Urbanization in a Growing World Series

Session 3: Urban Infrastructure

October 11, 2012 1:15-2:45 EDT

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Food Security in an Urbanizing World

Sept 5, 2012
1:15 to 2:45 PM EDT

Moderator: Constantin Abarbieritei
Abt Associates
Division Vice President, International Economic Growth
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- Create Global Public Good
- Build Human and Institutional Capacity
- Strengthen and Grow Partnerships
- Develop Entrepreneurial Capacity

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Constantin Abarbieritei, Abt Associates’ International Economic Growth Division Vice President, oversees a portfolio of projects focused on the links between food security, climate change and private sector development. He has extensive experience working with companies and governments in Southeast Asia, the Middle East, Eastern Europe, and Central Asia to help design and implement economic growth programs. Prior to Abt he has managed international development divisions at IBM and PwC.
Session Agenda

• Introduction to the Panel: Constantin Abarbieritei
• Panel Presentations
  ➢ Charles Godfray, Oxford University: food system dynamics
  ➢ Ed Keturakis, Abt Associates: the four pillars of food security, conceptual framework and analysis
  ➢ Alan Kelly, University of Pennsylvania: sustainable intensification and the importance of context: China, India, and the African continent
• Panel Discussion Questions
  • Michael Kugelman, Wilson Center joins the discussion
• Audience Questions: Send your questions through the chat box
• Summary Points
• Thank you!
  • Please fill out the audience survey
Dr. Charles Godfray, Oxford’s Hope Professor of Zoology and Director of the Martin Programme on the Future of Food, was a Lead Expert in the UK Government Office for Science’s Foresight project, which published *The Future of Farming: Challenges and Choices for Global Sustainability*

Ed Keturakis, an agribusiness specialist and agricultural consultant to USAID, has experience developing projects in over 10 countries and is the lead author of *India’s Potential Best Practices for Food and Nutritional Security*, which assesses the value of many programmatic approaches to food security in India and their potential application elsewhere in the world.

Dr. Alan Kelly, Dean Emeritus, Department of Pathobiology, School of Veterinary Medicine at the University of Pennsylvania and co-editor of *Food Security in a Global Economy*, a volume about public health and veterinary medicine and public health which asks: “Is it possible to feed a burgeoning world population while respecting the welfare of livestock and poultry, containing the spread of disease and managing the Earth’s natural resources?”

Michael Kugelman, co-editor of *The Global Farms Race: Land Grabs, Agricultural Investment, and the Scramble for Food Security*, is the South and Southeast Asia associate at the Woodrow Wilson International Center for Scholars in Washington, DC.
Urban Food Security: Key issues and considerations

Constantin Aarbierreitei
September, 2012
Global Food System Challenges

- Urbanizing population
- Agriculture output volatility – increasing with climate change
- Food price crisis
- Food security as an issue of national security
- Food price “squeeze”
  - In developing countries where agriculture is foundation of economy, high prices help farmers while low prices help consumers—need to balance interests of each group
- Rise in non-communicable consumption-related disease as a public-health threat
  - Obesity, diabetes, etc.
Urbanization Challenges

- Structural shifts characteristic of economic growth
  - >40% of populations of low- and middle-income countries live in urban areas
  - Up to half of populations in mega-cities live in slums

- Relative shift in income sources from agricultural production to manufacturing and services
  - Limited facilities for food preparation and storage
  - Large amounts of time spent in transit to work
  - Limited savings facilities
  - Weak social safety nets due to weaker community ties
Characteristics of Urban livelihoods

- Tradeoffs between production and consumption decisions
  - Significant reliance on markets – the poor have small/no contingency buffer
  - Poor urban (living in slums) – markets mostly informal/street, small, without economies of scale, hygiene and nutrition standards, etc.
  - Urban consumers tend to work for income and use it to purchase foods
  - Agricultural activity for own consumption is relatively costly and mainly a risk management activity
  - Need to economize on food acquisition and preparation expenditures (including time)
  - Large relative expenditures on ready-to-eat (street) foods
Differing Solution Strategies

