per unit tend to be lower than those of

small stores, supermarkets sell in large sizes, do not extend credit, and tend to be located far from poor neighborhoods—all factors that discourage households from buying from supermarkets and realizing those per-unit savings (Crush and Frayne 2011). Fifth, in examining the role of urban agriculture in the lives of urban households, they uncovered three types of cultivators: the poorest householders (who grew food for sustenance), the more economically secure (who view their crops as “insurance” against price volatility), and the small-scale entrepreneurs (who sell, rather than consume, produce) (Crush and Frayne 2010). However, not many households depend on urban agriculture for significant portions of their diets: when queried, 22 percent of poor householders said they used food from their gardens but did so infrequently—8 percent once a week; 3 percent once a month (Battersby 2012). These researchers conclude that urban agriculture does not present much promise in addressing food insecurity in the rapidly urbanizing places of the developing world.

Other research has focused on the role of the informal sector in food distribution for lower-income populations in developing countries. While data is limited (due to definitional and resource problems), what exists provides insights into the role of the informal sector and how it is intertwined with larger livelihood issues (Hitimana, Allen, and Heinrigs 2011). More than ten years ago, the International Labor Organization (ILO) reported that of the half-million street traders in South Africa, 350,000 were dealing in food and that 245,000 of these were women (ILO 2003: 4). A more recent study in Bolivia, Ecuador, Philippines, and Thailand documented the types of jobs that female street vendors have; these include food hawking/street vending, manning mobile food stalls, and producing prepared food in home-based kitchens or public market eateries. The study also revealed that women choose food service employment not only to earn income but also to ensure food for their families, since what is not sold can be eaten (Sagrario and Swain 2013: 92). In addition to these specific studies on the informal sector, additional studies that



monitor the growth of supermarkets note their parallel existence with informal street vending, documenting the co-existence of two streams of food distribution while underlining the dynamic landscape of urban food systems in rapidly urbanizing places (Reardon and Timmer 2007).

In the developed world, household food consumption habits differ from those in the developing world. Recent reviews reveal that in the United States, for example, households, regardless of income, eat nearly three-quarters of their meals at home and the remainder primarily in fast food establishments (Smith et al 2013). But, like their counterparts around the globe, U.S. households feel pressed for time. The U.S. respondents say they are unwilling to spend more than 20 minutes on average in cooking food, and may live in places where nutritious food is unavailable due to lack of stores or high cost (Smith et al 2013, Ploeg 2013). As a result, they tend to rely on processed or prepared foods both at home and outside, consuming diets high in refined grains, sugars, and fats and low on fresh fruit and vegetables (Smith et al 2013).

Within cities, food distribution patterns create planning issues. As mentioned above, urban households in rapidly urbanizing places in the developing world eat the majority of their meals outside the home. Land-use issues play some role in this behavior. For example, the separation of work and housing combined with dysfunctional transportation networks leads to hours-long commuting. Individuals, especially poor individuals, are pressed for time and so buy expensive, prepared foods near transport nodes or in grocery stores. They not only spend more per unit but also frequently purchase high-calorie, low-nutrition foods leading to poor dietary outcomes (Battersby 2012). Further, in crowded slums, habitable space is so limited that housing units not only lack basic facilities like water and toilets but also have no dedicated kitchen space. Food storage is difficult due to lack of space and infestation by rodent and insects as is cooking, which, if done, occurs over dung- or coal-fueled cook stoves located in whatever interstitial

space may be available. At the neighborhood level, the high incidence of food borrowing among fiscally stressed households demonstrates the importance of community planning that strengthens social cohesion.

Work in Medellín, Colombia illustrates a form of “acupuncture” planning—the insertion of bridges, escalators and ski-lifts in formerly isolated and unserved slums—that is positively affecting journey-to-work and neighborhood revitalization outcomes. While no one has studied the food security impact of these changes, the ski-lift program alone has cut the average commuting time to downtown in half from two or more hours to an hour (B. Alshalalfah, A. Shalaby, S. Dale, and F. M. Y. Othman 2012).

Researchers have clearly demonstrated that urban food security is more than a question of food availability; evidence shows that production, distribution, and delivery patterns and context-driven, spatially determined issues of access and utilization are also implicated in food security. Their research also begins to suggest remedies, with some solutions focusing on regional land use issues to preserve sustainable agriculture in the face of urbanization, some entailing mixed-use zoning to address the jobs/housing disparities and the location of markets, others aiming to strengthen communities to support neighborly “safety-net” efforts, others focusing on the provision of well-served and more spacious housing and others working to balance the informal and formal economies to foster an improved food delivery system. Researchers’ findings suggest that a wide range of policies will be needed. While the worldwide challenge of undernourishment is immediate and undeniable, it is not the only facet of food security in need of attention.

### THE FUTURE OF URBAN FOOD SECURITY RESEARCH, PRACTICE, AND POLICY

The framework for a specialized urban food security domain exists. The articulation of its concerns and the problems to be solved is in development. The need for additional work is evident in the fact that in the developing world

the trajectory of urbanization is upward while the developed world has already passed the three quarters mark. The planet is urban and will continue to be so.

A first step is to gain acceptance for a set of metrics that demonstrate deprivation more accurately than the current single measure.

#### BETTER MEASURES NEEDED

The worldwide community of food security experts from traditional and emerging disciplines need to agree on measures that will best represent urban food security challenges. As with any policy development, the first step is to assess the extent of the problem at the national level and then to drill down to collecting basic data for lower levels. National level data will provide directional assistance in dealing with production and distribution issues (such as broad-scale agricultural issues, health and education deficits, and transportation policy) while regional, city, and neighborhood data can point to distribution and access issues (such as local agricultural, land use, housing and transportation services). For example, the United States produces an annual survey, *Household Food Security in the United States* (Jansen-Coleman 2012), that outlines the national scale of the problem; the most recent one reported that 15 percent of the U.S. population (or 49 million) is food insecure (using the caloric measure), and that 84 percent of the food insecure (41 million) live in metropolitan areas, of which 40 percent (16 million) live in central cities. Region-level studies—exemplified

**THE HIGH INCIDENCE OF FOOD BORROWING AMONG FISCALLY STRESSED HOUSEHOLDS DEMONSTRATES THE IMPORTANCE OF COMMUNITY PLANNING THAT STRENGTHENS SOCIAL COHESION.**



**Figure 9:**

Food System Assessments and Education. The Philadelphia Department of Health informs consumers about nutrition in order to reduce the incidence of obesity-related disease (left) while reports from the DVRPC illustrate the source of the Greater Philadelphia region's food (center, facing page).

Source: DVRPC 2010; City of Philadelphia, Department of Public Health 2013.



by the work of the Delaware Valley Regional Planning Commission's (DVRPC's) *Greater Philadelphia Food Systems Study* (2010) and *Eating Here, Greater Philadelphia Food Systems Plan* (2011)—inventory and protect production and distribution, while city-level programs—exemplified by the City of Philadelphia's "Philadelphia: Food Fit" initiative ([www.foodfitphilly.org](http://www.foodfitphilly.org)) that aims to reduce food deserts, improve dietary outcomes, and expand opportunities for physical activity—deal with delivery and with programs based on local urban food insecurity assessments. See Figure 9 for more information on these Philadelphia-area studies and programs.

A contrasting approach is taken in South Africa, which has no national food assessment program but relies on several databases to tease out the dimensions of the food insecurity problem. This research reveals that rural areas of the country, as would be expected, are much deprived—but it also shows a substantial amount of urban food insecurity.

Rough estimates suggest that approximately 20 percent of the country's 34 million urbanites are food insecure (Labadario 2011). But these data are suspect due to the undercount of the country's population living in informal settlements.

In reality, in cities in developed and developing countries, the details of how urban food security plays out rely on a combination of growing case study evidence and quantitative studies, which help direct national and local policy approaches. The work of AFSUN, largely conducted by social scientists, demonstrates the strength of the needed household surveys in offering specific details about consumption patterns and their causes (J. Crush, A. Hovorka and D. Tevera 2010). Disaggregated statistical data recording key indicators uncover the extent of specific food security issues like stunting, low protein diets, levels of waste that can be benchmarked and monitored (Lipinski et al 2013).

Among the projects to be considered in developing better measures are:

- ▶ *Develop disaggregated data to highlight the spatial dimensions of food insecurity, including measures of under- and overnourishment.*
- ▶ *Adopt an urban food security indicator system or index along the lines of Oxfam's recently released "Good Enough to Eat" Index.*
- ▶ *Monitor waste at all levels of the food system.*
- ▶ *Include data derived from qualitative studies in refining city-specific food security analyses.*

#### AVAILABILITY

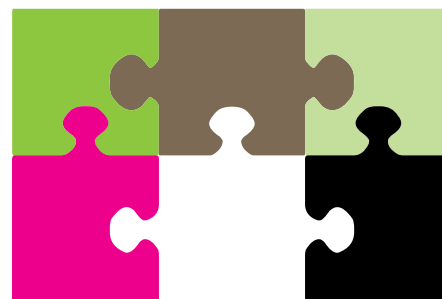
Urban food provisioning will require unprecedented levels of coordination across nations and regions and among sectors. After accounting for population growth and dietary shifts, feeding the world's population in 2050 will require the production of as much food over the next four decades as was produced throughout



**Figure 10:**

Urban Food Security Metrics Are Interconnected and Context Dependent. Analyzing urban food insecurity requires consideration of many measures derived from quantitative and qualitative research.

- ▲ Calories
- ▲ Store/Distance
- ▲ % Diet Fresh Food
- ▲ Urban Agriculture & Supermarkets
- ▲ Jobs: Street Vendors



all of human history. Meeting urban food needs will call for 1.) addressing broad concerns related to planetary resources and 2.) incorporating innovations in supply and distribution without disrupting traditional modes of organization.

**Planetary Resources and Food Security**

Achieving worldwide food security and meeting the growing need for water and energy without causing irreparable environmental damage is part of a broader discussion of food security as it relates to planetary resources. According to the Stockholm International Water Institute, the global water consumption rate is growing twice as fast as the global population. With the agricultural sector already consuming 70 percent of all fresh water and the industrial sector another 20 percent, only 10 percent of fresh water worldwide is available for drinking and sanitation. Extending access to safe drinking water and sanitation infrastructure to rapidly growing urban populations puts enormous pressure on natural resources.

Given the anticipated increase in competition between urban and agricultural water use, an estimated \$6 trillion will be needed to improve efficiency and extend services to meet basic demands by 2050 (Chaim 2050). Many innovations in this field already exist or are emerging, but the financial and technological resources to implement these innovations in developing countries are lacking. As Figure 11 shows, regional discrepancies in agricultural, industrial, and household water use explain both the tremendous scale of the challenge as well as the considerable efficiencies that can be realized through the dissemination of best practices and new technologies. For example, agricultural practices in South Asia require more than four times the water resources as in North America, while developed economies in North America and Europe display widely different levels in water withdrawals by sector that stem, in part, from more efficient practices in water use in agricultural production, a subject beyond the scope of this study.

Beyond water needs, climate change more broadly is threatening both livelihoods and production levels in the world’s agricultural, livestock, and fisheries sectors. Global warming is now expected to result in 1.8 and 4.0 °C temperature increases, placing 20–30 percent of all plant and animal species at risk of extinction by 2100 (FAO 2007). While predictions concerning overall agricultural productivity are controversial, climate change will almost certainly dramatically impact the geography of global production; major regions of North and South America, Africa, and Asia are all expected to experience declines in productivity, while certain areas of the United States, Canada, and both Western and Eastern Europe will likely benefit from increased productivity (see Figure 12).

**Innovations to Supply and Distribution**

Meeting the global demand for food will require fashioning innovative agricultural intensification techniques, developing land conversion devices that smooth rural land transfer or conserve peri-urban agricultural land, attracting investment

in modern and ecologically sustainable agricultural practices, and supporting new arrangements among small agricultural producers. Improving distribution systems will require developing new trade policies and legal frameworks that link regions of surplus to those with deficits, improving weak logistical arrangements, and creating marketing strategies that effectively integrate considerations of nutritional value and consumer awareness in cities in order to curb increases in diet-related diseases.

Meeting this multifaceted challenge will require recognizing the mutual dependency between urban and rural places. This means integrating rural and peri-urban food producers in robust production and distribution networks and balancing the benefits and costs of globalization and technological advances (which increasingly support large-scale intensive farming systems) with those of localization (which is largely dominated by small producers of food).

Among the projects to be considered to serve availability issues are:

- ▶ *Adopt national policies that enhance rural/urban food chains by improving logistics and by fostering public-private partnerships to assist in delivering affordable, healthy food to disadvantaged populations.*
- ▶ *Bolster rural and peri-urban food production by designing more productive and ecologically sustainable farms in the hinterlands and conserving close-in land for fresh foods (like dairy).*
- ▶ *Enhance the safety of crop and livestock production where agriculture and human populations are in close proximity.*

**ACCESS AND UTILIZATION**

Achieving urban food security is highly dependent on household purchasing power. City-dwellers buy, not grow, the majority of their food regardless of source (whether informal, such as food vendors), or formal, such as supermarkets). Addressing poverty, especially through education and employment programs, is fundamental. In the long term, such a strategy will solve major aspects of food insecurity; in the short term, however, it will not. Short-term

**Figure 11:**

Comparing Water Use by Agriculture, Industry and Households



Source: Green Harvest.

strategies fall into three categories: 1.) perfecting a city’s current and future food chain with special attention to improving poor households’ access, 2.) developing good planning that supports strong community ties and mixed uses, placing markets, housing, and jobs within easy reach of low- and middle-income people, and 3.) educating consumers about healthy food choices. To be successful, programs in each of these categories must begin with a clear understanding the local (national, regional, city, or neighborhood) context in which they are developed.

**Food Chain Imperfections**

Any drill-down to the metropolitan scale forces a focus on post-production food chains (from production to household purchase). Along this urban food chain unique issues emerge including logistics and storage (which require the public

sector to provide better highways and rail) and more efficient wholesale practices and refrigeration (which are largely private sector responsibilities). Solutions to these problems require the development of public-private partnerships aligned with national urban policies that recognize the special needs of cities and metropolitan regions.

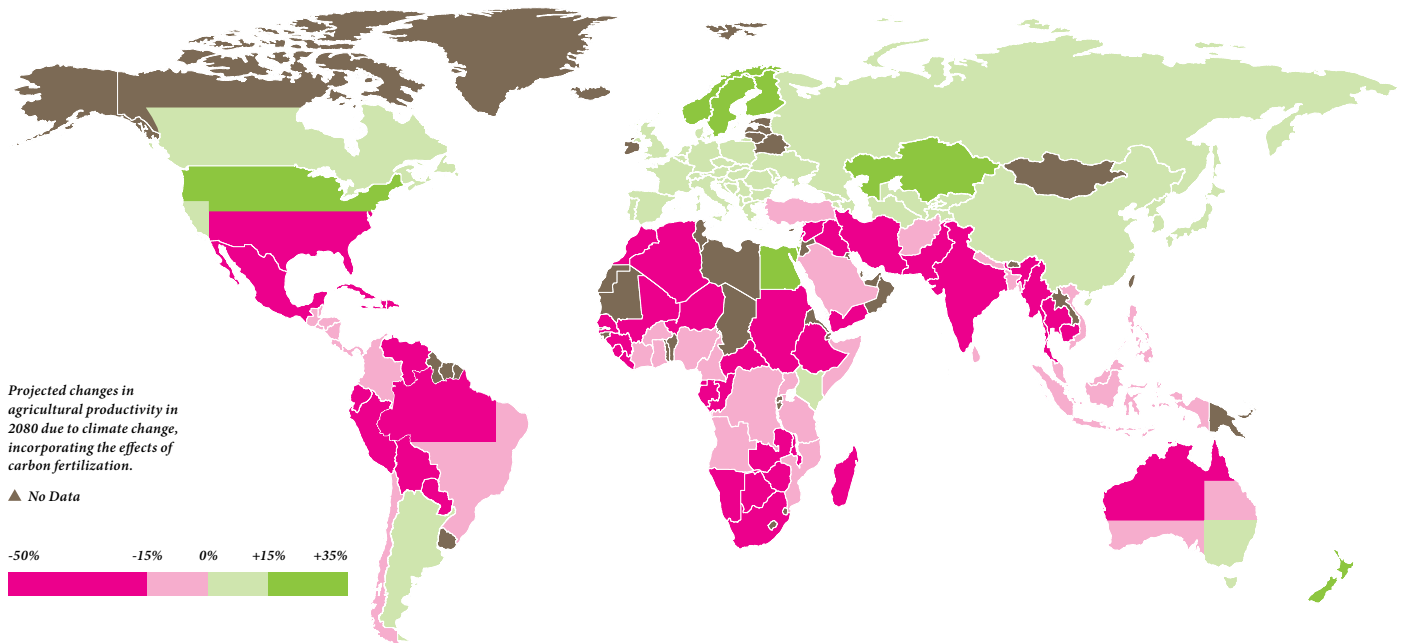
At the city and neighborhood scale, understanding the role of the informal sector as an ally in supplying healthy food is important. This will require improving mechanisms for capturing and integrating information about supply structures, food safety, and the economics of informal food systems.

**Good Planning**

A raft of other food security issues emerges within city boundaries. Fundamental are land-use and

**Figure 12:**

Impact of Climate Change on Agriculture by 2080



Source: Cline 2007.

**BEYOND WATER NEEDS, CLIMATE CHANGE MORE BROADLY IS THREATENING BOTH LIVELIHOODS AND PRODUCTION LEVELS IN THE WORLD'S AGRICULTURAL, LIVESTOCK, AND FISHERIES SECTORS. ...WHILE PREDICTIONS CONCERNING OVERALL AGRICULTURAL PRODUCTIVITY ARE CONTROVERSIAL, CLIMATE CHANGE WILL ALMOST CERTAINLY DRAMATICALLY IMPACT THE GEOGRAPHY OF GLOBAL PRODUCTION.**

transportation decisions that not only determine city structure and form but also affect the means by which households procure their food. The majority of urban household dietary needs are served by purchasing, not producing, food. While this holds true in general for urban populations, the details of purchasing behavior are highly contextualized, wrapped up in local economic development and in local health concerns. For example, recent attention to food deserts (lack of food outlets in disadvantaged neighborhoods) in developed and developing countries has led for calls to increase supermarket penetration. Yet, as seen in several case studies in poor neighborhoods, unit costs of supermarket food are lower than those of small retailers and food vendors, but the latter sector provides an important source of employment. So any policy that attempts to improve cost efficiency for poor households via supporting supermarket development might have the unintended effect of contributing to unemployment. The intertwining of urban spatial patterns with food systems issues has yet to be well-integrated into planning and development practice.

Where supporting urban agriculture may be of interest in some circumstances, a number of issues confound its development. For example, in rapidly urbanizing cities in the developing world, the use of contaminated land when undertaken in former industrial neighborhoods yields unhealthy produce; the lack of adequately protected spaces and a dearth of sufficient clean water are also concerns (Crush and Frayne 2011). In the developed world, legacy cities having high levels of land abandonment or vacancy also face similar problems with brownfields and commonly turn to urban agriculture as a land use of last resort. However, when carefully planned, urban agriculture can offer food production, employment, stewardship of abandoned land, and ecosystem services like rainwater drainage.

#### *Educating Consumers about Healthy Food and its Preparation*

Public health and nutrition programs are a necessary component of improving food security. A fundamental principle in these efforts should

be that “not all calories are equal.” In the poor urban neighborhoods where households live in unsanitary, crowded conditions, food preparation activities also need attention. The use of small, smokey dung- or coal-fueled stoves, for example, poses major respiratory system threats to women and children hovering over them. Further, in many places, the lack of clean water and sanitary facilities adds to health hazards in cooking. In short, these programs should educate, incentivize and/or subsidize consumers to pursue healthy diets, limit prepared foods, purchase fresh food (fruit and vegetables), and use clean-energy cook stoves.

Among the projects to be considered to address access and utilization issues are:

- ▶ *Integrate food distribution considerations into local land-use and transportation planning; this means attending to the lack of supermarkets while taking care of small retail outlet owners or food vendors and finding ways to make their enterprises economically viable while serving healthy foods.*
- ▶ *Devise programs that mitigate price volatility of basic foodstuffs.*
- ▶ *Develop programs to enhance diets with fresh food, ensure food safety, and promote clean energy food preparation.*
- ▶ *Craft emergency systems to deliver micro- and macronutrients to food-insecure populations where necessary.*

## **GETTING TO URBAN FOOD SECURITY: BUILDING KNOWLEDGE NETWORKS**

Achieving urban food security will require not only new knowledge about how to feed people but also will call for an understanding of the context in which this knowledge is to be implemented by city and national governments, the private sector, and international donor and lender groups. The pace and trajectory of today’s urbanization necessitates new and immediate action because business-as-usual practices simply will not satisfy the world’s food needs.

Integrating food production and supply systems locally and globally and developing joint food security and public health programs to foster a comprehensive understanding of the relationships between food production and nutrition will be a complicated but not insurmountable challenge.

## **THE PACE AND TRAJECTORY OF TODAY’S URBANIZATION NECESSITATES NEW AND IMMEDIATE ACTION BECAUSE BUSINESS-AS-USUAL PRACTICES SIMPLY WILL NOT SATISFY THE WORLD’S FOOD NEEDS.**

Broadly speaking, any call for improved knowledge networks suggests a two-way flow of information to replace current unidirectional tendencies. Agricultural extension programs, educational outreach for nutrition, and land-use planning for food security can benefit from community engagement. The advent of widespread social media is useful in helping with organizing and publicizing agricultural cooperatives, farmers’ markets, and local food procurement. To this end, researchers and practitioners should analyze the appropriate technology and context for engaging the community in building knowledge hubs to spread innovation. The Fifth Assessment report of the International Panel on Climate Change. “Climate Change 2014: Impacts, Adaptation, and Vulnerability,” underlines the urgency of undertaking these tasks as quickly as possible with its warning: “All aspects of food security are potentially affected by climate change, including food access, utilization and price stability.” It goes on to outline the many areas in need of research and policy solutions including many questions related to production, but concludes with other suggestions: “There remains limited quantitative understanding of how non-production elements of food security will be affected, and of the adaptation possibilities in these domains.” (IPCC 2014, 3).

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# PART II: CONFERENCE PROCEEDINGS, *FEEDING CITIES: FOOD SECURITY IN A RAPIDLY URBANIZING WORLD*

## OVERVIEW

In an effort to foster the interdisciplinary and cross-sector collaboration necessary to achieve a more food secure future, the Penn Institute for Urban Research, in partnership with the University of Pennsylvania School of Veterinary Medicine and a Faculty Steering Committee representing nine Penn schools and six centers, convened a three-day conference entitled *Feeding Cities: Food Security in a Rapidly Urbanizing World* in March 2013.<sup>6</sup> Funding from The Rockefeller Foundation and Penn's Office of the Vice Provost for Global Initiatives supported the conference. Attended by 450 participants, the conference featured plenary and breakout sessions, a special photography exhibit illustrating global food security issues, film screenings, and an extensive book fair.

In addition to addressing the core challenges throughout the domains of urban food security, the *Feeding Cities* conference articulated three major cross-sectoral themes that underlie policy, research, and instruction: food security is central to sustainable urban development, planning for resilient urban systems, and absence of comprehensive policy. What follows is a discussion of these three themes, followed by the conference schedule, summaries of conference sessions, and speaker biographies. ►



## FOOD SECURITY IS CENTRAL TO SUSTAINABLE AND EQUITABLE URBAN DEVELOPMENT

Researchers and practitioners must be sensitive to the many strands of influence that the food system exerts on other systems, be they environmental land uses or socioeconomic effects. As Molly Jahn, Professor of Agronomy and Genetics, Nelson Institute for Environmental Studies, asserted, “I can’t demand food without setting up a series of collateral interactions in water, or energy, or greenhouse gas emissions.” Heather Grady, Vice President of Foundation Initiatives, The Rockefeller Foundation, echoed this belief: “Food security is about more than keeping hunger at bay, it is about stable societies, productive societies and, in our twenty-first century world, we believe it is about resilient societies.”