- Developing country solutions generally focus on rural areas
  - Majority of poor live in rural areas – food security both an income and consumption/nutrition issue
  - From a production/market linkages focus – increasingly added emphasis on access and nutrition through initiatives such as Feed the Future
  - Increased domestic production, coupled with strengthened marketing systems and infrastructure, arguably will enhance urban food security by increasing food supply and reducing prices

- Developed country solutions focus on entitlement (access) and nutritional aspects (utilization)
  - Adequate availability of food at national level and relatively low costs
  - Public entitlement programs predominate
The Challenge of Feeding 9-10 Billion People

Charles Godfray

Department of Zoology & Director, Oxford Martin Programme on the Future of Food
Increasing demand

- Population most likely to peak ~9B

Livestock consumption (FAO 2009)

- People will be richer and demand higher quality diet
- Population increasingly urban
Increased recent food price volatility

- FAO Food Price Index currently near highest value since its inception in 1990
- But still historical low in the rich world

FAO Food Price Index

Updated July 2012

UN Food and Agriculture Organisation 2012
The challenge and food prices

Drivers of change:

- Population and consumption growth
- Competition for water, land, energy
- Climate change

Modelling commissioned by the project

- Partial equilibrium economic models of the food system

Source: IFPRI Nelson et al. (2009)
The challenge and food prices

Drivers of change:

- Population and consumption growth
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Modelling commissioned by the project

- Partial equilibrium economic models of the food system

Source: IFPRI Nelson et al. (2009)
Action needed throughout the food system

- Increase supply
- Moderate demand
- Improve efficiency and governance
- Test changes against
  - Sustainability
  - Needs of poorest
Very limited new land

- Major environmental costs to much land conversion – GHG emissions & biodiversity
- Restoration of agricultural lands a priority

Sustainable intensification

- Increase yields
- Increase input efficiency
- Reduce negative environmental effects
Producing more using existing knowledge

- The yield gap
- Price signal response
- Barriers
  - Social capital: revitalise & remodel extension
  - Invest in economic and physical infrastructure
- Is this all that needs to be done?

Source: Bruinsma (2009)
Innovation to increase production

New knowledge to maintain & increase yields

• Recent trends & time lags

Refocused research

• Yields, sustainability & needs of poor

• Invest in:
  • Biotech (including GM)
  • Neglected subjects (agronomy, agri-ecology, soils)

• Barriers
  • Understand social and economic context of innovation
  • Public/private/third sector co-ordination
Influencing demand

- It is impossible for the world to have a western diet
  - Meat consumption
- Major research issues
  - Footprint of different foods
  - Levers of demand modification
- Empowering consumers to make informed decisions ...
  - Better labelling
  - Facilitate informed debate
- ... and legitimise others to act
  - Legislation & tax
  - Choice editing
Reducing waste

• About 30% of all food produced never consumed
• Post-harvest waste in low-income countries
• Consumer and food service sector waste in high-income countries
• Economics of waste
  • Response to prices
  • Optimum waste
  • Food skills
  • ... but clear gains
Improving governance

- Importance of trade
  - Protection against production shocks
  - Allows exploitation of comparative advantage
- Liberalised trade rules
  - Subsidies and international equity (CAP etc.)
  - Trust in times of crisis
  - Special measures for poorest
  - Introduce sustainability
Key messages

- We are about to go through a phase change in the food system
- Action on supply, demand and governance all needed
- No new land and sustainable intensification
- Food system needs radical and profound change
- We do not have the luxury to be doctrinaire
- We fail on food we fail on everything

Report available at http://www.bis.gov.uk/foresight
See also, Godfray et al. 2010, Science 327, 812-8
Urban Food Security: A Conceptual Framework

Ed Keturakis
September, 2012
Food Security Defined

“The physical and economic access to sufficient, safe and nutritious food that meets (consumers) dietary needs and food preferences for an active and healthy life” - World Food Summit, 1996

- Four pillars generally recognized as underpinning food security
  - Availability
  - Access
  - Utilization
  - Stability
Conceptual Framework