In the U.S. context, Malik Yakini, Director of the Detroit Black Community Food Security Network (DBCSN) introduced his organization’s concept of food justice as the primary component of a food security movement. Describing the ways in which issues of race, class, and gender have created severe inequalities in global food systems, Yakini called particular attention to the need to re-evaluate the role of food systems for traditionally marginalized groups.

Acknowledging that various other systems interact with the food system, numerous panel members called for a reassessment of the non-food-security benefits related to food security “domains” (See Figure 10). They cited, for example, studies on the influence of urban agriculture on surrounding property values, mental health, urban heat island effect, and water filtration.

Finally, many observed that in continuing to assess the spin-off benefits or drawbacks of food security policies, researchers and practitioners

will need to update their metrics and impact assessments to reflect ancillary policy products.

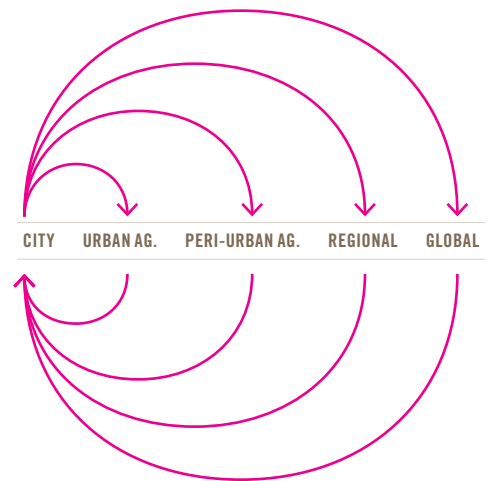
## PLANNING FOR RESILIENT URBAN FOOD SYSTEMS

To meet the increased demand for food production associated with projected increases in urban populations, conference participants emphasized the need to create a resilient food system; specifically, they called for comprehensive food policy initiatives that integrate centralized animal production and agricultural practices, smallholder farming, and urban and peri-urban agriculture rather than initiatives that place these practices in competition with one another. They envisioned food production as a series of loops that parallel and complement each other. They observed that urban agriculture cannot replace rural agriculture in terms of yields and products, nor can global food production systems entirely supplant local food production systems in providing responsive, secure, and affordable sources of fresh fruits and vegetables to vulnerable urban populations in times of environmental stress and price shocks. In sum, a resilient food system has spare capacity, redundancy, and adaptability at multiple scales, utilizing a variety of production techniques and sites, and characterized by functioning feedback loops throughout (Figure 10).

Joan Clos, Undersecretary and Executive Director, United Nations Human Settlements Program (UN-Habitat), brought a broader perspective to the global challenges of proactively planning for urban growth and sustainable food systems. He illustrated that point by noting that attendees were walking down the same grid of streets in Philadelphia that William Penn laid out 400 years ago, punctuating the long-term

**Figure 13:**

Feedback Loops in a Resilient Food System



Source: Catherine Brinkley.

consequences, both positive and negative, that today’s food security planning and infrastructure decisions will have on future generations.

Conference participants recognized that comprehensive planning can coordinate food security goals already established via international, national, or local authorities. In terms of achieving any food production goals, Thomas Daniels, Professor of City and Regional Planning at the University of Pennsylvania, noted that “it is very important to have a comprehensive plan that cites agriculture as an important industry that you want to maintain well into the future. This will set the legal basis for your zoning.” Panelists agreed that, in urban environments, supportive land use policies that allow city farming are needed. “Land access, including the quality of the land and especially land tenure, largely defines urban agriculture’s ability to impact community food security,”

<sup>6</sup> To view all conference presentations and media coverage from the event and subsequent commissioned work by journalists, practitioners, and academics building on the discussion initiated at Feeding Cities go to: [www.feedingcities.com](http://www.feedingcities.com).

asserted Domenic Vitiello, Assistant Professor of City and Regional Planning, University of Pennsylvania. While much needs to be done to coordinate urban growth and farmland retention, panelists urged land-use planners to retain elements of flexibility in prescribed land use patterns. Kevin Morgan, coauthor of *The School Food Revolution*, noted that “the key point is multi-functionality. . . It is incumbent on the food movement to be a big tent, to frame food policy in a sufficiently capacious way.” Regional systems of distribution and waste recycling may require the planning of specific infrastructure improvements to support multifunctional areas of food production, recreation, and wildlife habitat. All of this planning must be coordinated; plans that match food security needs with food access points can guide more efficient delivery systems. Lastly, citing the success of food security planning in Belo Horizonte, Brazil, panelists emphasized the need for pilot projects to try new policies, evaluate success, and then scale up.

As part of this theme, “planning for resilient urban food systems,” the topics discussed below were identified as important areas for which to develop action agendas. These agendas should be considered together rather than as stand-alone solutions. As Molly Jahn noted, “maximizing short-term crop production doesn’t equate to food security and certainly not nutritional security or nutritional health;” all policies must occur in tandem.

## ABSENCE OF COMPREHENSIVE POLICY

Panelists identified multiple competing agendas in food security policies noting that some policies unintentionally create competition among various food security scales, while others may create competition but more research will be needed to know for certain. For example, financial and health regulations that favor large-scale agriculture, which can more readily comply with packaging and safety laws, may allow the global feedback loop to flourish at the expense of local and regional feedback loops. An example of policies in direct competition with one another is that of the contradiction between anti-hunger advocates (who mainly address undernourishment and the lack

of access to necessary calories) and public health advocates (who mainly address overnutrition in the sense of obesity and diet-related disease). A policy in need of additional research includes that of emergency food distribution in urban areas: in this case, longitudinal studies to evaluate if this practice moves people towards food self-sufficiency or dependency are needed. At the conference, participants outlined the need for a model through which these issues can be simultaneously addressed and food-security agendas can be made compatible. Regarding the division between anti-hunger and public health advocates, specifically, participants recommended shifting emphasis towards the provisioning of fresh fruits and vegetables as a cornerstone of local food policy and emergency feeding programs, and away from cheaper, more calorie-dense processed foods.

Contradictions also exist among economic planning policies. For example, increasing food production often requires increasing the price of food to incentivize farmers, while efforts to reduce current hunger and malnutrition in cities requires reducing the price of food. This contradiction—between the need to balance investment in food availability (production) and access (distribution)—came up more than once in conference discussions. Participants noted, for example, the value of global trade in providing urban populations with staple foods at low prices, and the domestic agricultural policies that must simultaneously support the profitability and viability of local food production and rural livelihoods. To address this contradiction, governments will need to play a central role in correcting locally for price distortions on the global market. In Belo Horizonte, Brazil, for example, the public sector buys food from local farmers, supporting peri-urban agriculture, while making fresh food available at a discount to all citizens, a program that de-stigmatizes public food access or relief. Leveraging partnerships with the federal government, the municipality of Belo Horizonte is able to run this comprehensive package of policies and programs with only 2 percent of the city’s budget (Rocha 2001). As a result of Belo Horizonte’s success, Brazil has

encouraged the adoption of local Food Councils throughout the country.

Taken together, the transformative impact of urbanization on livelihoods, land use, diets, and human health and the unprecedented challenge of feeding a growing global population within the context of climate change and natural resource depletion present among the most complex and far-reaching human development challenges of the twenty-first century. The *Feeding Cities: Food Security in a Rapidly Urbanizing World* conference provided a forum for a discussion of these two phenomena; the conference discussions acknowledged the complex, interdependent relationship between the two phenomena and laid the foundation for research and action agendas that recognize not only the urgency of improving individual policies and practices related to food production, distribution, and utilization, but also that these innovations must not be developed in isolation.

*Feeding Cities* participants emphasized the importance of evaluating all food security initiatives with criteria relating to urban and regional governance, ecological sustainability, equity and culture, nutritional health and human development, trade and economic policy, and cross-sectoral cooperation between public, private, and non-governmental actors. Above all, the *Feeding Cities* participants stressed the importance of coordinated policy and research in the realm of urban food security. They reiterated that, though no one silver bullet will ameliorate the challenge of food insecurity in a rapidly urbanizing world, the uncoordinated deployment of simultaneous, and often adversarial, approaches threatens to compound the problem.

Ultimately, each session of the *Feeding Cities: Food Security in a Rapidly Urbanizing World* conference (as presented in the following pages) underlined why developing new, multi-disciplinary and multi-sectoral approaches to food security research and practice, as well as effectively disseminating models that are working in cities and regions around the world, will play a critical role in sustainably provisioning future generations with accessible and nutritious food.

**I CAN'T DEMAND FOOD WITHOUT  
SETTING UP A SERIES OF  
COLLATERAL INTERACTIONS  
IN WATER, OR ENERGY, OR  
GREENHOUSE GAS EMISSIONS.**

—MOLLY JAHN

**FOOD SECURITY IS ABOUT MORE  
THAN KEEPING HUNGER AT BAY,  
IT IS ABOUT STABLE SOCIETIES,  
PRODUCTIVE SOCIETIES AND, IN  
OUR TWENTY-FIRST CENTURY  
WORLD, WE BELIEVE IT IS ABOUT  
RESILIENT SOCIETIES.**

—HEATHER GRADY

# INAUGURAL SESSION: PENN IUR URBAN LEADERSHIP FORUM: FOOD SYSTEMS AND THE TWENTY-FIRST CENTURY CITY

## MODERATOR

**Eugénie L. Birch**, *Lawrence C. Nussdorf Professor of Urban Research and Education; Co-Director, Penn IUR, University of Pennsylvania*

## AWARDEES/PRESENTERS

**Joan Clos**, *Undersecretary and Executive Director, United Nations Human Settlements Programme (UN-HABITAT), Nairobi, Kenya*

**Ridwan Kamil**, *Founder and Principal, Urbane Indonesia, Bandung and Jakarta, Indonesia*

**Yael Lehmann**, *Executive Director, The Food Trust, Philadelphia, Pennsylvania*



The Penn Institute for Urban Research (Penn IUR) hosted the 9th Annual Urban Leadership Forum on Wednesday March 13th, 2013 to celebrate exemplary leaders in the effort to build resilient, food-secure, and livable cities. The Penn IUR Urban Leadership Award is awarded annually to leaders who have made outstanding contributions to urban scholarship and to building cities that successfully respond to the challenges of the twenty-first century.

The 2013 Urban Leadership Forum launched the *Feeding Cities* conference. Addresses from the three awardees and a panel discussion examined the impact of urbanization on agriculture, diets, and food security in both developing and developed world contexts. Introductory remarks by Penn IUR Co-Directors Susan M. Wachter and Eugénie Birch called attention to the broad scope and urgency of the topic, outlining not only the extent to which achieving food security in a rapidly urbanizing world presents one of the most multi-faceted and far-reaching global challenges of the twenty-first century, but also how the multi-disciplinary strength of the *Feeding Cities* conference participants and its Steering Committee at the University of Pennsylvania is poised to address these challenges. ►

**AS LONG AS YOU HAVE  
A WILL, THERE IS A FORM  
OF CREATIVITY TO  
CONTAIN THE SOIL AND  
THE VEGETABLES.**

—RIDWAN KAMIL

**IF WE DON'T PLAN TODAY,  
WE ARE ALREADY TOO LATE.**

—JOAN CLOS

**THE PRIMARY MOTIVATOR  
FOR US IN RUNNING THE  
FARMERS MARKETS IS TO  
PROMOTE GOOD HEALTH...  
AND IT IS SUSTAINABLE  
BECAUSE THE FARMERS ARE  
ACTUALLY MAKING A PROFIT.**

—Yael Lehmann

## SUMMARY OF DISCUSSION

Each Urban Leadership Award was presented individually, followed by five-minute presentations by awardees Ridwan Kamil, Yael Lehmann, and Joan Clos. In his address, Ridwan Kamil outlined how his work as an architect and planner in Indonesia has evolved to include a leadership role in the “Indonesia Berkebun” movement, a grass-roots movement dedicated to promoting urban agriculture throughout the country and transforming abandoned land into fertile spaces of community agriculture. Utilizing a social media campaign, predominantly through Twitter, the Berkebun movement began in Kamil’s hometown of Bandung before expanding to Jakarta and subsequently to a network of twenty-seven cities organized through social media, regular “urban agriculture competitions,” and harvest festivals.

Among Kamil’s key points was the immense potential of social media and web-based networks to unlock latent potential for engagement by civil society, as well as to transform urban agriculture from “a trend to a culture” within Indonesia. Kamil also identified a critical factor of the Berkebun movement’s success as its increasing ability to provide knowledge and logistical support within the specialized areas of Campus Farming, Street Farming, Slum Farming, and Rooftop Farming, which highlights the need for multiple forms of urban agriculture to fit distinct spaces within the city. For example, while the Berkebun movement promotes the use of walls and vertical spaces to grow vegetables in slums, street farming’s inherent

proximity to pollution from automobiles means that it is more commonly recommended for the growth of flowers sold for economic gain rather than consumption.

In her remarks, Yael Lehmann outlined the various public policy levers available to address inadequate nutrition among low-income urban populations throughout the United States. In particular, she discussed the Food Trust’s “Fresh Food Financing Initiative,” a public-private partnership that brought ninety new grocery markets to Pennsylvania (over twenty of them to the City of Philadelphia); became a model for improving access to high-quality, healthy foods in urban areas; and was subsequently scaled-up through the Obama Administration’s national “Healthy Food Financing Initiative.”

Joan Clos, former Mayor of Barcelona, Spain, and current Executive Director of the United Nations Human Settlements Program (UN-Habitat), brought a broad perspective to the global challenges of proactively planning for urban growth in both the developing world (which currently lacks robust urban and regional planning capacity) and the developed world (where urban development continues to rely on paradigms established in the twentieth century based on cheap energy, urban sprawl, and an increasing disconnection from ecological systems and agricultural production). Clos emphasized the importance of planning in charting a path toward sustainable food systems.

Clos also outlined UN-Habitat’s phased approach to working with local municipalities throughout the Global South in strengthening urban institutions of public finance and management: UN-Habitat and the local municipality first produce plans and define desired land uses and public spaces then seek investment to construct infrastructure and develop neighborhoods. Clos called for new paradigms of urban planning that acknowledge the need to allocate space for civic and environmental purposes such as urban agriculture—not only for food production but also for community development and economic growth.

## QUESTIONS RAISED AND KEY THEMES

Following the individual presentations, the speakers engaged in a discussion and a question and answer period with the audience. They focused broadly on three levels of engagement:

- 1. The need for active public policies on food security and nutrition in cities that adequately recognize the scale of the problem. Interventions discussed included methods of positioning farmers markets in proximity to those who otherwise lack access to fresh food, as well as the importance of public-private partnerships in ensuring that these markets are able to accept food stamps and other comparable subsidies;***
- 2. The need for social engagement and community-building centered around agriculture in cities, and the importance of social media in building these networks;***

3. *The need for new urban planning paradigms to acknowledge the importance of proximity between urban centers and agriculture and to supplement the existing, linear model of international production and distribution with a more cyclical, closed-loop relationship between urban areas and their immediate food-producing hinterlands.*

Comments and questions from the audience addressed:

- ▶ *The ways in which rapid urbanization can be leveraged to improve global food security, as well as the potentially negative implications of urban policy that undermines rural livelihoods without producing adequate alternative economic access and opportunity within cities.*
- ▶ *The common challenge of competing land usage and ownership in developing world cities and informal settlements where space comes at a very high premium and open space is very rare.*
- ▶ *The importance of understanding urban agriculture's potential to foster happiness and economic development, rather than simply support food security.*
- ▶ *The need for a more coordinated approach to scaling up public-private partnerships aimed at utilizing vacant lots in U.S. cities for urban agriculture.*
- ▶ *What are the pros and cons of substituting technology for agricultural labor?*

## OPENING KEYNOTE SESSION

### WELCOMING REMARKS

Vincent Price, *Provost, University of Pennsylvania*

### KEYNOTE ADDRESS

#### FOOD SECURITY FOR AN URBAN FUTURE: A GLOBAL PERSPECTIVE

Heather Grady, *Vice President, Foundation Initiatives, The Rockefeller Foundation*

Vincent Price opened the second day of conference programming by acknowledging the organizers and thanking The Rockefeller Foundation

for its support. Price described how the recent history of global food politics dates back to the green revolution of the 1970s. To illustrate how thinkers in previous decades held concerns similar to our own about the future of the global food supply, he quoted Lester Brown, a long-time thought leader in the area of climate change and food security, who in 1973 said: “Increasing worldwide affluence and population growth will produce chronic food shortages and the emergence of a global politics of food scarcity.” In conclusion, Price underlined the need for a multidisciplinary approach to addressing the food security challenge and applauded the diversity of backgrounds found among the conference speakers and audience members. ▶

Heather Grady introduced The Rockefeller Foundation’s legacies in food security, ranging from its crucial support of the Green Revolution in the 1970s to its current focus on resilient food systems in the face of climate change. She argued that sustainable urbanization must be addressed as the central pillar of achieving global food security, pointing to three factors:

#### ▶ *What is sustainable intensification?*

The growth of urban populations and workforces results in decreases in agricultural labor, especially among younger generations who—unlike their forbears who often farmed for a living and therefore produced more food than they consumed—are increasingly comprised of people who consume more food than they produce. Large urban political centers have also long played a role in keeping food prices artificially low through policy intended to reduce the cost of urban labor and avoid popular uprisings provoked by the high cost of life in cities. In many cases, such policies have undermined the long-term viability of domestic agriculture. Finally, the encroachment of urban land uses into traditional farmland in peri-urban areas means less land available for production and

thus less robust local systems to ensure urban populations access to affordable, nutritious food during times of global food-price spikes.

#### ▶ *Diet Shifts:*

Urbanization and associated income increases are accompanied by higher demand for protein and nutrient-rich foods. While these shifts may be beneficial for those whose incomes are rising and for the farmers producing those goods, they have a notable negative impact on poor and marginal populations and present major issues of equity and access within cities.

#### ▶ *Climate Change:*

Severe and unpredictable weather affects agricultural yields and degrades soil around the world. Shocks to the food systems are more frequent and extreme than ever.

Grady challenged the audience to find ways to increase food production without further stressing ecological systems; to invest in new systems and technologies to reduce the inefficiencies of global food waste; and to create policy environments that expand and intensify urban and peri-urban agriculture to supply fresh food and serve as buffers during times of shock and reduced global production.

**FOOD SECURITY IS ABOUT MORE THAN KEEPING HUNGER AT BAY, IT IS ABOUT STABLE SOCIETIES, PRODUCTIVE SOCIETIES, AND, IN OUR TWENTY-FIRST CENTURY WORLD, WE BELIEVE IT IS ABOUT RESILIENT SOCIETIES.**

—HEATHER GRADY

**INCREASING WORLDWIDE  
AFFLUENCE AND POPULATION  
GROWTH WILL PRODUCE  
CHRONIC FOOD SHORTAGES AND  
THE EMERGENCE OF A GLOBAL  
POLITICS OF FOOD SCARCITY.**

**—LESTER BROWN**

# PLENARY 1: SUSTAINABLE RESOURCE ALLOCATION: URBANIZATION, AGRICULTURE, AND THE ENVIRONMENT

## MODERATOR

**Robert Giegengack**, *Professor Emeritus of Earth & Environmental Science, School of Arts and Sciences, University of Pennsylvania*

## SPEAKERS

**Gordon McGranahan**, *Principal Researcher, Human Settlements Group, International Institute for Environment and Development (IIED)*

**Molly Jahn**, *Professor of Agronomy and Genetics, Nelson Institute for Environmental Studies, Center for Sustainability and the Global Environment, University of Madison-Wisconsin*

**Carl Hausmann**, *Global Policy Advisor, Bunge Limited*



## SUMMARY OF DISCUSSION

The panel outlined the interconnected nature of agricultural production and urban development—the two dominant human land uses on earth—as they pertain to ecological sustainability. Gordon McGranahan first introduced the need for a nuanced understanding of the term “urbanization,” arguing that its use in describing increasing densities (rural-urban migration) is often conflated with the phenomenon of decreasing urban densities (urban land growth and sprawl); these phenomena, however, have very different implications for sustainable resource allocation. He also outlined how urban economic growth consistently produces a shift from predominantly localized environmental burdens (such as poor ambient air quality) to more globalized environmental burdens; typically, urban economic growth results in a zero-sum tradeoff, with local conditions improving and the global situation deteriorating. As an illustration of this trend, he argued that the urban middle-class diet shift towards more meat and processed foods results in a dramatic increase in the global food-footprints (the environmental impact of the food production required per person) of urban dwellers. Primarily, however, McGranahan stressed the importance of understanding that these trends are first and foremost a result of increasing incomes, not urbanization per se, and that policymakers must be wary of attempts to curb urbanization (attempts that have in the past increased inequality) and rather should address directly the dietary changes driving increased per-capita resource footprints. ►



## EXCLUSIVE URBANIZATION WILL CREATE FOOD INSECURITY, ESPECIALLY IF RURAL LIVELIHOODS ARE ALSO BEING UNDERMINED, FOR EXAMPLE BY CLIMATE CHANGE.

—GORDON McGRANAHAN

In her address, Molly Jahn introduced the concept of a “closed system for sufficiency and prosperity looking forward” from the perspective of agricultural production. She stressed the importance of securing a future where agricultural producers and researchers move away from concern exclusively with output (as in conventional industrial agriculture) and towards a new paradigm in which food production, energy expenditure, and water use take place within a closed system where environmental burdens are acknowledged and mitigated.

Ultimately, Jahn argued for the need for new research and broad-based engagement around the question of what a “safe operating space” for agriculture production, diets and nutrition, and ecological sustainability might look like in the future, identifying four key areas for intervention: sustainable agricultural intensification, reshaping diets, managing waste, and advancing integrated information systems capable of articulating critical feedback loops between food production and environmental conditions.

Carl Hausmann introduced the critical role that global trade plays in equilibrating and mitigating the impact of food surpluses and deficits globally. While only 12–15 percent of the grain consumed by humans and animals is traded on the global market (a figure that demonstrates the primary role played by domestic agriculture around the world) he argued that, nonetheless, global trade is necessary to promote sustainable agriculture by ensuring that geographic areas

## MAXIMIZING SHORT-TERM CROP PRODUCTION DOESN'T EQUATE TO FOOD SECURITY AND CERTAINLY NOT NUTRITIONAL SECURITY OR NUTRITIONAL HEALTH.

—MOLLY JAHN

with comparative advantages in soil quality, rainfall, and technology are linked by functioning markets to those areas at a natural disadvantage for food production. Hausmann also said that an increase in food production will be necessary to keep pace with a growing population (a goal he is confident the global community can meet); that targeted investments in science and technology can increase the sustainability of agricultural practices; and that engaging civil society, policymakers, and environmental and agricultural scientists in addressing these two challenges and in thinking strategically about a vision for a sustainable future is a complex but necessary challenge.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

#### ► *What is sustainable intensification?*

As described by the panelists, sustainable intensification of agriculture entails reducing externalities and environmental impacts as well as improving outputs (such as increasing yield per hectare). Other measures of sustainable intensification must evolve out of a broader public visioning and engagement process. Panelists agreed that sustainable production will be defined by shifting priorities and conditions and that responsive metrics must be designed with public input.

## TRADE IS CRITICAL TO BALANCE SURPLUSES AND DEFICITS AROUND THE WORLD AND WE HAVE LOTS OF THEM. IF A COUNTRY IS PRODUCING A SURPLUS BUT DOES NOT HAVE ACCESS TO TRADE THEY WILL NOT PRODUCE AS MUCH AND YET THE WORLD WILL BE NEEDING MORE.