- **Availability (supply)**
  - Refers to the physical supply of food via production, trade (markets) and storage
  - Can be analyzed at several levels such as national, city, community or household.
  - Concerns availability of the volume of sought-after food commodities as well as food quality attributes such as absence of contamination and nutritional value
Conceptual Framework

- Access (demand)
  - Refers to effective demand for food (purchasing power)
  - Can be assessed at the national, household and intra-household levels
  - Factors that affect a consumer’s access to food include income, food prices, and “safety net” programs
Conceptual Framework

- Utilization (preparation, nutrition)
  - Concerns the actual transformation of food into the nutritional benefit received by the consumer
  - Affected by
    - nutritional knowledge
    - preparation practices
    - availability of adequate water and sanitation
    - Food choices also often included in the utilization pillar
  - For example, a lack of clean water for food preparation could increase the risk of contracting an infectious disease that can inhibit the body’s ability to make effective use of a food’s nutritional benefit.
  - A food consumer’s underlying health status is also a factor affecting utilization to the extent that it affects the body’s capacity for digestion.
Conceptual Framework

**Stability**

- Refers to the constancy of the other three dimensions (availability, access and utilization) over time.
- Considers nations’, households’ or consumers’ vulnerability to shocks which might disrupt these.
- Shocks can have various sources:
  - Economic or political sources as in the case of policy changes, macroeconomic shocks (to exchange rates, financial markets or fuel prices), or political instability.
  - Physical sources as in the case of natural or man-made disasters, disease epidemics (such as HIV/AIDS), adverse weather patterns due to climate change, pests and disease outbreaks.
  - Household-level shocks such as loss of employment or sickness or death of a family member.
Analysis: Availability of Food

- Diverse food origins
  - Rural production
  - Imports
  - Urban/peri-urban production
    - Generally focused on high-value ag products, rather than staples
    - Estimates on significance vary broadly
      - One estimate of 15-20% world food supply
      - Estimated at 1% urban Ghana food supply
    - Important risk management role for households
Analysis: Availability

- **Extended traditional distribution systems**
  - “Anonymous” sourcing and long distance traveled for traditional channels
  - Weak (or non-existent) cold chain, traceability, storage and distribution brings food safety and quality issues to forefront
    * Fish preserved with formaldehyde sold in urban areas of Bangladesh
    * Pesticide residues
    * Bacterial contamination
Analysis: Availability

- Modernization of retail transforming entire supply chain
  - Ongoing expansion of modern retail outlets (ex. Supermarkets and hypermarkets)
    - Catalyzes development of retail merchandising, logistics and procurement practices
    - Increases in market share can marginalize traditional distribution outlets
    - Use of contracts, purchases via specialized wholesalers or direct from producers, and with stringent quality standards reduce costs and allow for traceability and quality assurance
    - Competition on price and quality, targeting both high, mid- and low-income consumers
Analysis: Access

- Is food generally more expensive in urban areas than rural (estimated 30%)?
  - Slums lack established marketplaces
  - Higher cost for distribution and increased spoilage.

- Do urban poor pay more than urban wealthy?
  - Issue has been considered in developed countries such as U.S. in context of “food deserts”
  - Need for consideration of issue in developing countries
Analysis: Utilization

- Preparation constrained by living conditions with
  - Limited and costly fuel
  - Little preparation/storage facilities
  - Limited time for preparation

- Greater infectious disease risk due to
  - Poor water and sanitation infrastructure and dense population distribution
  - UPA can be hurt by urban/peri-urban water and industrial pollution (UPA may also contribute to such pollution)

- Different choices and influences on food consumption decisions increase highly processed food consumption

- Greater incidence of non-communicable consumption-related disease (ex. Obesity, diabetes)

- Intra-household distribution of food an important under- and over-nutrition can exist side-by-side in same household
Analysis: Stability

- **Availability**
  - At city-level, more diverse sources, distribution, outlets, can decrease vulnerability to supply shocks
  - Greater (relative to rural) visibility and security-implications (ex. rioting) of food availability interruptions ensures rapid response in times of acute crisis
  - Policies that impede movement of food between regions, etc. can alter this generalization
Analysis: Stability

- **Access**
  - Insecurity of incomes and lack of savings facilities and social safety net make urban poor very vulnerable in terms of access.
  - Food represents a large portion of the household budget in developing countries, raising purchasing power is especially critical to food security. In Bangladesh for example, rice accounts for 30 percent of total household expenditures and 48 percent among the poor (Von Braun, 2007).