—CARL HAUSMANN

#### ► *How will we produce animal proteins to meet increasing demands given the intensive associated water use and the context of global scarcity?*

In addressing this issue, the need to leverage regional comparative advantages in rainfall and water tables was discussed, while the immense potential for innovation and improved efficiencies in water management within the agricultural sector was also highlighted. Finally, the need to keep in mind broader issues of evolving water competition within urban areas was raised, especially with regard to ensuring that sufficient water was made available for improvements to the urban Water, Sanitation, and Hygiene (WASH) sector—which itself plays a role in supporting health by reducing diseases that compromise nutrient utilization in many developing world cities.

#### ► *What are the pros and cons of substituting technology for agricultural labor?*

Discussion on this topic acknowledged that context-specific strategies must be formulated and that while many rapidly urbanizing countries would benefit from reducing the number of individual households involved in subsistence agriculture, employment in the formal farming sector should increase. Caution was advised in recognition that, if labor is reduced in primary agriculture, it must increase in other sectors and that these policies must be coordinated with larger economic development strategies.

## BREAKOUT A: CLOSING THE RURAL-URBAN NUTRIENT CYCLE

### MODERATOR

**Patricia Gallagher**, Associate Professor, Civil, Architectural and Environmental Engineering, Drexel University

### SPEAKERS

**Peter van der Steen**, Senior Lecturer in Environmental Engineering, UNESCO-IHE Institute for Water Education

**David Vaccari**, Associate Professor and Director, Department of Civil, Environmental and Ocean Engineering, Stevens Institute of Technology

### SUMMARY OF DISCUSSION

The session addressed the flows of critical nutrients such as phosphorous (a finite resource that is currently irreplaceable in the production of fertilizer), nitrogen, and potassium within agricultural systems and urban waste cycles. With the current system characterized by one-way flows of nutrients into cities where they are utilized, treated, and disposed of, panel discussion centered around strategies to recycle these nutrients back into use in agriculture rather than continuing to rely on extraction and disposal. ►

David Vaccari offered a comprehensive overview of global phosphorous management, highlighting that the nutrient is one of the most unequally distributed resources on earth, with twelve countries holding 98 percent of the global reserve (Morocco alone holds 74 percent). This geopolitical reality, coupled with the resource's indispensable role in food production and the fact that it is a finite resource, means that improving the efficient recycling of the nutrient will be critical to ensuring global food security into the future. Vaccari explained that while experts agree that global reserves are finite, they disagree about when "peak phosphorous" will be reached, with estimates ranging from as soon as 2035 to at least three hundred years from now depending on varying assumptions about population,

technological, and diet trends; in addition to the possibilities of accessing new reserves under the ocean and of advancing techniques for sustainable utilization of phosphorous, dietary trends will affect how quickly phosphorous is depleted considering the large amounts of fertilizer needed to produce animal feed.



Peter van der Steen described emerging practices in urban water reuse that are aimed not only at preserving water but also at separating, treating, and recapturing nutrients from human waste at the household and urban level, arguing that these new methods of recycling urban waste for use within agricultural production can make both systems more efficient and sustainable.



While using wastewater to irrigate and fertilize crops has health risks, van der Steen argued that proper precautions make the practice safe and efficient and cited numerous examples from around the world to illustrate his point. Using subsurface irrigation rather than traditional above-ground irrigation, for example, allows the soil and root systems to filter out pathogens.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

#### ► **Scaling innovation:**

Discussion covered the potential of innovative technologies and systems, such as aquaponics, to improve water treatment and reduce fertilizer and phosphorous use at a small scale and in certain contexts, but stressed the need for multiple new techniques and technologies to be adopted in order to reproduce close-loop waste and nutrient systems in cities around the world. Panelists also touched on the importance of addressing context-specific cultural practices and fears about the negative health impacts of waste reuse in any effort to transfer and scale-up best practices across cities and regions.

#### ► **The role of municipalities:**

Participants pointed out that city governments can lead the way in introducing new technologies by implementing demonstration projects in public buildings and in centralized city infrastructure. In addition, they highlighted the importance of improving communication among city administrators, planners, and farmers in cities in developing countries; specifically, better communication regarding the transition from open to closed sewer systems and other public infrastructure that alters the flow and availability of water and nutrients is paramount.

**THE GREATEST EFFICIENCIES TO BE FOUND [IN NUTRIENT MANAGEMENT] ARE IN THE AGRICULTURAL STAGE, BEFORE YOU GET TO THE CONSUMPTION STAGE... BUT WITHIN THE URBAN ENVIRONMENT THE ROLE OF [NUTRIENT] RECYCLING, REUSE, AND RECOVERY CONTRIBUTES TO THE SOLUTION.**

—DAVID VACCARI

**BY COMBINING THE ENVIRONMENTAL AND AGRICULTURAL OBJECTIVES OF WASTEWATER REUSE WE CAN CREATE A WIN-WIN SITUATION.**

—PETER VAN DER STEEN

## BREAKOUT B: WATER FOR URBANIZATION AND AGRICULTURE: NEW SYSTEMS TO ENSURE FUTURE SUSTAINABILITY

### MODERATOR

**Susan M. Wachter**, *Richard B. Worley Professor of Financial Management, Wharton School; Co-Director, Penn IUR, University of Pennsylvania*

### SPEAKERS

**Olufunke Cofie**, *Volta Basin Leader, International Water Management Institute, West Africa*

**Marcus Moench**, *Director, Institute for Social and Environmental Transition (ISET)*

**Howard Neukrug**, *Water Commissioner, City of Philadelphia*

### SUMMARY OF DISCUSSION

The session introduced the critical issues of water management for urbanization and agriculture. Marcus Moench began by introducing a case study of the regional variation in which Indian cities experience both extreme scarcity and abundance of groundwater. Beyond regional discrepancies in the availability of water, Moench described how groundwater pumping can be seen as the biggest outcome of the Green Revolution in India with an increase in the number of mechanized water wells from approximately 3,000 in the 1940s and 1950s, to over 27,000,000 today. In addition, competition between agricultural and urban water uses in India is significant, due to the fact that 90 percent of all drinking water is sourced from groundwater (rather than surface waterbodies) nationally. ▶

Olufunke Cofie outlined the ways in which urban growth rates in Sub-Saharan Africa put pressure on water resources, describing how regions characterized by high urbanization rates are often the same ones challenged by water scarcity. He explained that water scarcity can be understood

not only as a lack of rain and groundwater, but also as a lack of institutional, technological, and managerial capacity to access and utilize available resources. Cofie also discussed an important distinction between the developed and developing worlds in the management of water: while the formal sector oversees water distribution and reuse in developing countries, the informal sector often fills this role in developing countries. Best practices and experience gained in one context do not always translate well to the other.



Howard Neukrug discussed Philadelphia's Green City, Clean Waters program as well as the importance of working with public and private partners (farmers in particular) to manage Philadelphia's regional watershed. Neukrug described how the city is implementing the Green City, Clean Waters goal of increasing permeable groundcover in Philadelphia by introducing urban agriculture into vacant lots, a practice that has also helped improve the diets of those living in food deserts.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

#### ▶ **Reservoirs and water storage:**

Participants discussed the value of reservoirs in providing drinking water and water for agricultural use as well as the controversies building them can foster (the introduction of dams is often met by strong resistance from ecological and social activists concerned with sustainability and equity). Conversation also touched on the potential of emerging computer-based modeling programs to weigh issues related to reservoir water conservation, retention, and use.

#### ▶ **Urban and peri-urban agriculture and water runoff:**

Participants discussed using peri-urban and urban agriculture to manage water by introducing or preserving permeable land cover in cities across both developing and developed regions of the world.

#### ▶ **The prospect of desalination:**

Panelists were asked to address the viability of desalination technologies in providing drinking water to urban populations. While acknowledging that desalination is a reliable and established technology, panelists highlighted its relatively high cost and energy demand and said those are primary reasons only wealthy, extremely water-scarce regions—such as parts of the Middle East—have adopted it. Micro-desalination techniques, however, offer potential in developing-world cities.

#### ▶ **The future of water as a centralized utility:**

Panelists envisioned future scenarios in which water is provided on a pay-by-use basis by private, informal sector actors (as is the current de facto reality in many Asian and Sub-Saharan African cities) rather than as a centralized public utility available 24/7, and discussed the pros and cons of the possible trajectories.

#### ▶ **Education and engagement:**

The speakers highlighted the role of public education and engagement in increasing efficiency of water use in household, industrial, and agricultural sectors.

#### ▶ **Planning and institutions:**

Finally, the panel emphasized the importance of establishing the planning and institutional frameworks necessary to control urban growth and support innovative methods of water use in cities in the developing world.

**WATER FLOWS UPHILL TOWARDS MONEY, SO WHEN YOU TALK ABOUT WATER ISSUES YOU ARE VERY MUCH TALKING ABOUT ECONOMIC ISSUES.**

—MARCUS MOENCH

## BREAKOUT C: ENERGY AND FOOD SECURITY

### MODERATOR

**Eugénie L. Birch**, *Lawrence C. Nussdorf Professor of Urban Research, Department of City and Regional Planning, School of Design; Co-Director, Penn IUR, University of Pennsylvania*

### SPEAKERS

**Gavin Albert**, *Adjunct Professor, Finance and Economics, Columbia University*

**Ian Y. Bennett**, *Owner, The Harvest Protection Network, LLC*

**Patrick Canning**, *Senior Agricultural Economist, USDA Economic Research Service*

**Harry Stokes**, *Director, Project Gaia, Inc.*

### SUMMARY OF DISCUSSION

**Gavin Albert discussed the dependence of the agro-food supply chain on consistent and considerable energy inputs, from large-scale agricultural inputs to household cooking and waste disposal. He began by providing an overview of the energy bottlenecks within the food sector. Albert argued that—given the increases in food yield, storage, and distribution that will be necessary to feed the world's growing population—an investment of \$50 billion a year for the next twenty years will be needed to support infrastructure improvements that will allow food to be delivered from the farm gate to urban populations. He estimated 95 percent of this new investment will come from private capital. ▶**

Patrick Canning described energy use in the U.S. food system, calling attention to the fact that the food system (from inputs to production to consumption to waste) consumes energy at a rate disproportionate to its size in the economy. While household energy flows have continually decreased over the past several decades, supply chain inputs have not; this is illustrated by the fact that, between 1997 and 2002, the highest increase in energy use within the food system came from the food processing stage. Canning attributes this to American's increasing reliance on packaged and

processed foods—buying bagged salads where they used to be heads of lettuce, for example. Though Canning's work is specific to the United States, he did note that the methodology developed for his study was applied recently in Taiwan and with very similar findings. Assuming that these trends in per capita energy use for food processing and manufacturing are replicated across the developing and urbanizing world, the ongoing increase in global energy use will likely be exacerbated.

Ian Bennett addressed the cold chain and storage sectors, describing how 25 percent of annual harvests in Senegal are lost due to inadequate post-harvest storage. His company, The Harvest Protection Network LLC, currently works in Senegal to improve storage capabilities for small-holder farmers. Bennett called attention to the need for coordinated interventions, noting that improved storage is only useful if there is a value chain that allows producers to access markets and transition from subsistence farming to collectivized commercial farming.

Finally, Harry Stokes presented Project Gaia's work to promote the adoption of alcohol-based fuels for household use (cooking, lighting, heating, refrigeration and small-scale power generation). He noted that improving cook stoves, which represent the largest household energy demand in the developing world, provides not only health benefits from better ambient air quality but also preserves forested areas by reducing reliance on charcoal production (the number one cause of deforestation in Sub-Saharan Africa). Stokes also pointed out that charcoal is unsuited to apartment blocks and high-density settlements, patterns, emphasizing the importance of moving to fuel sources that are more appropriate in urban environments.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

#### ▶ **The energy impacts of convenience:**

The panel discussed the increased reliance on packaged and prepared food associated with urbanization and the attendant increase in cost and energy use.

#### ▶ **Food vs. fuel:**

The panel discussed the use of corn and other crops to produce ethanol (as opposed to food). Discussion centered on the benefits of utilizing "uncompetitive" crops in the developing world to produce clean fuel and support local farmers. Panelists also outlined how wasted food increases stress on energy systems, although food waste can also be used to produce energy.

#### ▶ **The cooperative challenge:**

Audience questions called attention to the socio-political difficulties in many developing countries in establishing farmer cooperatives even where such economies of scale provide a much better opportunity to leverage improvements in storage (to prevent post-harvest losses) and distribution (bringing the agricultural goods to market).

**FOOD VERSUS FUEL HAS  
BECOME A BARRIER IN TERMS  
OF POLICY DEVELOPMENT...  
THE REAL FOOD VERSUS FUEL  
DEBATE IN AFRICA IS “DO I BUY  
FUEL TODAY TO COOK MY MEAL,  
OR DO I BUY FOOD.”**

**—HARRY STOKES**

## PLENARY 2: URBANIZATION, DIETS, AND DEMAND

### MODERATOR

**Karen Glanz**, *George A. Weiss University Professor, Perelman School of Medicine, University of Pennsylvania*

### SPEAKERS

**Barbara Burlingame**, *Senior Officer and Leader, Nutrition Requirements and Assessment Group, Food and Agriculture Organization of the United Nations (FAO), United Nations*

**Raghav Gaiha**, *Professor, Faculty of Management Studies, University of Delhi*

**Emmy Simmons**, *Co-Chair, AGree*



### SUMMARY OF DISCUSSION

In the second plenary session, panelists examined the complex relationships among urbanization, diets, and public health. Barbara Burlingame presented the FAO's recently adopted definition of "Sustainable Diets," which makes the link between human nutrition needs and consumption and the health of ecosystems and the maintenance of biodiversity: Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources. Burlingame explained that, while calorie needs can be met without biodiversity, micronutrient needs cannot. She noted that, although the Green Revolution increased global food yields, it unintentionally propagated monocultures at the expense of biodiversity. ►

## SUSTAINABLE CITIES, SUSTAINABLE FOOD SECURITY, HIGH LEVELS OF HEALTH AND PRODUCTIVITY—TO ME THAT’S NOT AN ASPIRATIONAL GOAL, BECAUSE IF WE DO NOT ACHIEVE THAT GOAL WE ARE GOING TO BE IN BIG TROUBLE AS A WORLD THIRTY OR FORTY YEARS FROM NOW.

—EMMY SIMMONS

Emmy Simmons pointed out that as China has urbanized, its residents’ diets have changed; higher incomes, which are traditionally associated with the process of urbanization, are resulting in a lower percentage of household expenditures going to food and greater consumption of protein, fat, and sugar in China. Patterns in Sub-Saharan Africa differ, as rising income is not as closely tied to urbanization, resulting in less noticeable diet shifts by city-dwellers. Describing potential “game changers,” Simmons pointed to the need to educate consumers and empower markets to respond to demand. In addition, she reiterated Burlingame’s point that nutrition, health, and agricultural practices must be fully linked to one another in popular discourse; she added that while nutritional health is a core societal goal, economic incentives are not aligned to achieve it.

Raghav Gaiha contributed a nuanced interpretation of the impact of supply-side phenomena (such as the Foreign Direct Investment and the presence of multinational corporations and food chains) on urban diets and health in India. Gaiha described how urbanization and the associated growth of supermarkets has helped diversify the food available, but has also contributed to a rise in junk food intake and to increasingly sedentary lifestyles. These factors, in turn, have led to a rise in non-communicable diseases (NCDs) that negatively affect economic development outcomes, both in terms of work days lost as well as through catastrophic expenditures on healthcare depleting household savings.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

► **Health spending by sector:**

Participants noted that, in many developing and middle-income countries, the majority of national health expenditures go to communicable diseases rather than NCDs; this aggravates the difficulty of addressing “overnutrition” and obesity (which are both direct causes of many NCDs). However, it was stressed that in spite of the growing prevalence of NCDs caused by “overnutrition” and their burden on healthcare systems and economic development, undernutrition and food scarcity in cities must not be overlooked as a primary driver of civil unrest and rioting in urban centers and a challenge in need of increased attention.

► **Policy instruments to improve nutrition:**

Panelists agreed that health education is an important tool to reduce the impact of NCDs, and called for an overhaul of existing regulations governing the labeling of food products and nutritional claims. Panelists also discussed other policy instruments, from banning sugary drinks in schools to taxing foods with high sugar, salt, and fat content. Panelists recognized, however, the difficulty of influencing food preferences through regulation—people generally do not accept regulations on “essential goods.” Panelists considered the potential of linking consumer

nutrition education with ecosystems and biodiversity as a way of motivating individuals to change their habits voluntarily. Finally, panelists discussed the lack of reliable research on the impact of marketing and food-placement within supermarkets on purchasing.

► **The role of urban planning and policy:**

Participants noted that the kind of cities we live in and how we move around them significantly affects health and fitness. How much residents work, and what they do for work, also affects how much time city dwellers’ have for food preparation and exercise.

## BREAKOUT D: WHAT FOOD SYSTEMS ARE NEEDED TO FEED THE CITIES?

### MODERATOR

**David T. Galligan**, *Professor of Animal Health Economics, Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania*

### SPEAKERS

**Roger A. Cady**, *Senior Technical Advisor and Sustainability Lead, Elanco Food Industry & Consumer Affairs*

**James D. Ferguson**, *Section Chief, Animal Production Systems; Professor of Nutrition, Department of Clinical Studies, School of Veterinary Medicine, University of Pennsylvania*

**Delia Grace**, *Program Manager, International Livestock Research Institute*

**Narayan Hegde**, *Trustee and Principal Adviser, BAIIF Development Foundation*

### SUMMARY OF DISCUSSION

This breakout session provided an overview of the various animal production systems in use throughout the world and the implications of rapid urbanization on the production and distribution of animal proteins. Delia Grace provided background on The International Livestock Research Institute's ongoing research on how urbanization and changing diet preferences have led to "hotspots" for the transfer of zoonotic diseases as human populations continue to rely on keeping livestock for nutrition and income even as they move into higher density settlements, which results in an exponentially higher risk of animal-to-human disease transfer. Grace also stressed, however, the benefits of livestock in and around towns (such as reduced transaction costs) and called for improved regulations and sanitation that take into account indigenous knowledge and customs as key tools in minimizing disease transfer. ►

James Ferguson took a production-oriented perspective, providing an analysis of the large variation in production levels per head of cattle (both meat and milk) that results from the different production methods used worldwide.

In the United States, for example, intensification and consolidation of cattle production has meant that the number of dairy farms has dramatically decreased in the past two decades, while the number of cows has stayed level. Per-head production levels have increased significantly due to advances in technology and feed quality. In contrast, increases in production in India have been achieved by increasing the number of cattle in production.

Roger A. Cady noted that intensive animal production leveraged economies of scale with regard to cattle feeding: double the level of milk production or animal growth could be achieved with considerably less than double the amount of cattle feed. Cady also argued that the environmental impact of milk production in the United States has lessened considerably since 1944 since—due to advances in production efficiency—less land, water, and energy is needed to produce the same amount of animal protein; as a result, the dairy industry's overall carbon footprint has experienced a 41 percent net reduction.

Narayan Hegde provided an overview of food production systems in India, focusing particularly on likely sources of increased animal protein. Dietary habits vary considerably by region and population in India, with Muslim populations abstaining from pork and Hindu populations largely abstaining from meat altogether. This regional variation shows why the country must approach food production differently than other large urbanizing countries (such as China). In addition, with small-holder and household dairy production still a mainstay of the Indian economy and food system, Hegde emphasized the potential to achieve economies of scale through cooperatives and the dissemination of basic mechanization—rather than through large-scale, industrialized farming methods. Finally, he touched upon the importance of understanding the role of land tenure and gender equality in improving agricultural outputs in India, where the majority of farmers are women.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

#### ► *The impact of food to fuel on animal production:*

Audience members questioned the extent to which global increases in corn prices affect U.S. animal production given that industry's reliance on grain as a feed-source for livestock. While panelists agreed that the price shock associated with the 2007 U.S. government mandate requiring a certain percentage of all corn be converted into ethanol for fuel use, rather than being used as food for livestock and humans, did affect U.S. agriculture, they pointed out that some synergies exist between ethanol production and animal farming: the byproducts and waste leftover from producing ethanol is an ideal part of the diet for certain livestock. This topic evolved into a discussion of the extent to which livestock feed-sources complete with food for human diets; panelists reiterated that much of the feed for cattle is comprised of the byproducts of agricultural production for humans and is therefore not directly competitive.

#### ► *Animal and human welfare in centralized production systems:*

Panelists discussed how centralized animal production systems allow for more sanitary spatial relationships between human settlements and animal agriculture, thus reducing instances of zoonotic disease outbreaks. However, the economic importance of livestock to poor populations in the developing world was reiterated, as well as the improved food safety outcomes associated with reduced time between slaughter and consumption which wet-markets (fresh food markets common in Asia and Sub-Saharan Africa often featuring the sales of live animals) and peri-urban livestock production facilitate. Animal welfare within centralized production operations was also discussed and, despite concern about inhumane practices, panelists argued that, overall, conditions in such facilities have greatly improved (with less concrete flooring in barns, higher ceilings for improved ventilation, and a better understanding of optimal nutrition).



## BREAKOUT E: THE URBAN DIET SHIFT AND THE DOUBLE HEALTH BURDEN

### MODERATOR

**Marilyn Sommers**, Lillian S. Brunner Professor of Medical-Surgical Nursing; Director, Center for Global Women's Health, School of Nursing, University of Pennsylvania

### SPEAKERS

**Bill Clark**, Executive Director, Philabundance

**Shiriki Kumanyika**, Professor of Epidemiology, Department of Biostatistics and Epidemiology, Perelman School of Medicine; Senior Advisor, Center for Public Health Initiatives, University of Pennsylvania

**Amy Hillier**, Assistant Professor, Department of City and Regional Planning, School of Design, University of Pennsylvania

**Eric Olsen**, Senior Vice President of Government Relations and Public Policy, Feeding America

### SUMMARY OF DISCUSSION

The panel introduced the serious challenge of simultaneously addressing both under-nutrition and over-nutrition in a coordinated manner. Shiriki Kumanyika outlined this challenge, calling attention to the traditional divide between anti-hunger advocates (concerned primarily with increasing caloric intake) and nutritionists (concerned primarily with NCDs and obesity). Kumanyika presented the complex, but similar, pathways through which both under- and over-nutrition have emerged as widespread challenges, including the role that poverty plays in producing the double burden of malnutrition and NCDs in both developing and developed countries. Kumanyika also noted that how these issues are framed and discussed affects how they are addressed: the challenge of malnutrition typically presents a relatively positive narrative in which all food is good food, poverty is to blame, and the food production industry is central to the problem's solution.

The narrative of NCDs, alternatively, which labels certain foods as “bad,” runs contrary to status aspirations of the urban poor who seek diets rich in animal protein, fat, and salt that have traditionally been unaffordable, and interferes with free markets as well as the demand for convenience. ►

Eric Olsen described how persistent underemployment is producing chronic reliance among many urban and rural populations on food assistance and is changing the nature of food banks in the United States. Olsen then outlined Feeding America's programming, which enables food banks to serve as platforms for comprehensive health interventions by providing services such as diabetes and pre-diabetes screening as well as nutritional education.

Bill Clark presented Philabundance's soon-to-launch nonprofit grocery store, located in Chester, Pennsylvania (approximately fifteen miles south of Philadelphia). He argued that a nonprofit grocery store will better provision frozen and fresh goods than will a traditional food bank, at prices more affordable than a traditional for-profit chain store. Scaled up, the model also provides an opportunity to produce and source food locally, which would support local economic growth and purchasing power.

Finally, Amy Hillier detailed the role of research and data-driven policy in supporting food security initiatives for urban populations. Hillier described in particular the importance of robust research methodologies in helping elucidate individuals' purchasing habits with regard to food, including the impact of transportation, prices, and the “food environment” within supermarkets (i.e. what healthy foods are available, what is on sale, and how shelf space is allocated).