- **Climate change issues**
  - Flooding, etc. can affect transmission of infectious diseases.
  - Points to multi-functional role of UPA for environmental integrity in addition to food production.
Opportunities

- How is the urban food security situation in developing countries more hopeful?
  - Availability is generally not an issue
  - The extension of urban infrastructure is generally easier
  - Opportunities for education through multi-media campaigns exists
  - Trained, educated personnel are relatively more available
Conclusion

- Opportunities arise from unique characteristics of urban food systems
  - Concentrated population with access to multiple media outlets opens opportunities for consumer education on nutrition
  - Reliance on specific food outlets can provide channels for innovation, social safety net programs, etc.
    - Ex. Jakarta with nutritious street-food program
  - Diverse communities with diverse nutritional profiles provides opportunities to identify and promote “positive deviants”
  - Concentrated communities create opportunities for community solutions to childcare, food preparation, urban-agriculture, etc.
Food security & the Cities

In the next 40 years the World has to produce as much food as was produced in the past 500 years while accommodating for climate change & limited water supplies

Food security however, is not just about food production
Goals:

• to sustainably intensify agriculture
• improve access to food
• improve the nutritional quality of diets

Challenges:

• Amount of arable land is finite.
• World looses~ 30 M acres agricultural land /yr due to:
  City expansion, contamination, drought & desertification
• Politics of food

Intensification leads to fewer jobs in agriculture
Migration to cities
Growth of slums
What does sustainable intensification look like?
Increasing animal productivity, not animal numbers

<table>
<thead>
<tr>
<th>Country/yr</th>
<th>Yield/cow</th>
<th># milk cows million</th>
<th># heifers million</th>
<th>Total # Cattle million</th>
<th># people/yr supported by 1 cow</th>
<th>Methane emission/gal of milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA 1950</td>
<td>664 gals/yr</td>
<td>22 M</td>
<td>17.6 M</td>
<td>40 M</td>
<td>30</td>
<td>0.0485 lbs</td>
</tr>
<tr>
<td>USA 2010</td>
<td>2,750 gals/yr</td>
<td>9 M</td>
<td>7.2 M</td>
<td>16.2 M</td>
<td>121</td>
<td>0.0158 lbs</td>
</tr>
<tr>
<td>China</td>
<td>667 gals/yr</td>
<td>15 M</td>
<td>12 M</td>
<td>27 M</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>300 ** gals/yr</td>
<td>102 M</td>
<td></td>
<td>304 M*</td>
<td>~ 15</td>
<td></td>
</tr>
</tbody>
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* NDDB Statistics 2012, ** IFCN estimate
Urbanization changes agriculture from subsistence led system to an integrated market driven system.

- Agriculture must supply distant cities using a robust, food supply infrastructure

- Urbanization also changes demand:
  - increased affluence & demand for an improved diet
  - increased consumption of processed foods, high energy but low nutritional value
  - obesity
Changes in total meat and milk production in millions of tons in the developing and developed world 1980 - 2030

<table>
<thead>
<tr>
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<th>Developing world</th>
<th>Developed world</th>
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<tbody>
<tr>
<td></td>
<td>1980</td>
<td>2030</td>
</tr>
<tr>
<td>Meat prod.</td>
<td>45</td>
<td>255</td>
</tr>
<tr>
<td>Milk prod</td>
<td>112</td>
<td>491</td>
</tr>
</tbody>
</table>

The Livestock Revolution

Source, FAO stats
Food Security & China
20% of world’s population.

60% is poor & rural, many small farmers

7% of world’s arable land

7% of the world’s water resources

Avg. farm size = 1/3 acre.