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

#### ► *What evidence is necessary to impact policy?*

Panelists identified the gaps in understanding consumers' likelihood of buying healthier food when it is available, something that would

support companies interested in producing and marketing these items. Panelists also discussed the danger for politicians in championing issues, such as food security, that do not have an obvious solution. Panelists also noted that longitudinal studies examining the impact of emergency food distribution on how people move towards food self-sufficiency would be particularly useful to food banks and other emergency food support agencies.

#### ► *Policy coordination:*

Discussion centered around the premise that while improved access to nutritious foods is necessary it alone is insufficient in changing dietary habits; speakers argued for coordinated policy that pairs nutrition education and marketing with wider availability of fresh, nutritious foods. Discussing other opportunities for policy coordination, speakers said that private sector policies aimed at environmental sustainability—while extremely important—have had the unintended side effect of reducing the donation of overproduced goods on which food bank systems have traditionally relied. At a larger scale, speakers added that coordination of global policy and food aid to address both under- and over-nutrition so that neither problem is overlooked is important.

## BREAKOUT F: THE FUTURE OF FOOD IN THE CITY: DESIGNING FOOD SYSTEMS IN URBAN AREAS

### MODERATOR

**Marilyn Jordan Taylor**, *Dean and Paley Professor, School of Design, University of Pennsylvania*

### SPEAKERS

**James Haig Streeter**, *Landscape Design Practice Director, U.S. West, AECOM*

**John Sugrue**, *Associate and Senior Urban Designer, Skidmore, Owings and Merrill LLP (SOM)*

**Marina Khoury**, *Partner, Director of Town Planning, Duany Plater-Zyberk & Company (DPZ)*

### SUMMARY OF DISCUSSION

The panel examined the role that urban design can play in integrating food production into the urban fabric, as well as in reducing damage from unplanned growth on the ecological systems on which agriculture relies. Marina Khoury introduced the multiple scales at which urban design interacts with agriculture and food production:

1. *Small-scale urban agriculture (introduction of food production into urban areas);*
2. *Regional scale agricultural retention (through regional smart growth and compact urban development strategies); and*
3. *Agrarian urbanism (urban settlements in which the entire society is involved with food in all aspects of production and consumption: organizing, growing, processing, distributing, cooking and eating).*

Khoury offered examples of each from DPZ's work and compared models of density, land use, and urban form for each. ▶

Providing background on his firm's master plan for the Nanhu Country Village in China's Yangtze Delta, John Sugrue outlined the guiding design principles of accommodating urban growth while preserving agricultural production and encouraging new investment in and civic engagement with food production. Since only 13 percent of China's land is used for agriculture (compared to 41 percent in the United States, for example), farmland preservation is a critical aspect of any Chinese urban development plan. Beyond preservation, however, the Nanhu Country Village Plan proposes consolidating and intensifying agriculture by using larger plots and introducing mechanization to tend these larger areas effectively. Sugrue also explained that the plan is meant to create an environment that will serve as a modern knowledge hub as well as engage younger people in the food supply chain.

Finally, James Haig Streeter examined smaller-scale alterations to the urban fabric in Europe and discussed the benefits of integrating agriculture and greening into the urban form, from boosting ecotourism to providing climate control for buildings to improving ambient air quality in cities.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

#### ▶ **The importance of pilot projects:**

Panelists discussed the importance of having private clients and demonstration projects that can introduce the public to the concepts and forms associated with agrarian urbanism. They also considered how urban design can allow many people to live near agriculture and open spaces without necessarily taking part in its management or cultivation.

#### ▶ **Metrics and impact assessment:**

Panelists discussed developing metrics to measure the social and environmental impacts of urban agriculture and local food systems and the intangible impacts of preserving agricultural land; such metrics help turn discrete demonstration projects into mainstream practices. The conversation included questions about structuring incentives

for developers to build densely in certain areas in order to preserve agricultural land elsewhere.

#### ▶ **The challenge of land consolidation:**

In discussing the Nanhu Country Village plan, which relied heavily on land consolidation (rearranging land parcels and ownership in order to improve the overall agricultural production of an area) panelists exchanged examples of the complex challenge of land consolidation, especially within China where land is occupied and cultivated but not privately owned.

**AT ROOT, WE BELIEVE THAT  
THE IDEAL FOOD DISTRIBUTION  
SYSTEM FOR POOR PEOPLE  
LOOKS EXACTLY LIKE THE IDEAL  
DISTRIBUTION SYSTEM FOR  
RICH PEOPLE, IT JUST HAS A  
DIFFERENT PRICE STRUCTURE.**

**—BILL CLARK**

# PLENARY 3: FOOD SYSTEMS IN THE 21ST CENTURY: FROM SEED TO CITY

## MODERATOR

**Joan C. Hendricks**, *Gilbert S. Kahn Dean of Veterinary Medicine, School of Veterinary Medicine, University of Pennsylvania*

## SPEAKERS

**Julien Custot**, *Facilitator, Food for the Cities Multidisciplinary Initiative, Food and Agriculture Organization (FAO), of the United Nations*

**Udaya Prabath Gammanpila**, *Minister of Agriculture, Agrarian Development, Minor Irrigation, Industries & Environment, Sri Lanka*

**Raj Khosla**, *Professor of Precision Agriculture, Colorado State University*



## SUMMARY OF DISCUSSION

The third plenary addressed various features of food systems ranging from the politics of local food systems to the implementation of regional urban agriculture programs to the employment of precision agriculture practices at various scales. Julien Custot introduced the need for comprehensive intersectoral approaches to local food security and the importance of constructing food systems that empower municipal governments to define and manage local food policy. Custot outlined the UN FAO's three-phase approach to placing food policy within local political agendas:

**Phase 1: Assessing the existing food system**

**Phase 2: Developing scenarios for an alternative, local food system**

**Phase 3: Setting up a local food council to set priorities for action and develop an implementation mechanism ►**

## THE SOLUTIONS DISCUSSED RANGED FROM SOPHISTICATED TECHNOLOGY SUCH AS THE INTRODUCTION OF HIGH-TECH SENSORS IN COMBINES THAT ALLOW FARMERS TO PRODUCE DIGITAL MAPS SHOWING PRODUCTIVITY RATES THROUGHOUT THE FIELDS, TO LOW-TECH OR “RIGHT TECH” SOLUTIONS SUCH AS USING BOTTLE CAPS IN DEVELOPING COUNTRIES TO EFFICIENTLY TARGET THE APPLICATION OF FERTILIZERS.

Central to the FAO’s approach is the understanding that a local food system is not necessarily one in which all food is sourced locally, but rather one in which local municipalities and elected city officials, independent of national level policy, make the decisions about what is and is not produced locally.

Building on the conceptual structure of local food policy put forward by Custot, Udaya Gammanpila presented a case study demonstrating how his administration was able to achieve greater food security in Sri Lanka through governmental support for urban agriculture. Gammanpila explained that strengthening Sri Lankan urban and peri-urban agriculture (UPA) helped mitigate the country’s high risk of natural disasters impacting regional, national, and global food systems. He detailed how his administration secured funding and support for urban food production under the umbrella of climate change adaptation planning. Gammanpila’s administration promoted edible landscaping throughout Colombo, Sri Lanka’s largest city, for dual benefit of beautification and food production. Reiterating a key point from Ridwan Kamil’s presentation on urban agriculture in Indonesia, Gammanpila stressed the importance of tailoring UPA programs to specific populations and urban spaces, such as to school-aged children, elderly populations, the disabled, or ex-prisoners. As a result of this approach, more than 75 percent of residents of the Western Province of Sri Lanka are now engaged in some form of food production.

Highlighting the importance of traditional rural agriculture as the central means of producing food for urban populations, Raj Khosla presented on the advances that have taken place in the field of precision agriculture, which utilizes technology to improve the efficiency of agricultural practices. Khosla pointed out that agricultural practices and production levels in many developing countries are similar to the conditions in the United States circa 1900 and that with relatively small, targeted interventions these production levels could be dramatically increased.

The solutions discussed ranged from sophisticated technology such as the introduction of high-tech sensors in combines that allow farmers to produce digital maps showing productivity rates throughout the fields, to low-tech or “right tech” solutions such as using bottle caps in developing countries to efficiently target the application of fertilizers. Overall, Khosla’s presentation stressed the importance of understanding and correcting for variability at the field level, allowing farmers to reduce their efforts and resources.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

► ***The scale of UPA’s impact:***

Audience members asked about the overall impact that urban and peri-urban agriculture can have on a city’s reliance on food imports. In response, Gammanpila described how

the UPA program had reduced the Western Province’s dependency on regional and international food imports by 30 percent. He pointed, however, to a lack of funding for longitudinal studies assessing the program’s impact on health and nutrition.

► ***Supporting small-holder farmers:***

Panelists discussed the challenge of disseminating advances in precision agriculture in places (such as much of the developing world) where farmers work independently and at relatively small scales. Panelists discussed the potential of cooperative farming as well as of strengthening farmer-to-farmer networks and exchange to address this challenge. Khosla described how his projects often rely on innovative and forward-thinking farmers to pilot projects and practices, and then build networks for dissemination around them. Speakers discussed the need to understand the broader impact that new technologies and practices have on farming communities and the importance of recognizing that food producers operate within their own unique cultures and preferences.

## **BREAKOUT G: BY 2030 CAN CHINA, INDIA, BRAZIL, AND SUB-SAHARAN AFRICA SUSTAINABLY PROVISION THEIR CITIES?**

### MODERATOR

Allan Kelly, Gilbert S. Kahn Dean Emeritus,  
School of Veterinary Medicine, University of  
Pennsylvania

### SPEAKERS

Zhengxia Dou, Professor, Agricultural Systems,  
Department of Clinical Studies, School of  
Veterinary Medicine, University of Pennsylvania

Narayan Hegde, Trustee and Principal Adviser,  
BAIF Development Foundation

Roberto Sainz, Professor, Department of Animal  
Science, University of California Davis

Joyce Turk, Senior Livestock Adviser, U.S. Agency for  
International Development (USAID)

### SUMMARY OF DISCUSSION

This session explored whether domestic food production will keep pace with population growth, urbanization, and diet shifts in China, India, Brazil, and Sub-Saharan Africa. Zhenxia Dou described the historic and emerging food production trends in China, outlining the country's challenge of feeding 19 percent of the world's population with only 9 percent of world's arable land and 5 percent of the world's water resources. While the green revolution and an increasing use of chemical fertilizer has enabled China to increase domestic grain production five-fold over the past thirty years, Dou described how current efforts to increase production now rely on the expanding cropland rather than increasing per-hectare yield. Dou pointed to out that, by 2030, China's urban population is expected to total 1 billion (550 million of which will be in the middle class) and will require 700800 million tons of grain per year to support emerging dietary habits,

an increase of 200 million tons of grain per year. More alarmingly, Dou estimated that if the average Chinese diet were to mirror current eating habits in the United States, total grain production would need to reach 1.7 billion tons per year. Dou predicted that, under the current agricultural model, China will be unable to meet demand through domestic production alone. She highlighted the considerable challenge that China's potential reliance on grain imports will pose for the global community. ▶

Narayan Hegde was more confident in India's ability to maintain relative food self-sufficiency through 2030. He pointed to the population's extreme diversity in dietary habits as a reason for optimism—especially since the anticipated higher demand for animal protein will likely be for poultry and milk rather than beef or pork (as in China). Hegde called for investments that would make the dairy industry more lucrative for smallholder producers, in particular for investments that would result in more productive cows and better feed.

Roberto Sainz presented on the enormous growth in food production in Brazil since the 1970s, which built on a large-scale, coordinated government response to price shocks in 1973, including legal- and land-tenure adjustments, increased spending on research and development, and investment in transportation infrastructure. Sainz outlined how Brazil has been able to transition from a net importer of staple foods in 1970 to a net exporter, with agricultural production representing 28 percent of the country's GDP and 42 percent of its exports. Sainz attributed this success to the scaling-up of sustainable, integrated agricultural practices. This has led to an approximate production increase of 5 percent annually since 1991, with 20 percent of this growth based on the extension of agricultural land and 80 percent due to improved technology and farming practices.

Joyce Turk added perspective on the immense challenges that face Sub-Saharan Africa in its efforts to improve food self-sufficiency and security. The continent has a population of approximately 875 million, with 36 percent in urban areas. Turk

noted considerable differences among countries in food production, annual GDP, and per capita income, making generalizations about the region's forty-seven countries difficult. While up to 85 percent of the wheat and 45 percent of the rice consumed is currently imported, agriculture still comprises approximately 20 percent of the region's total GDP and the most common source of income for individuals. Turk also said that animal agriculture is a large part of the continent's economy. She pointed out that, in the Horn of Africa alone, the documented trade in livestock export is \$60 million per year and undocumented trade is estimated at \$200 million per year. She noted the need for improved governance and institution-building in a subgroup of Sub-Saharan African countries considered "fragile;" such efforts are needed in order to provide stable political environments in which investments in agricultural production and infrastructure can be made. In "fragile" and "non-fragile, low income" countries of Sub-Saharan Africa, Turk noted that animal-sourced foods (rather than plant-based alternatives) can improve nutrition through higher levels of protein, essential amino acids, and micro nutrients. Currently, Sub-Saharan African populations get roughly half the protein and experience nearly double the rate of undernourishment than does the world on average. Despite low levels of production and high levels of malnutrition, Sub-Saharan Africa contains more than half the world's remaining unutilized arable land.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

#### ▶ *Exporting knowledge and technology:*

Panelists discussed the possibility of Sub-Saharan Africa benefiting from the transfer of practices and technology from leading agricultural producers such as Brazil. While the speakers expressed hope for the wider adoption of basic, small-scale technologies, they stressed that problems with institutional frameworks and land-tenure challenges should be addressed first if the benefits of technology transfer is to be maximized. Speakers also noted the importance of actively engaging local populations and governments in decision-making regarding what practices ought to be adapted and adopted.

► **The role of agriculture as a tool for national development:**

In countries with significant agricultural production, such as Brazil, panelists noted that—in addition to contributing to GDP and improving health and nutrition—the agricultural sector can help finance social safety-net programs.

► **Capacity building and knowledge extension:**

Speakers stressed the importance of establishing knowledge hubs for farmers and improving the capacity of extension services both domestically and through international knowledge partnerships.

**IF CHINA CANNOT BE SELF-SUFFICIENT, THEY ARE GOING TO BUY... HOW CHINA WILL FULFILL ITS GROWING APPETITE IS NOT SIMPLY A DOMESTIC ISSUE BUT TRULY A GLOBAL MATTER.**

—ZHENGXIA DOU

## BREAKOUT H: URBAN AGRICULTURE: STRENGTHENING LOCAL FOOD NETWORKS

### MODERATOR

*Laura Lawson, Professor and Chair, Department of Landscape Architecture, Rutgers University*

### SPEAKERS

*Olufunke Cofie, Senior Scientist, International Water Management Institute (IWMI) Volta Basin*

*Nevin Cohen, Assistant Professor of Environmental Studies, The New School*

*Domenic Vitiello, Assistant Professor, Department of City and Regional Planning, School of Design, University of Pennsylvania*

### SUMMARY OF DISCUSSION

This session outlined the importance of urban and peri-urban agriculture (UPA) in supporting local food security in the developing world, as well as the broader, multi-functional benefits that urban agriculture offers in cities in the developing world. Olufunke Cofie began by citing the role that UPA is playing

in mitigating the impacts of growing urban poverty and food insecurity that has accompanied rapid urbanization rates in twenty cities throughout the Global South. These varied urban and peri-urban agriculture projects, largely supported by the Resource Center on Urban Agriculture and Food Security (RUAF), support the livelihoods of recent rural-urban migrants, improve access to critical micro-nutrients through local production of fruits and vegetables, bolster local economic development, and help mitigate the impacts of climate change, flooding, and drought. Cofie explained the critical importance of RUAF's multi-stakeholder engagement process in the success of programs in various contexts and countries, in enabling an analysis of the existing social and agricultural context, as well as in creating a broad public engagement process that informs program selection. ►

Domenic Vitiello presented an overview of the strengths and limitations of urban agriculture in U.S. cities. Vitiello described community gardening and urban farming programs—both of which rely first and foremost on access to quality land for success, but which offer differing benefits. Urban Farms, comprised of larger plots and often located towards the edge of cities, produce a greater quantity of food, while community gardens, which are smaller and more centrally located, provide more opportunities for community engagement and development and support self-reliance and equity in community food security.

Vitiello stressed urban agriculture as a vital “assist strategy” to improve urban nutrition, financial literacy, cooking skills, and social support networks, while also warning against framing the practice as a silver bullet capable of producing food self-sufficiency and full-time employment for urban populations.

Nevin Cohen built on this overview by calling for increased consideration within public discourse of urban agriculture's multi-functional benefits.

In addition to the benefits described by professor Vitiello, Cohen added urban agriculture's ability

to strengthen urban-rural networks, with farmers markets now serving as regional food hubs that more closely align the interests of urban and rural food producers alike in creating new infrastructure through which to sell their goods to urban populations. The Five Borough Farm Study, a multidisciplinary review of urban agriculture and food policy in New York City funded by the Design Trust for Public Space and co-authored by Cohen, highlighted numerous constraints and opportunities for urban agriculture in New York City and proposed a series of metrics and indicators to quantify the multi-functional benefits of urban farming and gardening. Among the benefits specifically mentioned was how support for rural and urban agriculture has promoted innovations in watershed and stormwater management, and how urban agriculture has served as a cross-cutting issue on which numerous city agencies must engage and coordinate. Finally, Cohen noted the need to understand urban agriculture as a tool for undoing racial and gender bias, though he also discussed the divergence of two systems of urban agriculture in New York City—one largely run by white people with the support of funding from foundations and grants, and another mainly run by minority populations and women with significantly less financial support—as a major challenge to the future of urban agriculture.

### QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

► **Engaging stakeholders:**

Panelists addressed the importance of engaging a broad range of stakeholders in cities in both the developing and developed world. They noted that universities are good resources for extension and knowledge dissemination; that the make-up of stakeholder groups is continuously expanding and changing; and that assessing power dynamics within and among constituency groups is important.

► **Vacant lots and land value:**

Many comments addressed the tension between using vacant lots for urban agriculture and the value of urban space for redevelopment. Discussion of soil suitability followed, with conversation focused not only on the viability of urban agriculture but also

on the challenge of establishing land-tenure for the gardeners who often invest in amending the soil and improving it over time.

► **At what point and to what extent should urban planners be engaged?**

Discussants noted that urban planning can limit and prohibit urban agriculture but—with help from the multi-functional approach to understanding urban agriculture—city planning departments are becoming central to the effort to coordinate the economic development, ecological sustainability, and other benefits of UPA. Panelists also discussed inter-departmental competition over control of the spaces of urban agriculture (between Redevelopment Authorities and Parks and Recreation Departments, for example).

► **Race, class, and urban agriculture:**

Returning to Cohen's comments on the two parallel systems of urban agriculture observed in the study of New York City, conversations addressed finding common ground and methods of breaking down barriers between the two communities. Opportunities to support urban agriculturalists through technical assistance with marketing, business development, and credit/financing were also discussed.

**LAND ACCESS, INCLUDING THE QUALITY OF THE LAND, AND ESPECIALLY LAND TENURE LARGELY DEFINES URBAN AGRICULTURE'S ABILITY TO IMPACT COMMUNITY FOOD SECURITY.**

—DOMENIC VITIELLO

**THE QUESTION THAT I MOST FREQUENTLY GET ASKED BY PEOPLE IS WHETHER I THINK FARMS AND GARDENS IN THE CITY CAN ACTUALLY PRODUCE ENOUGH FOOD TO FEED THE CITY, AND THAT IS COMPLETELY THE WRONG QUESTION TO ASK. PEOPLE ARE THINKING ABOUT URBAN AGRICULTURE AS A CITIFIED VERSION OF RURAL AGRICULTURE AND IT IS A COMPLETELY DIFFERENT BEAST.**

—NEVIN COHEN

## BREAKOUT I: AGRI-FOOD SUPPLY CHAINS FOR URBAN POPULATIONS

### MODERATOR

*Eric Orts, Guardsmark Professor of Legal Studies and Business Ethics and Management; Director, Wharton Initiative for Global Environmental Leadership, University of Pennsylvania*

### SPEAKERS

*Carl Hausmann, Global Policy Advisor, Bunge Limited*

*Katrin Kuhlmann, President, TransFarm Africa*

*Peter B. White, Private Agribusiness Consultant*

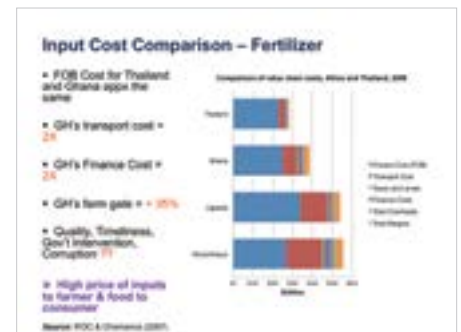
### SUMMARY OF DISCUSSION

Panelists engaged with the question of how global agri-food supply chains can be improved to support local food security in developing countries, with a focus on Sub-Saharan Africa. Carl Hausmann first stated the importance of well-developed global trade networks that can serve as a relief valve during times of stress, even though they constitute a relatively small part of the total supply chain when compared to domestic production and distribution. He argued that, at the local level, investments in infrastructure, transportation, and logistics for the delivery of food to urban centers should be prioritized. Hausmann noted that urban centers tend to invest less in the infrastructure that supports the storage, transportation, and delivery of food than they do in other utilities. “Infrastructure” in this context goes beyond physical infrastructure to include the development of trust between urban populations and rural agricultural producers. ►

Peter White focused on the market opportunity presented by the need to construct a twenty-first-century supply chain for Sub-Saharan Africa. He noted that the participants in the value chain beyond the food producer and consumer—such

as producers of agricultural inputs like fertilizer, as well as food processors, retailers, and the transportation sector—must be engaged in building a more effective and profitable system. White explained how these aspects of the value chain are often overlooked even though they account for a combined 78 percent of the value added in the supply chain, with the farming sector representing 22 percent. White elaborated on the role that bottlenecks in supply chains can play in raising consumer prices. He demonstrated the effect by comparing the end costs of fertilizer inputs in different countries; logistical and transportation challenges in Ghana, for example, mean that the basic cost of fertilizer for farmers in Ghana is 35 percent higher than in Thailand.

Katrin Kuhlmann introduced the importance of legal frameworks in enabling value chains to function properly, stressing that even the best-intentioned international and regional trade laws can only work when those international and regional markets are functioning. As a result of the common disconnect between legal frameworks designed for ideal conditions, and the imperfect functioning of real markets, international trade agreements meant to mitigate



regional and national barriers to trade often lack actionable implementation mechanisms. To address this problem, Kuhlmann argued for an investment-oriented approach to building legal frameworks that focuses on specific desired outcomes and works back to identify and navigate the real barriers at the international, regional, cross-border, and national levels.



## QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

► ***The role of the informal sector:***

Panelists outlined how sustainable intensification of agriculture cannot focus only on output measure such as yield per hectare, but also measure reduced externalities. Other measures that should be applied to judge outcomes in sustainable intensification must evolve out of a broader public visioning and engagement process with civil-society. Consensus centered around the fact that sustainable production will be defined by shifting priorities and conditions and that responsive metrics must be designed with public input.

► ***Investment and farmer-oriented legal frameworks:***

Conversations on how to best build legal frameworks specifically aimed at enabling the farmer and investor working within imperfect and often underdeveloped trade systems stressed the importance of identifying key barriers and engaging a multidisciplinary team to address these barriers. All panelists agreed that investment opportunities were regularly missed because of the lack of a feedback system to ensure that policymakers remained informed of the on-the-ground challenges faced by investors and food producers.

# PLENARY 4: THE GEOPOLITICS OF URBAN FOOD SECURITY

## MODERATOR

Neal Peirce, *Chairman, The Citistates Group*

## SPEAKERS

Eugenio Díaz-Bonilla, *Visiting Senior Research Fellow, International Food Policy Research Institute (IFPRI)*

Jim Harkness, *Director, Institute for Agriculture and Trade Policy (IATP)*

Caitlin E. Welsh, *Foreign Affairs Officer, Office of Global Food Security, U.S. Department of State*



## SUMMARY OF DISCUSSION

The Geopolitics of Urban Food Security plenary panel focused on present and future trends in global food politics as well as the multi-lateral agreements and frameworks for international cooperation that are emerging to address global food security. Eugenio Díaz-Bonilla offered perspective on the legacy of the food crisis that took place in the 1970s and how policy responses led to both South and North America becoming net food exporters.

Looking forward, Díaz-Bonilla advised caution in predicting future dietary habits and purchasing power based on assumptions about exponentially increasing GDP growth in developing countries (a common assumption underlying many economic development models). Díaz-Bonilla also called attention to the importance of taking into account the dietary, economic, and behavioral changes that can be expected from a growing but aging world population. Ultimately, Díaz-Bonilla offered three hypothetical scenarios describing the trajectories of global food politics: ►

**WE KNOW THAT IN TERMS OF [FOOD] PRODUCTION WE DID OKAY, THE PROBLEM IS DISTRIBUTION AND MALNUTRITION DUE TO OTHER REASONS.**

—EUGENIO DÍAZ-BONILLA

1. *The Geopolitics of Food Scarcity: A supply-side scenario in which climate change, water scarcity, and increasing population growth prevent the global community from producing enough food to support populations. In this scenario, Díaz-Bonilla argued that international relations would be characterized by decreasing collaboration between global powers and receding globalization.*
2. *The Geopolitics of Collaboration: A scenario characterized by technological growth enabling significant increases in sustainable food production, collaboration between superpowers in functioning distribution markets, and continued globalization.*
3. *The Geopolitics of Muddling Through: A scenario in which the global community continues to engage in some collaboration, and where technological advances continue to be limited by political and environmental crises. In this, the most likely scenario, poverty will continue to drive food insecurity and inequality rather than abundance or scarcity of food supply.*

Díaz-Bonilla argued that the third scenario suggests a potential balancing of the existing geopolitical tilt towards Asia, the center of population and economic growth, given the availability of land and natural resources of Sub-Saharan Africa and the Americas. In this scenario, the Middle East could suffer from continued food riots due to land and water scarcity, which would affect urban development and governance.

**WE NEED TRADE, WE NEED ECONOMIES THAT CAN WORK... BUT A MODEL OF ECONOMIC DEVELOPMENT THAT PITS VERY SMALL PRODUCERS AGAINST EXTREMELY ECONOMICALLY POWERFUL COMPANIES THAT MIGHT BE THE ONLY BUYER IN A PARTICULAR MARKET OR, FOR CONSUMERS, THE ONLY SELLER IN A PARTICULAR MARKET... THAT'S NOT THE RIGHT WAY FOR MARKETS TO WORK, AND IT IS ALSO NOT THE WAY THAT A DEMOCRATIC SOCIETY SHOULD WORK.**

—JIM HARKNESS

Continuing in this vein, Jim Harkness argued for a transition away from the historically dominant paradigm of hunger as a problem of scarcity to be solved through investment in energy-intensive, centralized, and corporate-led food production, and towards a paradigm based on a resilience and a rights-based food system. Calling attention to the import-dependency which has grown from the fact that 75 percent of all global grain trade is now reliant on just forty companies, Harkness expressed concern over the existing system's ability to feed the world within the context of climate change, where even small increases in temperature dramatically impact crop production and where failures are inherently global in scale and impact. Harkness also noted how far-reaching, high-impact, land-use decisions are being guided by the highly centralized and globally funded food industry. High or unstable food prices prompted the private sector to engage in large-scale purchases of agricultural land in the Global South. These "land grabs" were fueled by food import-dependent countries attempting to out-source their food production and by the uncertainty in global financial markets, where, as Harkness put it, "hundreds of billions of dollars were sloshing around after the global financial crisis looking for a place to land."

Harkness described the need for a resilience-based framework, where agriculture would optimize production across a wide range of products rather than maximizing the production of only a few.

Caitlin Welsh provided examples of the international cooperation among governments and companies in answering the call for improved global food security. Welsh focused on the United States' Feed the Future program and the country's leadership role in G8 and G20 commitments to raise a combined \$22 billion from participating governments to invest in programs improving nutrition and food security. A central tenant of these programs, Welsh explained, is the principle of targeting investment in developing countries' own plans for improving food security at the local level.

## QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

### ► **Centralization and food security:**

Panelists and audience members discussed the question: to what extent has the centralization and industrialization of agriculture produced a global reliance on a limited number of monocultures, leaving little to no margin for error in production? Participants in this debate discussed the difficulty of utilizing anti-trust law as a policy tool to curb the consolidation of agriculture, the critical role that U.S. food policy plays in influencing global trends, and the importance of citizen participation in the national debate surrounding the politics of food.

### ► **Food buffers and international land grabs:**

Discussants agreed on the importance of improving domestic food production capacity

in developing countries (especially throughout Sub-Saharan Africa) in order to increase food reserves as a buffer against global price shocks. They also considered the increasingly common phenomenon of “farming abroad,” or “land grabs” now seen as a new food supply strategy by wealthy import-dependent governments. These land grabs (in the form of a wave of large scale purchases and leases of agricultural land (most often in Sub-Saharan Africa) show a fundamental lack of trust in global markets on the part of many governments, and illustrate how arable land has become a “stable bet” in global financial markets (with hedge funds the largest investors in the world’s underutilized agricultural land).

► **Food as a weapon:**

Participants outlined previous failed attempts by the U.S. government to utilize “food as a weapon,” such as its 1979/1980 grain embargo against the USSR, but argued that, despite a growing reliance of many countries on international markets, the complex interactions between global commodities markets now makes it increasingly difficult to use food policy as a weapon.

► **Finance and urban land value:**

Speakers acknowledged the growing role of urban planning paradigms that prioritize the transformation of peri-urban agricultural land to more financially valuable urban uses.

► **Infrastructure development:**

In the context of global aid and investment, policies and investments supporting improved infrastructure to reduce post-harvest loss were noted as mutually beneficial in promoting urban food security and raising rural incomes.

## BREAKOUT J: PRODUCING FOOD AND PROTECTING FARMLAND IN THE RURAL-URBAN FRINGE

### MODERATOR

**John Landis**, *Crossways Professor and Chair, City and Regional Planning, School of Design, University of Pennsylvania*

### SPEAKERS

**Qin Bo**, *Deputy Head, Department of Urban Planning and Management, Renmin University*

**Wayne J. Caldwell**, *Professor in Rural Planning, University of Guelph, Ontario, Canada*

**Tom Daniels**, *Professor and Director, Certificate in Land Preservation Program, City and Regional Planning, School of Design, University of Pennsylvania*

**Kevin Morgan**, *Professor of Governance and Development, School of Planning and Geography, Cardiff University*

### SUMMARY OF DISCUSSION

**New development and urban expansion is rapidly occurring on peri-urban farmland around the world. The panel addressed strategies for preserving farmland in multiple contexts in order to control urban sprawl and strengthen local food security. Tom Daniels gave an overview of peri-urban agriculture in the United States, pointing out that “metropolitan farms” produce a much larger percentage of food than is widely understood. ►**



Metropolitan farmlands, however, are continuously threatened by conversion to more profitable urban land uses compounded by the lack of labor and leadership from younger generations, which leads many farmers to sell their land at retirement rather than passing it on within the family. Daniels argued that, beyond metropolitan farms’ potential to produce food, peri-urban agriculture is a tool that can be used to limit unsustainable urban sprawl and should be integrated into comprehensive metro-level plans. Then, zoning and other regulations can be drafted to protect these areas from conversion to urban uses and to ensure coordinated capital investment programs that do not place heavy infrastructure in low-density agricultural zones.

Daniels elaborated on the various mechanisms being utilized to purchase development rights in agricultural areas for the purpose of long-term farmland preservation. He also provided best-practice examples of policies that promote agricultural greenbelts; these he drew from metro areas including San Francisco, Lexington, KY, Lancaster PA, and Baltimore County, MD.

Shifting focus to Canada, Wayne J. Caldwell shared the Ontario’s greenbelt planning experience. Caldwell stressed the importance of Ontario’s coordinated approach to farmland preservation: it paired its Greenbelt Plan (aimed at limiting urban growth) with a corresponding Growth Plan (aimed at identifying areas where urban expansion should take place). The Greenbelt and Growth Plans have successfully preserved farmland while directing high-density urban development in Toronto.

Kevin Morgan outlined the historic absence of urban planning from food policy in the United Kingdom. He emphasized that the food security movement should find ways to engage a more diverse set of stakeholders in defining and championing the importance of peri-urban agriculture.

The peri-urban fringe is often understood as “in limbo”—waiting to be filled by sprawl and other more profitable uses than food production, said Morgan. He argued that these areas must

be reimagined as defined spaces for critical eco-services. Morgan asserted that, as such, prohibitory planning (such as greenbelts and urban growth limits) must be accompanied by new, positive narratives framing peri-urban areas as assets within metropolitan areas and not simply spaces in need of protection.

Finally, Qin Bo described how farmland is being preserved in and around the city of Chengdu, capital of the Sichuan Province in Southwest China. Bo described the popularly perceived tension between urbanization and food security given the rapid pace with which cities are growing and the fact that China must rely on just 9 percent of its land for food production. The national “redline” of 120 million hectares of farmland which must be preserved in order to meet production demands, set in 1998, has been taken very seriously and has been upheld despite urban land growth. Bo outlined the importance of rural land consolidation within China’s farmland preservation strategy, a process that has been successfully implemented in the Chengdu metropolitan area due to a robust democratic engagement process; he also described how other regions have had problems with the consolidation and relocation process as a result of poorly developed citizen engagement and planning processes.

## QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

### ► *Metrics for success:*

Panelists discussed the difficulty in identifying one set of universal metrics to measure the success of farmland preservation policies; possible metrics range from measures of total acreage saved to the percentage of metropolitan land in use for agriculture. They agreed, however, that any assessments of acreage saved must acknowledge the importance of preserving blocks of land large enough to support economically viable farming operations and, ideally, of the size necessary to accommodate

the support industries that farms require, such as feed production, food processing, and distribution networks. They also agreed that any one measure of success would be insufficient and that each metro area must set its own priorities and devise its own strategy.

### ► *Managing conflict:*

Panelists discussed how conflict between urban and rural land use is managed in different contexts. While in Canada there is “Right to Farm” legislation, which requires any infringement on a farmer’s right to the land or to his or her livelihood to be justified in court, the U.S. depends far more on the legal precedence of development rights and zoning. In both cases, the importance of public acceptance of and support for greenbelt policies is viewed as important for continuity (as political leadership changes).

### ► *The power of the public plate:*

Morgan described how some city governments in Europe, such as Rome, London, and Bristol, are using procurement policies for government institutions and public school systems to shape food supply systems and support regional agriculture. These policies have resulted in the creation of local food councils and increased local control over food policy and, in so doing, are supporting the preservation of local farmland. The panelists agreed on the need for better data on how much locally produced food is locally consumed in each country, especially given the growth of urban food deserts (despite close proximity peri-urban agriculture in many cases).

**IT IS VERY IMPORTANT TO HAVE A COMPREHENSIVE PLAN THAT SITES AGRICULTURAL AS AN IMPORTANT INDUSTRY THAT YOU WANT TO MAINTAIN WELL INTO THE FUTURE. THIS WILL SET THE LEGAL BASIS FOR YOUR ZONING.**

—TOM DANIELS

**WE CAN NO LONGER THINK ABOUT DEFENDING SPACES THROUGH BANS AND PROHIBITIONS; WE HAVE TO HAVE MORE POSITIVE AND COMPELLING VISIONS FOR THE USE OF SPACE.**

—KEVIN MORGAN

**WHEN WE MEASURE [SUCCESS IN PRESERVING FARMLAND] WE MUST THINK ABOUT WHETHER THE FARMS ARE HAPPY OR NOT... IT IS ABOUT PEOPLE, NOT ONLY ABOUT FOOD.**

—QIN BO

## BREAKOUT K: PRICING, TARIFFS, AND TRADE

### MODERATOR

*Eugenio Díaz-Bonilla, Senior Research Fellow, International Food Policy Research Institute (IFPRI)*

### SPEAKERS

*Marc J. Cohen, Senior Researcher, Humanitarian Policy and Climate Change, Oxfam America; Professorial Lecturer in International Development, Paul H. Nitze School of Advanced International Studies, Johns Hopkins*

*William Martin, Research Manager, Agriculture and Rural Development, The World Bank*

## SUMMARY OF DISCUSSIONS

This breakout panel addressed the role international trade policy, tariffs, and subsidies play in local urban food security. Marc J. Cohen explained how factors such as the urban population’s reliance on internationally traded staples such as rice and wheat and its dependence on income to procure food converge to make urban populations particularly vulnerable to international shocks. In his case study of Haiti, Cohen argued that trade policies favoring international imports of staple grains such as rice have discouraged investment in local

production and compounded the country's vulnerability to international food-price spikes. Cohen also outlined the coping strategies urban populations rely on during price hikes, including: eating less; eating lower quality, less nutritious foods; keeping children out of school; and forgoing critical healthcare expenditures, among others—all of which have a negative impact on public health, human capital, and human security. ▶

William Martin said that—while food production and availability are important in addressing the realities of food insecurity, food production, and availability—access is usually the critically important issue in the developing world, where food-price surges and income reductions often go hand-in-hand. Martin also explained how price spikes have been shown to not only increase short-term food insecurity but also result in higher long-term poverty rates, jeopardizing broader development goals.

Finally, Martin described the complex ways in which national policy measures designed to strengthen local food security—both through export and import controls—can be harmful when poorly coordinated among international community members. Referring to World Bank studies, Martin described how “45 percent of the increase in global rice prices between 2005 and 2008 came from country's attempts to insulate themselves against the initial increase in prices;” he described this phenomenon as a “grandstand” challenge, making an analogy with sports games where, when everyone stands up to get a better view, no one does.

## QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

### ▶ *Question of subsidies:*

The pros and cons of multiple types of subsidy were discussed. There was agreement that a common difficulty encountered when implementing temporary protections is the tendency for them to quickly become politically entrenched. The core dilemma in developing

countries with respect to subsidies is the difficult balancing act between the benefit that low food prices bring to consumers and the damage that they often have on local producers. In addition, discussants stressed the importance of clarity in defining policy objectives, stating that if governments want to protect the poor, policies should be aimed at supporting livelihoods and incomes, not subsidizing particular crops. With regard to agricultural production and modernization, there was consensus on the need to create opportunities such that rural populations are pulled out of agriculture by improved prospects in urban areas, not pushed out by trade policies holding commodity prices artificially low. Trade policy was emphasized as a very important aspect of development and food security, but the tendency of existing frameworks to skew benefits towards developed countries and against small-holder farmers was also highlighted as an area in need of reform.

### ▶ *Commodities speculation:*

Panelists agreed that there was little evidence to support claims that speculators and futures markets have driven up food prices. That said, inconsistent projections of inflation growth is a major worry. This is particularly relevant given that in many poor countries most farmers will actually suffer from higher prices because they themselves are net purchasers of food.

### ▶ *Urban incomes and economic development:*

The importance of focusing on urban incomes as a tool to increase food security instead of a uniform focus on improved food production capacity was stressed. This was also linked to the transition to supermarkets as primary locations of food procurement given common inability of the urban poor to buy food in bulk and their traditional reliance on smaller-scale street food.

**NOT EVERYONE WHO IS MIGRATING INTO URBAN AREAS IN HAITI USED TO BE A RICE FARMER, IT'S MORE OF A PHENOMENON OF A LONG-TERM LACK OF INVESTMENT IN AGRICULTURE AND RURAL DEVELOPMENT GENERALLY... IT'S VERY HARD TO EARN A LIVING IN THE RURAL AREAS.**

—MARC J. COHEN

**WHAT YOU REALLY WANT IS TO HAVE PEOPLE PULLED OUT OF AGRICULTURE BY BETTER OPPORTUNITIES RATHER THAN PUSHED OUT BY CRISIS.**

—WILLIAM MARTIN

## BREAKOUT L: FOOD SOVEREIGNTY IN A GLOBALIZED WORLD

### MODERATOR

*Mary Summers, Senior Fellow, Robert A. Fox Leadership Program; Lecturer, Political Science/Health and Societies, School of Arts and Sciences, University of Pennsylvania*

### SPEAKERS

*Katherine Ozer, Executive Director, National Family Farm Coalition*

*Cecilia Rocha, Director, School of Nutrition, Ryerson University*

*Malik Yakini, Director, Detroit Black Community Food Security Network*

## SUMMARY OF DISCUSSIONS

The panelists addressed multiple aspects of “Food Sovereignty,” defined broadly as: “the peoples’ right to define their own policies and strategies for sustainable production, distribution and consumption of food that guarantee the right to food for the entire population” (World Forum on Food Sovereignty, 2001). ▶

In the U.S. context, Malik Yakini introduced the Detroit Black Community Food Security Network’s (DBCFSN) concept of justice as the primary component of a food security movement. Describing the ways in which issues of race, class, and gender have created severe inequalities in global food systems, Yakini called particular attention to the need for traditionally marginalized groups to have access to and ownership over land within urban areas for food production. In addition, Yakini described the DBCFSN’s multi-stakeholder engagement process as one seeking to engage a broad set of actors from academia, rural agriculture, and the public and private sectors

in a dialogue led by those urban and minority populations most marginalized by food insecurity.

In highlighting the need for lower-income minority populations to lead this process of framing and addressing urban food security, Yakini called attention to the tendency of food security initiatives to be spearheaded by wealthier, mainly white populations, reproducing existing inequalities and power-dynamics in the food system.

Director of Ryerson University's School of Nutrition, Cecilia Rocha presented the case study of Belo Horizonte, Brazil, where local food security and food sovereignty has been championed by municipal government. Rocha again underlined the concept of food sovereignty as a precondition for food security and described how these values have found voice through local and national policy in Brazil such as the adoption of the Zero-Hunger Strategy by the national government in 2003 and the subsequent inclusion of "The Right to Food" as part of the County's constitution in 2010.

As a result of this policy environment, local food policy throughout the country is now influenced by Food Councils operating at multiple levels and incorporating civil society into decision-making processes. Belo Horizonte, in particular, created a Municipal Secretariat for Food and Nutritional Security that takes charge and centralizes all the various food security programs, including:

1. *Subsidized food sales at certain "popular" restaurants and grocery stores,*
2. *Food and nutrition assistance delivered through a school meals program,*
3. *Market and supply regulation through the purchasing of targeted commodities from local farmers, among other programming,*
4. *Support for urban agriculture,*
5. *Education programs for nutrition and food consumption, and*
6. *Integrated support for employment and income generation.*

Leveraging key partnerships with the federal government, the municipality of Belo Horizonte is able to run this comprehensive package of policies and programs with only 2 percent of the city's budget.

From the perspective of an organization dealing directly with national-level food and agriculture policy in the United States, Katherine Ozer presented the ongoing work of the National Family Farm Coalition (NFFC) in representing family farms as they work to mitigate the impacts of international trade agreements on U.S. domestic producers. In doing so, the NFFC seeks to bring farmers to the table in the analyses of national policy such as the Farm Bill, as well as international trade agreements and their potential impact on local food sovereignty in the United States. All too often, Ozer argued, "Big Agriculture" is able to lobby government and amend legislation in their interests with little or no transparency, creating serious inequality in the U.S. food system and threatening the livelihoods of local farmers.

## QUESTIONS RAISED AND KEY THEMES

Panel discussion and audience questions focused on the following key themes:

### ► *Race relations and urban food security:*

Audience members and panelists discussed ways in which the impact of race and racism in the politics of food systems could be identified and mitigated. This included a call for urban agriculture organizations to analyze their own power dynamics so they can better partner with and empower the communities they are working in and, in essence, devise a strategy to "work themselves out of a job."

### ► *Role of community food hubs:*

The role of civil society in creating robust food hubs and networks was emphasized within the U.S. context, where little public policy support exists. In the case of Belo Horizonte and Brazil it was also noted that what is now a centrally supported set of policies began as a social movement around the Right to Food before taking root in government structures. Ultimately, the panelists agreed that the scale of change needed will require both public involvement and the creation of new government institutions.

### ► *Subsidies and the role of government:*

Panelists argued that the appropriate role of government in the agricultural sector is not by

paying subsidies, but rather in setting up a system that gives the farmer more control over pricing.

### ► *GMO foods and the danger of monopolies:*

While there was no discussion of the nutritional merit of genetically modified crops, the phenomena of private corporations patenting seeds was highlighted as a major threat to the Food Sovereignty movement by members of the panel as well as audience participants.

### ► *Access to food as a human right:*

At the core of the panel discussion was the understanding of access to nutritious food as a basic human right regardless of economic and social standing, race, class, or religion. The importance of placing food movements within the social justice and human rights framework, instead of the existing "productionist" and environmentalist paradigms was put forward as a key takeaway of the panel.

**ONE OF THE THINGS THAT WE ARE ACUTELY AWARE OF IN DETROIT IS THAT LAND IS THE BASIS OF ALL POWER AND THAT IN ORDER FOR COMMUNITIES TO HAVE SOVEREIGN FOOD SYSTEMS THEY MUST HAVE ACCESS TO AND OWNERSHIP OF LAND.**

—MALIK YAKINI

**IT IS NOT ENOUGH THAT PEOPLE HAVE ACCESS TO FOOD, THEY REALLY HAVE TO DEFINE THE FOOD SYSTEM THAT PROVIDES THEIR FOOD, AND NOT JUST TO DEFINE IT BUT HAVE CONTROL OVER THE FOOD SYSTEM.**

—MALIK YAKINI

**BELO HORIZONTE HAS CREATED AN ALTERNATIVE FOOD SYSTEM THAT IS MAINTAINED BY GOVERNMENT ACTION AND THAT HAS BEEN IMPORTANT IN FOLLOWING THE PRINCIPALS OF THE RIGHT TO FOOD.**

—CECILIA ROCHA

# **SPEAKER** **BIOGRAPHIES**



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**Gavin Albert**

Adjunct Professor,  
Finance and Economics  
Columbia University

Gavin Albert has been investing globally in the public markets for nearly twenty years. His career began as an analyst primarily covering the energy and property/casualty insurance industries in the small-cap group at Oppenheimer Capital. Within two years he was named a Vice President and Co-Manager of the Small-Cap Fund. After Oppenheimer Capital, he joined Ulysses Partners, the successor to Odyssey Partners, an approximately \$1 billion investment partnership. His career has included positions such as Senior Vice President—Pequot Capital, Senior Managing Director Tremblant Capital, and Portfolio Manager—Soros Fund Management. Additionally, he was the Managing Partner and CIO of Ardea Capital, a global long/short equity fund. He received a BBA in Finance with a concentration in Art History from Emory University and an MBA in Finance and General Management from the Owen Graduate School of Management at Vanderbilt University.

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**Drew Becher**

President  
Pennsylvania  
Horticultural  
Society

Drew Becher became the thirty-sixth President of the Pennsylvania Horticultural Society (PHS) in June 2010. Under his leadership, PHS has expanded the City Harvest program, which provides fresh produce to more than 1,000 families in need each week during the growing season; and initiated the PHS Pop-Up projects, utilizing vacant city lots to provide new spaces for gardening and community gatherings. He previously served as Deputy Director of Washington, DC's Office of Planning (2004–06), where he led the creation of the Department of Environment, and before that was Associate Director of the DC Department of Parks and Recreation. He also served as Chief of Staff for the Chicago Park District (1996–2004) and Assistant to Mayor. He helped forge Mayor Richard M. Daley's acclaimed environmental and beautification agenda that contributed to Chicago's recent placement on the Forbes list of the world's most beautiful cities, and he created and led many of the initiatives that are now hallmarks of Chicago's urban renaissance.

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**Ian Bennett**

Owner  
The Harvest Protection  
Network, LLC

Ian Bennett is the founder of Harvest Protection Network, an initiative that works with the Sub-Saharan farming community to provide coated-steel storage buildings to protect harvested crops against spoilage. Bennett was previously CEO of The Finance Network, LLC, providing international trade finance services to help US-based small businesses pursue international trade (1996–2006). He received his MBA from Wharton in 1967.

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**Eugénie L. Birch**

Lawrence C. Nussdorf  
Professor of Urban Research,  
Department of City and  
Regional Planning,  
School of Design;  
Co-Director, Penn IUR  
University of Pennsylvania

Eugénie Birch is Lawrence C. Nussdorf Professor of Urban Research; Chair, Graduate Group of City and Regional Planning, University of Pennsylvania School of Design; Co-Director, Penn Institute for Urban Research (Penn IUR); and Co-Editor, *City in the 21st Century* series, University of Pennsylvania Press. Her current research projects include developing the knowledge platform (Research Digest) for the U.S. Department of Energy-sponsored Energy Efficient Buildings Hub, Philadelphia; the Energy Smart Communities knowledge-sharing platform for the Asian Pacific Economic Cooperation's (APEC) Energy Working Group; and a Ford-funded Sustainable Development Indicator Catalog for the Partnership for Sustainable Communities, the alliance between the U.S. Departments of Housing and Urban Development and Transportation and the Environmental Protection Agency. Her most recent books are: *Women's Health and the World's Cities* (2011) (with Afaf Meleis and Susan M. Wachter), *Global Urbanization* (2011), *Neighborhoods and Life Chances: How Place Matters in Modern America* (2011) (with Harriet Newberger and Susan M. Wachter), and *Growing Greener Cities* (2008) (with Susan M. Wachter), and *Rebuilding Urban Places After Disaster, Lessons from Katrina* (2006) (with Susan M. Wachter). Birch is currently president of the International Planning History Society and has served as Chair, Department of City and Regional Planning, University of Pennsylvania; Chair, Department of Urban Affairs and Planning, Hunter College/CUNY; President, Association of Collegiate Schools of Planning; President, Society of American City and Regional Planning History; Co-Editor, *Journal of the American Planning Association*; and Chair, Planning Accreditation Board. She is currently Chair, Board of Directors of the Municipal Art Society of New York and Co-Chair, UN-HABITAT's World Urban Campaign.

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**Qin Bo**

*Deputy Head, Department  
of Urban Planning and  
Management  
Renmin University*

Qin Bo holds a bachelor's of engineering from the Department of Architecture in Wuhan University, a master's of science from the Department of Urban and Regional Planning in Peking University, and a PhD in urban studies from the National University of Singapore. He joined the Department of Urban Planning and Management at Renmin University of China in 1997 and now serves as the Deputy Head, mainly responsible for international collaborations and postgraduate programs.

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**Barbara Burlingame**

*Principal Officer,  
Nutrition Division  
Food and Agriculture  
Organization of the  
United Nations (FAO)*

Barbara Burlingame is a nutrition scientist and Principal Officer in the Nutrition Division of the Food and Agriculture Organization of the United Nations (FAO). She obtained her undergraduate degrees from University of California, Davis, in nutrition science and environmental toxicology, and her PhD from Massey University in New Zealand. Her expertise includes food composition, human nutrient requirements, and dietary assessment work. Recently, her efforts have been directed toward work on biodiversity for food and nutrition, and developing models and indicators for sustainable diets. She is a member of several scientific advisory boards and international committees; a recipient of the New Zealand Science and Technology Medal; the author of many scientific papers and UN publications, and several book chapters and reference books; and has served in the role of Editor and Editorial Board Member of several food and nutrition journals during the last twenty-five years.

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**Roger A. Cady**

*Senior Technical Advisor  
and Sustainability Lead  
Elanco Animal Health*

Roger A. Cady currently serves as a Senior Technical Consultant for Elanco Animal Health. In this role, Cady serves as the science officer assuring Elanco dairy products and marketing efforts are supported by sound science and sustainable agricultural practices. His research and dairy cattle industry expertise includes training as a quantitative geneticist with a heavy emphasis on statistics and dairy management records. Throughout his career, Cady has worked to integrate research information with practical on-farm management in the area of heifer management and on-farm economics including how micro-economics the farm and the macro-economics of the industry interact. He is currently focused on applying productivity to environmentally sustainable practices in the dairy industry.

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**Wayne J. Caldwell**

*Professor in Rural Planning and Development; Director, School of Environmental Design and Rural Development University of Guelph*

Wayne J. Caldwell is a Professor in Rural Planning and Development and Director of the School of Environmental Design and Rural Development at the University of Guelph, Ontario, Canada. He also has a career-long affiliation with the County of Huron. His primary focus has been on planning and change in rural and agricultural communities. He is an active researcher in the area of farmland preservation, rural conflict resolution, governance of nutrient management and community-based approaches to economic and environmental issues. His sixth book, *Rediscovering Thomas Adams: Rural Planning and Development in Canada*, was published in 2011. He is a founding member and past Chair of the Ontario Rural Council. He is also a founding member of the Huron Stewardship Council and the Lake Huron Centre for Coastal Conservation. He was appointed by the Ontario Government to Chair the Provinces Nutrient Management Advisory Committee and he served as President of the Ontario Professional Planners Institute from 2007–09 and as President of the Association of Canadian University Planning Programs from 2010–12.

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**Patrick Canning**

*Senior Research Economist USDA Economic Research Service*

Patrick Canning is a Senior Research Economist for USDA's Economic Research Service (ERS). He studies the U.S. food system with a focus on research that informs food policy discussions at the Federal level. His recent published research includes two in-depth ERS reports; one that provides a detailed answer to the question "Where do our food-dollars go?" and another that assesses energy use throughout the U.S. food system. His forthcoming article in the journal *Economic Systems Research* contributes to the field of applied regional studies by demonstrating a general framework to objectively assess input data quality used to calibrate multiregional data systems. He is currently a principal investigator on two transdisciplinary research projects. One project seeks to assess whether policies promoting healthy diets and policies promoting food system sustainability are complementary or competing. Another brings together an interdisciplinary team of scientists and expert practitioners to evaluate the viability of scaling up and scaling out specific value chains to alleviate food insecurity among the underserved populations of the Northeastern United States. Canning holds both a bachelor's and master's degree in Agricultural and Resource Economics from the University of Maryland. He earned his PhD in Economics from George Washington University.

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**William J. Clark**

*Executive Director Philabundance*

Bill Clark is President and Executive Director of Philabundance. A native of Philadelphia, Clark grew up seeing the great potential of the Delaware Valley, as well as the overwhelming need of residents struggling to make ends meet. At the beginning of his tenure with Philabundance, in 2001 Clark oversaw the integration of the Greater Philadelphia Food Bank and Philabundance, resulting in a significant increase in food acquisition and distribution from 10 million pounds to over 25 million pounds in just a few short years. This streamlined operation in conjunction with community outreach, fundraising and public awareness initiatives has enabled Philabundance to reach more people with better resources. Under Clark, Philabundance has created innovative programs that increase access to emergency food assistance which is strengthening the hunger safety net in the Delaware Valley. Clark's creativity and business savvy is evident in Philabundance's growth and exposure throughout the Delaware Valley. Clark is a graduate of the University of Pennsylvania's Wharton School and previously served as a product manager at Swift and Co., makers of Soup Starters and Brown 'n Serve breakfast meats. From 1982 to 1995, Clark owned W.J. Clark and Co., a Chicago-based company that produced and marketed specialty foods including Bean Cuisine soups and pastas, salad dressings, wild rice and mushrooms products, and natural licorice.

**Joan Clos**

*Executive Director  
United Nations Human  
Settlements Programme  
(UN-HABITAT)*

Joan Clos is the Executive Director of the United Nations Human Settlements Programme (UN-HABITAT), appointed at the level of Undersecretary-General by the United Nations General Assembly. Clos took office at the Programme's headquarters in Nairobi, Kenya on October 18, 2010. Prior to joining UN-Habitat, Clos was twice elected Mayor of Barcelona serving two terms during the years 1997–2006. He was appointed Minister of Industry, Tourism, and Trade of Spain in 2006 to 2008. In this role, he helped rationalize the Iberian Energy Market in line with European Union Policies. Prior to joining the United Nations, he served as Spanish ambassador to Turkey and Azerbaijan. At the international level, he was elected President of Metropolis, the international network of cities, in 1998. Two years later, he was elected President of the World Association of Cities and Local Authorities, (WACLAC). Between 2000 and 2007, Clos served as Chairman of the United Nations Advisory Committee of Local Authorities, (UNACLA), and between 1997 and 2003, he was member of the Council of European Municipalities and Regions, (CEMR). Clos has received a number of awards, which include a gold medal from the Royal Institute of British Architects in 1999 for transforming Barcelona. In 2002, he won the UN-HABITAT Scroll of Honour Award for encouraging global cooperation between local authorities and the United Nations.

**Olufunke Cofie**

*Senior Scientist;  
Volta Basin Leader,  
CGIAR Challenge Program  
on Water and Food (CPWF)  
International Water  
Management Institute  
(IWMI)*

Olufunke Cofie works for the International Water Management Institute, which is part of the Consultative Group on International Agricultural Research. Her field experience is in Sub-Saharan Africa where she has research, management, coordination and networking responsibilities. Over the past ten years, her research focus has been in the domain of water-sanitation-agriculture linkages in urban and peri-urban areas. From 2004–10, she served as the West Africa (Anglophone) Regional Coordinator for the International Network of Resource Centres on Urban Agriculture and Food Security. Since 2010, she leads the Challenge Program on Water and Food in the Volta River Basin in West Africa. This is a multi-institutional and multi-disciplinary research for development program which focuses on the management of rainwater and small water infrastructures for multiple purposes in the Volta Basin. In the 1990s, she worked as a university lecturer in Nigeria and then in Ghana.

**Marc J. Cohen**

*Senior Researcher on  
Humanitarian Policy  
and Climate Change  
Oxfam America*

Marc J. Cohen is a Senior Researcher on Humanitarian Policy and Climate Change at Oxfam America and a Professorial Lecturer in International Development at the Paul H. Nitze School of Advanced International Studies at Johns Hopkins University. He has several publications on food security in Haiti, and is co-author of the paper "The Food Price Crisis and Urban Food (In)security," written for the International Institute for Environment and Development and the UN Population Fund (2009). Cohen is also Co-Editor and contributor to two books on the world food crisis: *The Global Food Crisis: Governance Challenges and Opportunities* (Wilfrid Laurier University Press, 2009) and *Global Food-price Shocks and Poor People: Themes and Case Studies* (Routledge, 2011). He received his PhD in political science from the University of Wisconsin-Madison.

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**Nevin Cohen**

*Assistant Professor of  
Environmental Studies  
The New School*

Nevin Cohen is an Assistant Professor of Environmental Studies at The New School, where he teaches courses in urban food systems, environmental studies, environmental planning, and environmental policy analysis, including cross-disciplinary courses that connect the fields of urban policy, planning, and design. Cohen's research focuses on the development of urban food policy, the use of urban space for food production, and planning for ecologically sound urban food systems. He has been involved in food policy development in New York City, and recently co-authored a study (*Five Borough Farm: seeding the future of urban agriculture in New York City*) to support and strengthen New York City's urban agriculture system. He is currently working on two book projects: a study of urban food policymaking in the United States and Canada, and an analysis of urban agriculture projects that focus on social justice goals. He has a PhD in Urban Planning from Rutgers University, a master's in City and Regional Planning from Berkeley, and a bachelor's from Cornell.

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**Julien Custot**

*Facilitator, Food  
for the Cities  
Multidisciplinary  
Initiative  
Food and Agriculture  
Organization of the  
United Nations (FAO)*

Julien Custot is the Facilitator of the Food for Cities programme, a multidisciplinary initiative based within the United Nations Food and Agriculture Organization (FAO). The Organization is a knowledge network, shares policy expertise between the 191 member countries and also implements projects around the world, with and on behalf of member countries. The Food for Cities programme is a priority action of the FAO looking at all aspects of urban food security.

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**Tom Daniels**

*Visiting Professor and  
Director, Certificate in  
Land Preservation Program,  
City and Regional Planning  
School of Design  
University of Pennsylvania*

Tom Daniels is a Full Professor who directs the concentration in Land Use-Environmental Planning at the University of Pennsylvania's School of Design. His main areas of interest are farmland preservation, growth management, and connection between land use and water quality. He often serves as a consultant to state and local governments and land trusts. He lives in Lancaster, Pennsylvania where for nine years he managed the county's nationally-recognized farmland preservation program. Daniels has taught at SUNY-Albany, Kansas State University, and Iowa State University. He has served on the Editorial Advisory Board of the *Journal of the American Planning Association*, and in 2002 he was a Senior Fulbright Scholar at the University of New South Wales in Sydney, Australia.

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**Eugenio Díaz-Bonilla**

*Senior Research Fellow  
International Food Policy  
Research Institute (IFPRI)*

Eugenio Díaz-Bonilla, an Argentine national, is currently a visiting Senior Research Fellow at the International Food Policy Research Institute (IFPRI). Previously he served for almost nine years as Executive Director for Argentina and Haiti at the Inter-American Development Bank, where we was directly involved in the recent capital increase of the Bank from 100 billion to 170 billion dollars. He has more than thirty years of experience as an economist, working with the public and private sector in developing countries. He has also been a consultant and staff member with the World Bank, United Nations Development Program (UNDP), Food and Agriculture Organization (FAO), the Inter-American Institute for Cooperation in Agriculture (IICA). Díaz-Bonilla has held several diplomatic positions representing his country in negotiations involving trade and agricultural issues. He has written extensively on economic development, trade, poverty, and food security issues. He holds a master's in international relations from the School of Advanced International Studies of The Johns Hopkins University, and a PhD in Economics from Johns Hopkins University.

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**Zhengxia Dou**

*Professor, Agricultural  
Systems, Department  
of Clinical Studies  
School of Veterinary  
Medicine, University  
of Pennsylvania*

Zhengxia Dou is a Professor of Agricultural Systems at the University of Pennsylvania School of Veterinary Medicine where her research focus includes the transformation and transport of nutrients in agro-ecosystems, the environmental fate of manure-borne pathogens, pharmaceuticals, and their implications for public health, as well as agricultural productivity, sustainability, and global food security. Dou received her MS from the Chinese Academy of Sciences (1985) and her PhD from Penn State University (1993).

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**James Ferguson**

*Section Chief,  
Animal Production Systems;  
Professor of Nutrition,  
Department of Clinical Studies  
School of Veterinary Medicine  
University of Pennsylvania*

James Ferguson is the Section Chief, Animal Production Systems, and a Professor of Nutrition in the Department of Clinical Studies at the University of Pennsylvania School of Veterinary Medicine. His research interests include the relationship between nutrition and manure nutrient content and efficient recycling of nutrients on dairy farms as well as the relationships between nutrition, reproduction, and production in dairy cattle. Ferguson earned his MS (Biomedical Engineering and Science) from Drexel University, 1977 and his VMD from the School of Veterinary Medicine at the University of Pennsylvania, 1981.

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**Raghav Gaiha**

*Professor, Faculty of  
Management Studies  
University of Delhi*

Raghav Gaiha is a former Professor of Public Policy at the University of Delhi, Faculty of Management Studies. His current research interests lie in income distribution, agriculture, food prices, diets, malnutrition and disease, and rural public works and institutions. His book (jointly with S. Shankar) *Battling Corruption: Has NREGA Reached India's Rural Poor* will be published by Oxford University Press in March 2013. A second book (jointly with R. Jha and Vani S. Kulkarni), *Diets, Malnutrition and Disease in India*, is being revised for publication by Oxford University Press. Gaiha has also served as a visiting fellow/scholar at various institutions, including Harvard, MIT, Stanford, Yale, Penn, and University of Cambridge. He has also received several awards such as the British Council Visitorship (1991 and 1994), the Population Council Fellowship (1985–86), the Ford Foundation Fellowship (1980–81), and, more recently, a research grant from AusAid (2007–09). He obtained his PhD in Economics in 1977 from the University of Manchester in England.

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**Patricia Gallagher**

*Associate Professor,  
Civil, Architectural and  
Environmental Engineering  
Drexel University*

Patricia Gallagher is Associate professor of Civil, Architectural and Environmental Engineering at Drexel University. She received her bachelor's degrees in civil engineering and geological sciences from Rutgers University, a master's in civil engineering from the Ohio State University, and a doctoral degree in civil engineering from Virginia Polytechnic Institute and State University. Prior to joining the faculty at Drexel University, Gallagher was a consulting engineer involved in the design and construction of infrastructure systems. She is a licensed professional engineer in Ohio. She is the recipient of several awards and honors, including the U.S. National Science Foundation Faculty Early Career Development Award and the Alan Rothwarf Award for Teaching Excellence from Drexel University. She is a Provost's Fellow in Sustainability. As Provost's Fellow in Sustainability, Gallagher is leading the Urban Sustainability Planning Initiative, which is developing an exciting new research agenda at Drexel focusing on urban sustainability through the lenses of food, water, and energy. Her research involves sustainability and resilience of infrastructure. Her current focus is on incorporating lifecycle assessment methods into geo-environmental and geotechnical engineering to provide decision-making tools for enhancing the environmental sustainability of infrastructure and remediation projects.

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**David Galligan**

*Professor of Animal Health  
Economics, Department  
of Clinical Studies  
School of Veterinary Medicine  
University of Pennsylvania*

David Galligan is a Professor of Animal Health Economics at the University of Pennsylvania School of Veterinary Medicine. As Director of the University of Pennsylvania's Center for Animal Health and Productivity, Galligan has extensive experience in production agriculture. He earned his Veterinary Medical Doctor (VMD) and MBA degrees from the University of Pennsylvania in 1981 and 1985, respectively. Since joining the faculty at the University of Pennsylvania, Galligan has conducted extensive research in animal health economics, written sections in numerous textbooks, and spoken extensively at regional, national, and international meetings.

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## Udaya Prabath Gammanpila

*Minister of Agriculture,  
Minor Irrigation,  
Industries & Environment  
(Western Province)  
Sri Lanka*

Udaya Gammanpila was elected Minister of Agriculture, Minor Irrigation, Industries & Environment (Western Province) Sri Lanka in 2009. Previously, he was a member of All Party Representative Committee (APRC) appointed by His Excellency the President to formulate a solution to the crisis in the North and East of Sri Lanka. He was also a member of the Advisory Council for Ministry of Constitutional Affairs and National Integration as well as a member of National Economic Council chaired by H.E. the President. In February 2007, Gammanpila was appointed by the Minister of Environment as his Senior Advisor. Subsequently, H.E. the President appointed him as the Chairman of the Central Environmental Authority during which time he oversaw the introduction of environmental taxes as a mean of implementation of Polluter Pays Principle (PPP). Gammanpila was awarded a scholarship to Monash University, Melbourne by the Australian Government in 1988 and obtained a Bachelor of Computing (Information Systems) degree in 1994.

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## Robert Giegengack

*Professor Emeritus of Earth  
& Environmental Science,  
School of Arts and Sciences  
University of Pennsylvania*

Robert Giegengack is Professor Emeritus of Earth & Environmental Science in the School of Arts and Sciences at the University of Pennsylvania and has been on the faculty of the University of Pennsylvania since 1968. He received his BA and PhD in Geology from Yale University (1960, 1968) and his MS in Geology from the University of Colorado (1962). Giegengack established the undergraduate major in Environmental Studies at Penn in 1972, and has been undergraduate advisor for that major and for the Geology major in the years since. He is also Faculty Director of the Master of Environmental Studies (MES) program, which currently enrolls ~150 students. He has also been Director of Penn's Summer Course in Geologic Field Methods, based at the facility of the Yellowstone-Bighorn Research Association (YBRA) in Red Lodge, MT. Giegengack teaches courses in Environmental Analysis, Paleoclimatology, Environmental Geology, and Field Geology. He has also developed a series of Academically Based Community-Service courses in urban environmental public health that focus on the hazard of lead-based paint in residential buildings, teenage smoking, and environmental triggers of asthma attacks. He studies geologic archives that enable paleoclimatologists to reconstruct the history of environmental change, primarily climate change, during the very long period of time (~4.5 billion years) that preceded acquisition, during the last ~200 years, of the instrumental meteorological record. That work provides a useful time perspective on environmental processes currently under way, and an evolutionary perspective on the physical, biologic, and social configuration of the modern world. He has pursued fieldwork on every continent except Australia.

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## Karen Glanz

*George A. Weiss University  
Professor, Perelman School  
of Medicine  
University of Pennsylvania*

Karen Glanz, PhD, MPH is George A. Weiss University Professor, Professor of Epidemiology and Nursing and Director of a new Center for Health Behavior Research at the University of Pennsylvania. She was formerly (2004–09) Candler Professor of Behavioral Sciences and Health Education, Georgia Cancer Coalition Distinguished Research Scholar, and Director of the Emory Prevention Research Center at the Rollins School of Public Health at Emory University in Atlanta. From 1993 to 2004, she was Professor and Director of the Social and Behavioral Sciences Program at the Cancer Research Center of Hawai'i at the University of Hawai'i. From 1979 to 1993 she was a Professor in the Departments of Health Education and Medicine at Temple University in Philadelphia. Glanz received her MPH (1977) and PhD (1979) degrees in health behavior and health education from the University of Michigan. Her research, funded for over \$25 million over the past fifteen years, focuses on cancer prevention and control, theories of health behavior, obesity and the built environment, social and health policy, and new health communication technologies. Glanz is senior editor of *Health Behavior and Health Education: Theory, Research, and Practice* (Jossey-Bass Inc., 1990, 1996, 2002, 2008), a widely used text recently published in its fourth edition.



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**Delia Grace**

*Program Manager  
International Livestock  
Research Institute (ILRI)*

Delia Grace is an epidemiologist and veterinarian with more than fifteen years experience in developing countries. She is a Senior Researcher at the International Livestock Research Institute in Kenya, and also leads the Component on Agriculture-Associated Diseases in the new CGIAR Research Program on Agriculture for Human Nutrition and Health. Her research interests include food safety, gender, and participatory processes.

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**Heather Grady**

*Vice President,  
Foundation Initiatives  
The Rockefeller Foundation*

Heather Grady joined The Rockefeller Foundation in 2010. As Vice President for Foundation Initiatives, she sets strategic direction for the Foundation's broad initiatives of grantmaking and oversees all initiatives in execution, aligning grantmaking with the Foundation's mission to expand more equitable growth opportunities and build resilience. She provides vision, leadership, and direction to the Foundation's program staff, a diverse group of professionals working in the United States, Asia, and Africa. Prior to joining The Rockefeller Foundation, Grady was the Managing Director of Realizing Rights: the Ethical Globalization Initiative, founded by former Irish President Mary Robinson. There she managed strategy and operations, and helped lead programs on employment, climate justice, corporate responsibility and women's leadership. Grady has managed development and humanitarian programs in East Asia, the Middle East and Africa for nearly two decades with Oxfam Great Britain and other international organizations. She has written and taught on international development, human rights, and climate change, and served as an Adjunct Professor at Columbia. She is conversant in Vietnamese and Chinese. Grady received a bachelor's degree from Smith College and a master's degree in Public Administration from Harvard University.

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**Jim Harkness**

*President  
Institute for Agriculture and  
Trade Policy (IATP)*

Jim Harkness is the President of the Institute for Agriculture and Trade Policy (IATP) in Minneapolis, Minnesota. Since his arrival in 2006, he has strengthened IATP's work on food systems, climate change and social justice. He lived and worked in China for sixteen years before joining IATP, serving as Country Director of the World Wildlife Fund in China from 1999–2005, and as the Ford Foundation's Environment and Development Program Officer for China from 1995–99. He has written and spoken frequently on food and agriculture issues, China and sustainable development, and has served as an adviser for the World Bank and the United Nations Food and Agriculture Organization.

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**Carl Hausmann***Global Policy Advisor  
Bunge Limited*

Carl Hausmann is Global Policy Advisor at Bunge Limited and has thirty-five years of experience in the agribusiness and food industry. In his current role, he advises Bunge Limited on global agriculture and trade issues and represents the company in multistakeholder groups and at high-level public gatherings. Hausmann serves as Vice Chair of the Consortium of International Agricultural Research Centers (CGIAR). He retired from Bunge in 2012 as Managing Director, Global Government and Corporate Affairs. Prior to that role he served as CEO of Bunge Europe and CEO of Bunge North America. Hausmann began his career in the industry in 1978 at Continental Grain and has since worked in South America, Europe, Africa, and North America. Hausmann serves on the board of directors of several organizations, including the International Food and Agricultural Trade Policy Council (IPC) and is a past president of Fediol, the European association of oilseed crushers. He received a bachelor's degree in Business from Boston College and an MBA from INSEAD, Fontainebleau, France.

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**Narayan Hegde***Trustee and Principal Adviser  
BAIF Development Research  
Foundation*

Narayan Hegde has served since 1974 with BAIF Development Research Foundation in India, a Gandhian organization committed to sustainable livelihood of the rural poor through conservation and development of natural resources. He was Managing Trustee and President of BAIF from 1993 to 2009, during which time BAIF recorded a ten-fold expansion, reaching out to 4 million farmers in fifteen states in the country. Now serving as Principal Adviser and Trustee, BAIF, he is also Chairman, Children's Future India; Managing Trustee, Nature Cure Ashram; Trustee, Global Alliance for Livestock Veterinary Medicines, India800 Foundation, UK, MS Swaminathan Research Foundation, and several other nonprofit organizations involved in sustainable development. He has served as Member of the Scientific Advisory Committee to the Cabinet, Government of India and Working Group on Livestock, Environment, and Forestry and Agricultural Extension for IX to XII Five Year Plans of the Government of India. He has also served on various committees of the Ministry of Forests and Environment, Agriculture, Rural Development, Science and Technology. He has published 200 technical and policy papers. Recognized as one of the Ninety Illustrious Alumni over the ninety Years of the University of Hawaii, Hegde has written books including a series of books on nature; his book *Mother Nature* received Best Children's Literature Award from the Government of India.

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**Joan C. Hendricks***Gilbert S. Kahn Dean of  
Veterinary Medicine, School  
of Veterinary Medicine  
University of Pennsylvania*

Joan C. Hendricks, VMD, PhD became the 12th dean of the University of Pennsylvania School of Veterinary Medicine (PennVet) on January 1, 2006 making her the third female dean of a veterinary school in the United States. In the role of Dean, Hendricks is responsible for all faculty affairs, administration, and strategic planning for the School spanning both the Philadelphia and Kennett Square campuses. In addition, she oversees academic affairs and curriculum as well as the School's two teaching hospitals—the Matthew J. Ryan Veterinary Hospital for small animals in Philadelphia and the George D. Widener Hospital for large animals in Kennett Square on the New Bolton Center campus.

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**Amy Hillier**

*Assistant Professor,  
Department of City  
and Regional Planning  
School of Design  
University of Pennsylvania*

Amy Hillier teaches courses relating to GIS, built environment and public health, and community development in city planning, urban studies, public health and social work. Her research focuses on issues of geographic disparities and access to services and resources in disadvantaged communities. Her research has included GIS applications in redlining and housing discrimination, affordable housing, and public health. Her dissertation, funded by the Department of Housing and Urban Development (HUD), considered the impact of the Home Owner's Loan Corporation on lending in Philadelphia. She continued this research as a HUD Urban Scholars Post-doctoral Fellow. Most of Hillier's current research focuses on public health and the built environment. She frequently collaborates with colleagues at the School of Medicine and The Food Trust.

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**Molly Jahn**

*Professor of Agronomy and  
Genetics, Nelson Institute  
for Environmental Studies,  
Center for Sustainability  
and the Global Environment,  
University of  
Madison-Wisconsin*

Molly Jahn is Professor of Agronomy and Genetics, Nelson Institute for Environmental Studies, Center for Sustainability and the Global Environment, and former Special Advisor to the Chancellor and Provost for Sustainability Sciences, University of Wisconsin-Madison. She has had a distinguished research career in plant genetics, genomics, and plant breeding of vegetable crops focusing on molecular genetics of disease resistance and quality traits. She has also worked extensively in developing countries to link crop breeding with improved human nutrition and welfare using innovative approaches to inter-sector partnerships, engagement with emerging institutions, and integrated projects focused on impact and technology transfer. Jahn has numerous publications, lectureships, and awards for her research, teaching, service, and extension. She has served on boards and advisory groups including The AVRDC World Vegetable Center and World Dairy Expo, and founded and directed the Public Seed Initiative and the Organic Seed Partnership. She was named an American Association for the Advancement of Science Fellow in 2006. In 2009–10, she was called to Washington to provide interim leadership as Deputy Under-Secretary for Research, Education, and Economics at the U.S. Department of Agriculture. In 2011, she was chosen to be one of eleven members on the new CGIAR Commission on Sustainable Agriculture and Climate Change.

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**Ridwan Kamil**

*Founder and Principal  
Urbane Indonesia*

Ridwan Kamil is Founder and Principal of Urbane Indonesia (UI). Since founding UI in 2004, he has received the International Young Design Entrepreneur of the Year award from the British Council Indonesia (2006), and UI has been honored in the Building Design Business category of the BCI Asia Top 10 Awards for three consecutive years (2008, 2009, 2010). Among the high-profile international projects completed by UI is the Aceh Tsunami Museum in Banda Aceh, Indonesia. He also serves as a lecturer in the Department of Architecture, Bandung Institute of Technology. As an individual and through the work of UI, he is committed to grassroots urban design that empowers urban poor populations and he has been a pioneer in the "Indonesia Berkebun" movement to build amateur gardens in cities across Indonesia. As of 2011, the community project is established in fourteen cities in Indonesia, with membership approaching 4,000. He received his Bachelor of Architecture from the Bandung Institute of Technology (1995) and a Master of Urban Design degree from the University of California, Berkeley (2002).

**Alan Kelly**

*Gilbert S. Kahn Dean  
Emeritus, School of  
Veterinary Medicine  
University of Pennsylvania*

Alan Kelly received his veterinary medical education at Bristol University in England and, having been awarded a National Cancer Institute Fellowship, came to the University of Pennsylvania to pursue a PhD. In 1968 he joined the faculty in the Department of Pathobiology at Penn's School of Veterinary Medicine where he taught pathology and conducted NIH-funded research on neuro-muscular development and on the pathogenesis of Duchenne muscular dystrophy. In 1994, Kelly became Dean of the School of Veterinary Medicine and served in this office for the ensuing twelve years, retiring in December 2005. During his deanship the School's appropriation from the Commonwealth of Pennsylvania increased from \$12 million to \$38 million. In 2000, he led a campaign that raised \$127 million from private and public sources for construction of the Hill Pavilion, a new teaching and research building at the School. After retiring from the Dean's office, Kelly joined the Center for Animal Health and Productivity at the School's New Bolton Center campus. In 2007, he raised funds to organize an international symposium at Penn entitled Veterinary Public Health in a Global Economy. The goal of the conference was to introduce veterinary students to careers in global health, specifically in global food security. The proceedings of the Conference were published by Penn Press in 2008. Drs. Smith and Kelly are Co-Editors. In 2011, Kelly co-developed the course Veterinary Medicine and Global Food Security. The course covers broad topics of food security and included lectures from faculty in seven other schools at Penn. In 2012, this course was repeated as a four-credit undergraduate course for the Ben Franklin Scholars program.

**Raj Khosla**

*Professor of  
Precision Agriculture  
Colorado State University*

Raj Khosla is a Professor of Precision Agriculture at Colorado State University. Currently, he is serving as the Senior Science Advisor at the U.S. Department of State where he is the U.S. lead on the Policy Partnership on Food Security in the APEC region. He was chosen as the 2012 Jefferson Science Fellow by the National Academy of Sciences. In 2011, Khosla was appointed by NASA to the U.S. Presidential Advisory Committee on Positioning, Navigation, and Timing to work on the space-based PNT policy. In 2009, he was named the Colorado State University Distinguished Monfort Professor. In addition, Khosla is an Adjunct Scientist/Visiting Professor at the National Engineering Research Center for Information Technology in Agriculture (NERCITA), in Beijing, China. Khosla's main focus has been on "management of in-field soil and crop spatial variability using innovative geo-spatial and IT technologies for precision management." He has generated many discoveries in precision agriculture, most widely recognized among them is the innovative technique of quantifying variability of spatially diverse soils using satellite based remote-sensing to create management zones, which is currently being used by farmers in Colorado, across the United States, and in other countries around the world. He currently has projects in China, India, Saudi Arabia, Malaysia and the United States, and is championing efforts to enhance crop input use efficiency, productivity, profitability, and sustainability of large- and small-scale agricultural production systems. Khosla has co-authored over 300 publications and was been recognized with numerous national and international awards. He is a Fellow of the American Society of Agronomy, Fellow of Soil Science Society of America, and Fellow of Soil and Water Conservation Society, and is the Founder and Past-President of the International Society of Precision Agriculture.

**Marina Khoury**

*Partner  
Duany Plater-Zyberk  
& Company (DPZ)*

Marina Khoury is a Partner at Duany Plater-Zyberk & Company (DPZ) and has been Director of its Washington, DC office since 2007. She is a licensed architect with twenty years of professional practice. As Project Director of DPZ's new town and urban redevelopment plans throughout the United States, Canada, Europe, and the Middle East, she has extensive national and international experience in traditional neighborhood development and form-based coding. She was the Project Director for Miami 21 and was instrumental in transforming the City of Miami's use-based zoning code into the largest-known adoption of a form-based code. Having lived in Florida until 2007, Khoury served in a number of community leadership positions. She became the first female architect appointed to the City of Miami's Urban Development Review Board in 2001. She taught as an Adjunct Professor at the Design and Architecture High School (DASH) from 1993-99 and was a member of their Advisory Board from 2000-07. She is an active member of the Congress for the New Urbanism (CNU), and has been a Board member of the CNU-DC chapter from 2007-12. She currently serves on the following Boards: the Resource Council for the Form-Based Code Institute (FBCI), the Center for Applied Transect Study (CATS), and the Transect Codes Council (TCC). She is a member of the New Urban Guild and a LEED Accredited professional. She earned two masters degrees, in architecture and urban planning, from the University of Wisconsin-Milwaukee which she earned after attending the "Ecole Speciale D'Architecture" in Paris, France. She speaks widely on issues related to creating affordable, sustainable, and walkable communities.

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**Katrin Kuhlmann***President  
TransFarm Africa*

Katrin Kuhlmann is President of TransFarm Africa and a fellow with the Aspen Network of Development Entrepreneurs, where she chairs a Legal Working Group for the social enterprise sector. She is Director of the U.S.-Africa Business Center and a Senior Advisor at the Corporate Council on Africa. She is also a Wasserstein Public Interest Fellow at Harvard Law School and a member of the Advisory Board of the Harvard Law and International Development Society. She serves on the boards of the Washington International Trade Association and the Malaika Foundation. She was previously a Senior Fellow and Director at the Aspen Institute and a Transatlantic Fellow at the German Marshall Fund. She has held other senior positions in the nonprofit sector, including as President of the Trade, Aid and Security Coalition and Senior Vice President of the Women's Edge Coalition. Her work focuses on an opportunity-driven, market-led approach to trade, development and investment policy and on addressing policy and legal barriers faced by entrepreneurs. Prior to joining the non-profit sector, Kuhlmann served for six years as the Director for Eastern Europe and Eurasia in the Office of the U.S. Trade Representative (USTR) where she was responsible for developing and coordinating U.S. trade policy with Russia, Eastern Europe, the Caucasus and Central Asia. She has also practiced law in New York and Washington, DC. Kuhlmann holds degrees from Harvard Law School and Creighton University, and she was the recipient of a Fulbright grant in 1992.

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**Shiriki Kumanyika***Professor of Epidemiology,  
Department of Biostatistics  
and Epidemiology,  
Perelman School of Medicine  
University of Pennsylvania*

Shiriki Kumanyika is Professor of Epidemiology (Department of Biostatistics and Epidemiology and Department of Pediatrics (Gastroenterology, Section on Nutrition), and the Associate Dean for health promotion and disease prevention at the University of Pennsylvania Perelman School of Medicine. She was the founding director of Penn's Master of Public Health program, serving in this role from the program's inception in 2002 until May of 2007. From 2008–11 she was Vice Chair of the Secretary's Advisory Committee for Healthy People 2020 Objectives. She currently chairs the Institute of Medicine's (IOM) Standing Committee on Childhood Obesity Prevention, co-chairs the International Obesity Task Force of the International Association for the Study of Obesity, and is a member of the World Health Organization's Expert Panel on Nutrition. Kumanyika's research focuses on ways to reduce diet-related chronic disease risks, particularly in African Americans. She founded and chairs the African American Collaborative Obesity Research Network (AACORN—[www.aacorn.org](http://www.aacorn.org)), a national network that seeks to improve the quantity, quality, and effective translation of research on weight issues in African American communities. Her current research is funded by the NIH, the Robert Wood Johnson Foundation, and the Aetna Foundation. She has published extensively in the scientific literature and lectured widely within the United States and abroad.

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**John Landis***Crossways Professor  
and Chair, City and  
Regional Planning  
School of Design  
University of Pennsylvania*

John Landis is the Crossways Professor and Chair of the Department of City and Regional Planning at the University of Pennsylvania's School of Design. Landis' research interests span a variety of urban development topics; his recent research and publications focus on growth management, infill housing, and the geography of urban employment centers. Together with several generations of PhD students, Landis developed the California Urban Futures series of urban growth models. He is currently engaged in a National Science Foundation-funded project to model, forecast, and develop alternative spatial scenarios of U.S. population and employment patterns and their impacts on travel demand, habitat loss, and water use through 2050. Prior to arriving at Penn in 2007, Landis was on the planning faculties of the University of California, Berkeley (1987–2007), Georgia Tech (1985–1986), and the University of Rhode Island (1983–1984). He serves on the editorial boards of the *Journal of the American Planning Association* and he is a member of the Urban Land Institute and the American Planning Association.

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**Laura Lawson**

*Professor and Chair,  
Department of  
Landscape Architecture  
Rutgers University*

Laura Lawson is Professor and Chair in the Department of Landscape Architecture at Rutgers, the State University of New Jersey. Her research includes historical and contemporary community open space, with particular focus on community gardens and the changing roles of parks in low-income communities. She is author of *City Bountiful: A Century of Community Gardening in America* (University of California Press, 2005) and co-author, with Jeff Hou and Julie Johnson, of *Greening Cities, Growing Communities: Urban Community Gardens in Seattle* (University of Washington Press, 2009). She received her doctorate in environmental planning and her master's of landscape architecture from the University of California, Berkeley.

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**Yael Lehmann**

*Executive Director  
The Food Trust*

Yael Lehmann currently serves as Executive Director of The Food Trust, a nonprofit founded in 1992, which strives to make healthy food available to all. The Food Trust's work has been recognized by First Lady Michelle Obama, and described by Time Magazine as being a "remarkable success." The Food Trust has been the recipient of many national and local awards including the Human Rights Award for a Nonprofit Organization from the Philadelphia Commission on Human Relations for fostering intergroup harmony and cultural understanding among communities. Before becoming Executive Director of The Food Trust in 2006, Lehmann served as Associate Director and Deputy Director since 2001. In her tenure at The Food Trust, she has directed the growth of the organization's farmers' markets, nutrition education programs, food retail development initiatives, and other programs to promote access to affordable, nutritious food in low-income communities. Lehmann has a bachelor's degree from the University of California at Berkeley and a master's degree from the University of Pennsylvania's School of Social Policy and Practice.

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**William Martin**

*Research Manager,  
Agriculture and Rural  
Development, Development  
Research Group  
The World Bank*

William Martin is Research Manager, Agriculture and Rural Development, in the Development Research Group at the World Bank. He obtained his first degrees from the University of Queensland and the Australian National University, and master's and PhD degrees from Iowa State University. Before joining the World Bank, he worked as a Researcher and Manager at the Australian Bureau of Agricultural and Resource Economics, and as a Senior Research Fellow at the Australian National University. He has published extensively on agricultural trade policy and developing countries, with a particular focus on the World Trade Organization and economic development. He has published widely using quantitative models such as the Global Trade Analysis Project, and has a particular interest in using detailed data to build up a complete picture of the effects of policies on welfare impacts at national and household levels.

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**Gordon McGranahan**

*Principal Researcher,  
Human Settlements Group  
International Institute  
for Environment and  
Development (IIED)*

Gordon McGranahan is Principal Researcher in the Human Settlements Group at the International Institute for Environment and Development (IIED). He received his PhD in Development and Economics at University of Wisconsin, Madison. Before coming to IIED, he worked for two years each at Brookhaven National Laboratory and the World Bank, and went on to spend the 1990s at the Stockholm Environment Institute, leading their Urban Environment Programme. He works on a range of urban environmental issues, with an emphasis on addressing poverty and environmental problems in and around the home, and researching how the critical scale of urban environmental burdens changes as cities become wealthier. He was the convening lead author of the Urban Systems chapter of the Millennium Ecosystem Assessment. McGranahan has co-authored publications specifically on urbanization and food security, including: *Urbanization and Food Prices: Technical Briefing* (IIED and UNFPA, 2011), and “Urbanization and its implications for food and farming” (with Satterthwaite and Tacoli) in *Philosophical Transactions of the Royal Society B-Biological Sciences* (2010), and “Is urbanization contributing to higher food prices?” (with Stage and Stage) in *Environment and Urbanization* (2010).

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**Marcus Moench**

*President  
Institute for Social  
and Environmental  
Transition (ISET)*

Marcus Moench is President of ISET-International and has extensive experience working with communities, non-government, government, and international organizations on water, energy, and forest management in South Asia, the Middle East, and the Western United States. He combines a strong technical background in environmental science, hydrogeology and forestry with training and experience in the design and initiation of management institutions. He led the India Water Sector Review, Groundwater Component and Yemen Decentralized Management Study for the World Bank. Moench received his PhD from the University of California at Berkeley in 1989. He has published numerous articles and papers on natural resources management.

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**Kevin Morgan**

*Professor of Governance  
and Development,  
School of Planning  
and Geography  
Cardiff University*

Kevin Morgan is Professor of Governance and Development in the School of Planning and Geography at Cardiff University. One of his main research interests is sustainable food systems and the role that the planning community can play in fostering such systems in the cities of the Global North as well as the Global South. Over the past ten years he has focused on three aspects of the food system: (i) the public food system, where he explored school food service in Europe, Africa, and North America; (ii) the community food sector, where he was part of a team that explored the effects of the Making Local Food Work programme in the UK; and (iii) the urban food system, where he is part of a team at Cardiff University exploring the scope for and limits to sustainable urban food strategies. In addition to his academic research, he is actively involved in food policy activities, being a member of the UK Food Ethics Council, the chair of the Bristol Food Policy Council, and a member of Food and Farming Advisory Panel of the Welsh Government. Under the auspices of the Association of European Schools of Planning (AESOP), he is also trying to animate an urban food policy dialogue between planning associations in Africa, Europe, and North America.

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**Howard Neukrug**

*Water Commissioner  
City of Philadelphia*

Howard Neukrug is Chief Executive of Philadelphia's Water Utility and is responsible for providing safe and affordable drinking water and integrated wastewater and stormwater services to over 2.3 million people. Neukrug is a national leader for urban sustainability and the creator of Philadelphia's Green City, Clean Waters program. He is a Professional Engineer, Board Certified Environmental Engineer and a graduate in Civil and Urban Engineering from the University of Pennsylvania, where he currently teaches a course on Water, Science, and Politics.

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**Eric Olsen**

*Senior Vice President,  
Government Relations  
and Public Policy  
Feeding America*

Eric Olsen is the Senior Vice President of Government Relations and Public Policy at Feeding America, the nation's largest hunger relief organization. He is responsible for the coordination of all resources and research on issues of domestic hunger, public policy, and related topics for Feeding America public policy initiatives, publications, and public education activity. Additionally, he represents Feeding America at governmental and legislative forums, hearings, and other initiatives where Feeding America network food banks show their support for legislation and policy that will bring about positive change in the fight against hunger. Over the course of his career, he has worked on food and agricultural policy issues for more than twenty-five years. Prior to his role at Feeding America, he was Vice President of Corporate Affairs and Public Policy at Mars, Inc. He has seven years of experience working for the Secretary of Agriculture in the Clinton Administration, including the role of Chief of Staff, and was a partner at Patton Boggs, LLP, where he represented food, nonprofit, and agribusiness clients on a variety of policy issues, including nutrition. He holds a juris doctorate from the University of Minnesota Law School and a bachelor's of arts degree from the University of Minnesota.

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**Eric Orts**

*Professor of Legal Studies  
and Business Ethics  
and Management;  
Director, Wharton  
Initiative for Global  
Environmental Leadership  
University of Pennsylvania*

Eric Orts is the Guardsmark Professor at the Wharton School of the University of Pennsylvania. He is a Professor in the Legal Studies and Business Ethics Department with a joint appointment in the Management Department. He directs the Initiative for Global Environmental Leadership (IGEL) at Penn/Wharton. He serves also as an academic co-director of the FINRA at Wharton certificate program for securities compliance and regulatory professionals. His primary research and teaching interests are in environmental law and policy, corporate governance, and professional ethics. His scholarly work is widely published in academic journals (mostly law reviews) and books. Prior to joining Wharton's faculty in 1991, Orts practiced law at Paul, Weiss, Rifkind, Wharton & Garrison in New York City and was a Chemical Bank fellow in corporate social responsibility at Columbia Law School. He is a graduate of Oberlin College (BA), the New School for Social Research (MA), the University of Michigan (JD), and Columbia University (JSD). He is a member of the bar of New York and the District of Columbia, an elected member of the American Law Institute, and belongs to a number of other professional and academic associations.



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**Katherine Ozer**

*Executive Director  
National Family  
Farm Coalition*

Kathy Ozer is Executive Director of the National Family Farm Coalition, where she has worked on farm, rural, and fair trade policy for over twenty years. In the mid-1980s she worked for the United States Student Association (USSA) on education access issues. She is on the board of the Citizens Trade Campaign and Jobs with Justice and has worked closely on policy issues with the Community Food Security Coalition. Since 1999, she has been part of the farmer delegations at the WTO in Seattle and Cancun and at the United Nations. Her current work addresses the credit and global food crisis, holding onto farmer wins to restore fairness and competition in farm and food policy, and efforts to address the ongoing dairy farmer crisis. Kathy received her BA in Economics from the University of Massachusetts/Amherst and lives in Washington, DC.

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**Neal Peirce**

*Chairman  
The Citistates Group*

Neal Peirce is a syndicated columnist for the *Washington Post* and the chairman of the Citistates Group, America's only journalist team focused first and foremost on metropolitan regions. With Curtis Johnson, he has co-authored the Peirce Reports (now called Citistates Reports), a publication focused on compelling issues of metropolitan futures for leading media in twenty-five regions across the nation. Recent reports include *Boston Unbound*, released in May 2004, and a series on the Charlotte Citistate for *The Charlotte Observer*. He is also a principal author of a major report on approaching global urban challenges, *Century of the City: No Time to Lose*, based on The Rockefeller Foundation's 2007 Global Urban Summit in Bellagio, Italy. His ten-book series on America's states and regions culminated in *The Book of America: Inside 50 States Today* and, more recently, has published *Citistates: How Urban America Can Prosper in a Competitive World*; *Boundary Crossers: Community Leadership for a Global Age*; and *Breakthroughs: Recreating The American City*. Peirce is currently working on the development of Citiscope—a global news website focused on innovations and experiments underway in world cities, on topics ranging from climate change to slum upgrading, water, and food security in order to advance steps to protect against natural disasters.

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**Barry Popkin**

*W. R. Kenan, Jr.  
Distinguished  
Professor of Nutrition  
University of North Carolina  
at Chapel Hill*

Barry M. Popkin, PhD, is the W. R. Kenan, Jr. Distinguished Professor of Nutrition at UNC-CH. He has a PhD in economics and established the Division of Nutrition Epidemiology at UNC. He has developed the concept of the Nutrition Transition, the study of the dynamic shifts in dietary intake and physical activity patterns and trends in obesity and other nutrition-related non-communicable diseases. His research focuses globally on understanding the shifts in stages of the transition and the programs and policies to improve the population's health linked with this transition (see [www.nutrans.org](http://www.nutrans.org)). He is actively involved at the national and global level in policy formulation for many countries, particularly Mexico and China. He has played a central role in placing the concerns of global obesity, its determinants, and its consequences on the global stage and is now actively involved in work on the program and policy side at the national level. He has been an active consultant to an array of international agencies over his career (including the World Bank, WHO, UNICEF, and USAID). He has received a number of major awards for his global contributions (including India's Gopalan Award, UK's Rank Science Prize; U.S.'s Kellogg Prize for Outstanding International Nutrition Research, and The Obesity Society Mickey Stunkard Lifetime Achievement Award). He has published 370 refereed journal articles, is one of the most cited nutrition scholars in the world, and is the author of *The World is Fat* (Avery-Penguin Publishers, 2009).

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**Vincent Price**

*Provost  
University of Pennsylvania*

Vincent Price is Steven H. Chaffee Professor of Communication in the Annenberg School for Communication and Professor of Political Science in the School of Arts and Sciences. In his fourteen-year tenure at Penn, he has served as Interim Provost, Associate Provost for Faculty Affairs, Chair of the Faculty Senate, and Associate Dean of the Annenberg School. He is a leading global expert on public opinion, social influence, and political communication. His *Public Opinion* (Sage, 1992) has been published in six languages and taught in courses around the world. His work has been widely cited on such topics as the impact of political polls, the effects of TV news coverage, and the factors that shape public opinion. His most recent research, conducted with Annenberg colleague Joseph N. Cappella and funded by grants from the Pew Charitable Trusts, National Science Foundation, and National Institutes of Health, explores the increasingly important role of online discussion in shaping public knowledge and opinion. Provost Price earned a PhD (1987) and MA (1985) in Communication from Stanford University, and a BA magna cum laude (1979) in English from the University Honors Program at Santa Clara University. He came to Penn in 1998 from the University of Michigan, where he was Chair and Associate Professor of Communication Studies and a Faculty Associate of the Center for Political Studies. He became Penn's 29th Provost on July 1, 2009.

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**Cecilia Rocha**

*Director, School of Nutrition  
Ryerson University*

Cecilia Rocha (PhD, Economics) is the current director of the School of Nutrition and an Associate Professor of Food Security and Food Policy at Ryerson University, where she is also an Associate Researcher and past Director (2005–2010) of the Centre for Studies in Food Security, and an Associate Researcher of the Centre for Global Health and Health Equity. Her research interests are on assessing the social efficiency of food security initiatives and programs, the role of market failures in food insecurity, and the effectiveness of markets as policy tools. Recognized internationally for her academic work, Rocha has been invited to speak at international meetings, such as the 2009 United Nations High Level Meeting on Food Security for All in Madrid, Spain, and the 2009 Parliamentary Meeting on the Occasion of the World Food Summit in Rome, Italy. From 2004 to 2010, Rocha was the Director of the project Building Capacity in Food Security in Brazil, developed in partnership with the Reference Centre for Food and Nutrition Security in Rio de Janeiro. She has authored some of the key papers on the innovative and pioneering policies and programs in food security in the city of Belo Horizonte, Brazil. Rocha was an active member of the Toronto Food Policy Council from 2006 to 2011, and participated in the development of the Toronto Food Strategy (2009–10). She has conducted research on food security conditions among immigrant populations in Toronto, urban food insecurity in South Africa, and the manifestation of food sovereignty in an indigenous settlement in Brazil. In 2012, she was invited to be part of a distinguished Expert Panel on the State of Knowledge of Food Security in Northern Canada by the Council of Canadian Academies.

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**Roberto Sainz**

*Professor, Department  
of Animal Science  
University of California Davis*

Roberto Sainz is a Professor in the Department of Animal Science at the University of California, Davis and the U.S. Lead on the Brazil-U.S. Consortium in Sustainable Ruminant Livestock Production Systems. Sainz's research focuses on ruminant livestock production across a wide spectrum of levels of detail and research projects in his UC Davis lab range from basic cellular aspects of interactions among nutrition, genetics and physiological state, all the way to regional studies of environmental impacts of different livestock production systems. Sainz received his BS, Animal Science, from Cornell University in 1982, his MS, Animal Science (1984) and PhD, Nutrition (1986) from the University of California, Davis.

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## **Emmy Simmons**

*Co-Chair  
AGree*

Emmy Simmons is Co-Chair of AGree, a nonpartisan initiative funded by major foundations to examine the consequence of food and agriculture policy. She completed a career of nearly thirty years with the U.S. Agency for International Development (USAID) in 2005. In her last three years at USAID, she served as the Assistant Administrator for Economic Growth, Agriculture, and Trade, a presidentially appointed, Senate-confirmed position. From 1991 to 1994, she served in USAID's regional office for east and southern Africa as Supervisory Program Economist. She also served as Supervisory Agricultural Officer for Mali and as Regional Agricultural Advisor for West Africa, in addition to holding a number of supervisory positions in the Africa Bureau in USAID's Washington headquarters. Prior to joining USAID, she worked in the Ministry of Planning and Economic Affairs in Monrovia, Liberia, and taught and conducted research at Ahmadu Bello University in Zaria, Nigeria. She is currently an independent consultant on international development issues, with a focus on food, agriculture, and Africa. She serves on the boards of several organizations engaged in international agriculture and global development, including: the Partnership to Cut Hunger and Poverty in Africa, the International Livestock Research Institute, the International Institute for Tropical Agriculture, the Washington chapter of the Society for International Development, and the Africa Center for Health and Human Security at George Washington University. Simmons Co-Chairs the Roundtable on Science and Technology for Sustainability at the National Academies of Science and leads a Roundtable working group on Partnerships for Sustainability. Simmons began her international career as a Peace Corps Volunteer in the Philippines from 1962 to 1964. She holds an MS in agricultural economics from Cornell University and a BA from the University of Wisconsin-Milwaukee.

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## **Marilyn Sommers**

*Lillian S. Brunner Professor  
of Medical-Surgical Nursing;  
Director, Center for Global  
Women's Health  
University of Pennsylvania*

Marilyn Sommers is the Lillian S. Brunner Professor of Medical-Surgical Nursing at the University of Pennsylvania. She received her bachelors degree in nursing at the University of Pennsylvania, her masters degree in nursing education from New York University, and her PhD in nursing science with a minor in human physiology at The Ohio State University in Columbus, Ohio. She received postdoctoral training as a Faculty Fellow through the National Institute on Alcohol Abuse and Alcoholism from 1990–94 at the University of Cincinnati. Prior to her academic career, Sommers had fifteen years of experience as a staff nurse, clinical nurse specialist, and nurse administrator in the areas of critical care and trauma.

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## **Peter van der Steen**

*Senior Lecturer in  
Environmental Engineering  
UNESCO-IHE Institute for  
Water Education*

Peter van der Steen is lecturer in Waste Water Treatment. He holds a MSc degree from Wageningen University in the Netherlands (1994) and a PhD degree from the Ben Gurion University of the Negev in Israel (2001).

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**James Haig Streeter**

*Landscape Design Practice  
Director, U.S. West  
AECOM*

James Haig Streeter is the Design Practice Director for AECOM's U.S. West Region and is based in San Francisco. Prior to this he received a master's in landscape urbanism from London's Architectural Association, and spent seven years in AECOM's London studio. During this period he led the design of a series of award-winning projects including Pier Head, Liverpool, Westfield London and Education City, Qatar, together with leading key aspects of Blackpool coastal protection and the London 2012 Olympic masterplan. Recent work in the United States has included New York's World Trade Center public realm and San Francisco's preparations for the 34th America's Cup. Before joining AECOM he worked for Peter Walker and Partners, West 8, and Gross Max. His work has been published internationally, and has been guest design critic at the Architectural Association, London; the Graduate School of Design, Harvard; and UC Berkeley.

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**Harry Stokes**

*Director  
Project Gaia, Inc.*

Harry Stokes is a Founder and Director of Project Gaia, Inc. a nonprofit technical and development organization that facilitates the development of alcohol fuels for household energy. As Director of Project Gaia and Principal of Stokes Consulting Group, he has for over two decades provided support to industry, governments, financial institutions, and development organizations on resource management issues, particularly around biofuels. Project Gaia and an associated organization, the Gaia Association, an Ethiopian NGO, have spearheaded projects funded by the Shell Foundation, the USEPA, the World Bank, UNDP, UNHCR, the Nordic Climate Fund, and African governments, as well as corporate and private funders and donors. For its work in the refugee camps of Ethiopia, the Gaia Association won an Ashden Award in 2008, as well as two Energy Globe Awards for Ethiopia, in 2008 and 2011. In 2010, he was recognized by the World Bioenergy Association as runner-up for the First World Bioenergy Award for his efforts to pioneer alcohol fuels for cooking and other household appliance use. In 2012, he won the World Bioenergy Award. He holds a master's in forestry from Duke University, 1974, and served for over two decades in county and local government, with representations on state boards and national committees. He was Chair of the National Association of Counties Energy Sub-committee and Vice Chair in the Land Use, Environment, and Energy Committee. He served at state and county levels in the U.S. Conservation District movement (National Association of Conservation Districts) and USDA Cooperative Extension.

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**John Sugrue**

*Associate and Senior  
Urban Designer  
Skidmore, Owings and  
Merrill LLP (SOM)*

John Sugrue, AIA, is an Associate and Senior Urban Designer at Skidmore, Owings and Merrill LLP (SOM) in San Francisco. His work at SOM involves large-scale city design and urban planning throughout China and Asia. These projects focus on bringing a sustainable framework to urban redevelopment and new transit-oriented developments while maintaining and enhancing local culture and identity to create livable and environmentally responsible cities. Prior to joining SOM, he was a practicing architect in Chicago and New Orleans. He received a master's in urban design degree from University of California, Berkeley and a master's of architecture from Tulane University.

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## Mary Summers

*Senior Fellow, Robert A. Fox Leadership Program; Lecturer, Political Science/Health and Societies, School of Arts & Sciences University of Pennsylvania*

Mary Summers teaches academically based community service courses on the Politics of Food and Agriculture and Healthy Schools. She has worked with community partners to develop several health-related projects including the Coalition Against Hunger's Food Stamp Enrollment Campaign and the West Philadelphia Recess Initiative, which involves Penn students in organizing games at recess as a way to promote exercise and prevent bullying. She was the P.I. for the USDA grant that established the Food Stamp Enrollment Campaign and continues to investigate barriers to food stamp access. Her research interests include institutionally based approaches to service-learning, federal nutrition programs, Farm Bill politics, and the USDA.

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## Marilyn Jordan Taylor

*Dean and Paley Professor, School of Design University of Pennsylvania*

Marilyn Jordan Taylor was appointed as Dean of the University of Pennsylvania's School of Design in October, 2008. In addition to her role as Dean, as Partner in Charge of the Urban Design and Planning Practice at Skidmore Owings & Merrill LLP and the first woman to serve as Chairman of Skidmore Owings & Merrill, she is internationally known for her distinguished and passionate involvement in the design of large-scale urban projects and civic initiatives. Over a thirty-five year career with Skidmore Owings & Merrill, she has led many of the firm's largest and most complex projects around the world. She was also both the first architect and the first woman to serve as chairman (2005–07) of the Urban Land Institute, a nonprofit research and educational institution, where she championed a renewed focus on cities, sustainable communities, and infrastructure investment. She attended the MIT Graduate School of Architecture (1969–70), and received her M. Arch in 1974 from the University of California, Berkeley. She joined Skidmore Owings & Merrill in 1971, in the firm's Washington office, and was elected Partner in 1985. She received a prestigious David Rockefeller Fellowship from the Partnership for New York City in 1995.

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## Joyce Turk

*Senior Livestock Advisor U.S. Agency for International Development (USAID)*

Joyce Turk is Senior Livestock Advisor at the U.S. Agency for International Development's (USAID's) Bureau for Science and Technology, Office of Agriculture, where she develops, supervises, and evaluates global livestock production, health, and research programs, and manages multidisciplinary teams of scientific researchers in the United States and developing countries. She also advises developing country governments on strategies for livestock production, health, and marketing, and conducts policy analyses on livestock marketing issues. She joined USAID in 1980 following her service as a livestock advisor in the U.S. Peace Corps, Philippine Islands. She enjoyed three years in the former Sudan overseeing a multilaterally funded agricultural research project that built livestock research stations and trained staff in North and South Kordofan and Darfur states. Turk has been the primary organizer and chair of the Inter Agency Donor Livestock Group comprised of livestock representatives from the EU, BRIC, Japanese, and Australian governments, and the domestic Global Livestock Discussion Group which meets periodically to promote communication and networking among organizations that support international livestock development. She also represents the U.S. Government at European Union, United Nations, and other international venues. Turk attained a BS in Animal Science from The Ohio State University and an MS in Animal Science (ruminant nutrition) from Cornell University. She has been a multi-year recipient of USAID Meritorious Performance Awards.

**David Vaccari**

Director, Department  
of Civil, Environmental  
and Ocean Engineering  
Stevens Institute of  
Technology

David Vaccari is a Professor of Environmental Engineering and Director the Department of Civil, Environmental and Ocean Engineering at Stevens Institute of Technology in Hoboken, NJ. He has bachelor's, master's, and PhD degrees in environmental science, and a master's degree in chemical engineering, all from Rutgers University. He is a licensed professional engineer, and a specialist in the modeling and control of biological wastewater treatment and in modeling the fate and transport of pollution in rivers and streams. This work has led him to develop new methods for nonlinear time series analysis in a wide range of applications. His work in pollution control and in long-term life support systems for NASA led him to an interest in phosphorus resources, for which he is engaged in modeling material flow analyses and in forecasting resource supply and demand. He is author of the textbook *Environmental Biology for Engineers and Scientists* published by John Wiley. He has been prominent on the educational front, currently as a member of the Board of Directors of ABET Inc., the engineering accreditation organization. He recently won the Wiley/AEESP award for outstanding contribution to environmental engineering and science education, and the American Council of Engineering Companies of New Jersey Educator-of-the-Year Award.

**Domenic Vitiello**

Assistant Professor,  
Department of City and  
Regional Planning,  
School of Design  
University of Pennsylvania

Domenic Vitiello helps lead the Community and Economic Development concentration. He teaches courses on strategic planning, food systems, immigration, and urban history. He also teaches for Penn's Urban Studies Program (<http://urban.ssc.upenn.edu>) and is a senior fellow of Penn's Center for Public Health Initiatives ([www.cphi.upenn.edu](http://www.cphi.upenn.edu)). Trained as a planner and historian, his research focuses on community and economic development institutions, migration, and urban agriculture. His historical scholarship includes books on the economic development and decline of Philadelphia. As a practitioner, He has worked with public, private, and third sector organizations in community development and food system planning. He has served as founding president of the Philadelphia Orchard Project ([www.phillyorchards.org](http://www.phillyorchards.org)); board chair of JUNTOS/Casa de los Soles ([www.vamosjuntos.org](http://www.vamosjuntos.org)) and on the boards of the African Cultural Alliance of North America ([www.acanaus.org](http://www.acanaus.org)), and the Society for American City and Regional Planning History ([www.dcp.ufl.edu/sacrph](http://www.dcp.ufl.edu/sacrph)).

**Susan M. Wachter**

Richard B. Worley Professor  
of Financial Management,  
Wharton School;  
Co-Director, Penn IUR  
University of Pennsylvania

Susan M. Wachter is the Richard B. Worley Professor of Financial Management at The Wharton School and Professor of City and Regional Planning at PennDesign. She is the Co-Director of the Penn Institute for Urban Research, along with Eugénie Birch with whom she edited the volume *Growing Greener Cities* (Penn Press, 2008). As Assistant Secretary for Policy Development and Research at HUD from 1998 to 2001, she was responsible for national housing and urban policy. During that time she served as a member of the White House Interagency Taskforce on Livable Cities and directed the Partnership for Advancing Technology in Housing for the development of sustainable design in housing. In addition, Wachter is the Founder and Director of the Wharton GIS Lab and the Wharton Geospatial Initiative. The author of over 100 articles, she is a past President of the American Real Estate and Urban Economics Association and past Editor of *Real Estate Economics*.

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**Caitlin Welsh**

*Foreign Affairs Officer  
Office of Global Food Security  
U.S. Department of State*

Caitlin Welsh is a Foreign Affairs Officer in the Secretary's Office of Global Food Security (S/GFS) at the U.S. Department of State. She assists in the coordination of all aspects of U.S. diplomacy related to food security and nutrition, particularly in African countries. Her portfolio covers the U.S. global hunger and food security initiative, Feed the Future, and aspects of global donor coordination and accountability, including under the \$22 billion L'Aquila Food Security Initiative (AFSI), the Global Agriculture and Food Security Program (GAFSP), and the G-8 New Alliance for Food Security and Nutrition. She was a Presidential Management Fellow at the U.S. African Development Foundation and served as a Peace Corps volunteer in Morocco. Welsh holds an MPA from Columbia University School of International and Public Affairs and a BA from the University of Virginia. She speaks Arabic and French.

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**Peter White**

*Private Agribusiness  
Consultant*

Peter White has, over the past twenty-five years, worked with international commercial banks (Citibank, HSBC) and development agencies (IFC, World Bank, USAID, U.S. Peace Corps), promoting and financing private sector investments in emerging markets. While his experience spans numerous global markets, including China, India, and Turkey, his particular regional focus is West Africa, which is home today to 300 million people and will see its food consumption double over the coming two decades. Most recently, he was responsible for IFC's Agribusiness investment program in West and Central Africa, based in Accra. He has lived and worked extensively in both English- and French-speaking Africa. He currently consults for the World Bank Group and others and is a frequent speaker on agribusiness investment, trade policy, and food security. He has written or collaborated on publications analyzing the challenges and cost implications of intra-regional trade (West Africa), marketing of food staples, and accessing credit for SME and larger scale investment. Peter is an MBA graduate of the University of Pennsylvania.

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**Malik Yakini**

*Executive Director  
Detroit Black Community  
Food Security Network  
(DBCFSN)*

Malik Kenyatta Yakini is an activist and educator committed to freedom and justice for African people in particular and humanity in general. He is a founder and the Executive Director of the Detroit Black Community Food Security Network, which operates a seven-acre farm in Detroit. DBCFSN also spearheaded efforts to establish the Detroit Food Policy Council, which Yakini chaired from December 2009–May 2012. He served as a member of the Michigan Food Policy Council from 2008–10. He serves on the steering committee of Undoing Racism in the Detroit Food System. From 1990–2011 he served as Executive Director of Nsoroma Institute Public School Academy, one of Detroit's leading African-centered schools. In 2006 he was honored as "Administrator of the Year" by the Michigan Association of Public School Academies. He served as a member of the Board of Directors of Timbuktu Academy of Science and Technology from 2004–11. He is CEO of Black Star Educational Management. Yakini is dedicated to working to identify and alleviate the impact of racism and white privilege on the food system. He has an intense interest in contributing to the development of an international food sovereignty movement that embraces Black farmers in the Americas, the Caribbean, and Africa. He views the "good food revolution" as part of the larger movement for freedom, justice, and equality. Yakini is featured in the book *Blacks Living Green*, and the movie *Urban Roots* and is currently an Institute for Agriculture and Trade Policy Food and Community Fellow.

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- Malik Yakini, *Detroit Black Community Food Security Network (DBCFSN)*, 25, 54–55, 79

# PART III: PHOTOGRAPHY EXHIBITION

A juried photography exhibition accompanied the *Feeding Cities: Food Security in a Rapidly Urbanizing World* conference. The exhibition showcased images that illuminate the complex systems of food production, distribution, consumption, and nutrition in the face of urbanization, climate change, and population growth.

Penn IUR, in partnership with a university-wide faculty steering committee, organized the exhibition. An interdisciplinary jury evaluated all submissions, selected works to be included, and awarded prizes. Jury members included Joshua Mosley, curator; Laura Zarrow, The Innovation Group at Wharton; James Ferguson, School of Veterinary Medicine; Anu Vedantham, The Wexigle Information Commons; Domenic Vitiello, School of Design, School of Arts and Sciences; Carolyn Cannuscio, Perelman School of Medicine; and Lisa Mitchell, School of Arts and Sciences, South Asia Studies. ▶



### THE PRIZE-WINNING SUBMISSIONS

Catherine Brinkley's *Beak Trimmed Chicken* (above: Outstanding Submission, Food Production); Jacob Rivkin's *Cans* (top right: Outstanding Submission, Food Distribution); and Serena Stein's *Walls* (bottom right: Outstanding Submission, Food Consumption/Nutrition).



### FEEDING CITIES PHOTO EXHIBITION SUBMISSIONS

Column 1: Ryan Littman-Quinn, Night Market; Ayasha Guerin, Über Lebenskunst; Daniel Muscovici, Traditional Fish Boil; Jarret Stein, Interviews: Rebel Gardeners.

Column 2: Laurel Redding, Nepali Food Cart; Laurel Redding, Chips and Feed; Ellen Neises, Lettuce Shank Design; Swaroop Rao, City Green.

Column 3: Melissa Levin, Crop Duster; Daniel Muscovici, Fruit Market; Jin Lee, Cook.



Column 4: Ayasha Guerin, Allmende-Kontor; Daniel Muscovici, Namdaemun Market; Jacob Rivkin, Pots and Baskets; Ellen Neises, Food Preferences of Broccoli Eaters.

Column 5: Cristina Hutchinson, Gather and Distribute; Ellen Neises, Sprinklers and Seed; Mara Gordon, I'm Lovin' It; Ryan Littman-Quinn, Harare Heaps.

Column 6: Emily LaDue, Pelkey's Blueberry Farm; Emily LaDue, Ham, Beans & Salad; Melissa Levin, Mexicali Canal; Laurel Redding, Livestock Auction; Cristina Hutchinson, Buy Local.



**SUSTAINABLE CITIES, SUSTAINABLE FOOD SECURITY, HIGH LEVELS OF HEALTH AND PRODUCTIVITY—TO ME THAT’S NOT AN ASPIRATIONAL GOAL, BECAUSE IF WE DO NOT ACHIEVE THAT GOAL WE ARE GOING TO BE IN BIG TROUBLE AS A WORLD THIRTY OR FORTY YEARS FROM NOW.**

**—EMMY SIMMONS**

# ABOUT THE CONVENERS

**The Penn Institute for Urban Research (Penn IUR)** is dedicated to an increased understanding of cities through cross-disciplinary research, instruction, and civic engagement. As the global human population becomes increasingly urban, understanding cities is vital to informed decision-making and public policy at the local, national, and international levels. Penn IUR develops knowledge in three critical areas: innovative urban development strategies; building the sustainable and inclusive twenty-first-century city; and the role of anchor institutions in urban places. By providing a university-wide forum for collaborative scholarship and instruction, Penn IUR stimulates research and engages with the world of urban practitioners and policymakers.

*For more information, visit [penniur.upenn.edu](http://penniur.upenn.edu).*

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