Small farms limit investment & advances in technology

To increase farm size, people are moved off the land

Create more off-farm, urban employment
Industrialized swine & poultry industries

Large production systems, 80% of increase in pork production in last decade from these systems

Commonly in peri-urban location

Urban governments appropriate & sell farm land

Animal, human, & environmental health problems
CHINA is undergoing a super-market revolution
Massive influx of FDI.
Accounts for over 60% of food sales,
Geared to urban middle class
Food is less expensive, safer, uniform quality

Linked to supply chain usually involving large producers

China now has a good transportation infrastructure
Large units are efficient but marginalize small farmers & undermine social structures. In hilly regions ancient terracing provides an efficient system of farming.

Small farmers need to be integrated into an urban food supply systems.
INDIA

- Millions of small farmers, low productivity
  - Average farm size 3.5 acres.
- Govt. goal, expand production of the small farmer & maintain social system.
- Govt. limits farm size to ~20 acres

Largest milk producer in the world.
Amul, India’s largest milk cooperative.
• India should be self-sufficient in the production of food staples.
• GDP and food-grain production has increased faster than population growth over last 50 years
• There should be no food insecurity in India
• But chronic hunger and malnutrition persist on a massive scale
• ~ 50% of children underweight & malnourished
• ~ 21% of adults are malnourished.
• Food for poor unbalanced, entirely focused on cereals & is lacking in micronutrients

• 40% of produce is wasted
  - Due to fragmented distribution system & inadequate storage space.

• Multiple middlemen & high mark-up on food

• Food sold at millions of small Kirana stores

• Limited super-market penetration
• Numerous Govt. initiatives to address problem
• 2011 Govt. voted to permit FDI in supermarkets
  - Wal-Mart, Tesco, Carrefour
  - Cut out middlemen, provide fresher produce, reduce spoilage, reduce price mark-up
• Massive opposition,
• FDI bill tabled
Africa
The world’s most food insecure continent

- 70% of rural & 43% urban population is food insecure
- Failure of agricultural productivity, 80% of soils are degraded
- Migration to cities, rapid growth of slum population
- Vulnerable as high levels of food imports & price fluctuations
- Estimated 65% of the increase in hunger related to climate changes will be in African counties
- By 2020, the number of food insecure people in Africa is projected to exceed 500 million
• African agriculture has to produce more food,
  – International aid focused on increasing productivity of small African farmers
  – Investment needed in infrastructure to supply cities with fresh perishable foods & reduce waste
  – Improve food adequacy, reduce malnutrition & improve health

• Growing #s of supermarkets & consolidation into large scale farming operations
Key Points

• Population growth coupled with loss of arable land leads to the need for intensification
• Intensification can lead to less agricultural jobs
• Context matters: there is no universal solution
  – China has high supermarket penetration, potential for small farmers to connect to distribution system
  – India has resisted supermarkets, the government is focusing on increasing small farm production
  – Many African countries are highly dependent on food imports, aid is focused on productivity
Current Situation

The global food system faces rapid shifts, if not shocks, even without climate change.

How are national governments responding to urban food insecurity, as brought on by commodities inflation, price volatility that leads to food riots, etc.?
Thinking Ahead

The international donor community has traditionally focused on the rural poor in developing countries, but with overall reduced funding rural investments may decline.

How can investment priorities be balanced to optimize the food system?
Top-down approaches sometimes do not have the intended effect in communities and households. Interaction and engagement of the community will affect the desired outcome.

How can investment priority and policy shifts be measured and evaluated in terms of effectiveness in practice?
Audience

Question & Answer Session
• Urban poverty will be “the most significant and politically explosive problem of the 21st century” - World Bank 1990

• Urbanization has changed food systems from subsistence to market-based, making the urban poor more vulnerable to fluctuation

• The food system needs radical and profound change in all aspects of the system, including governance

• Innovation is needed for sustainable intensification

• Efficiency can be increased in each food system pillar

• Opportunities arise from unique characteristics of urban food systems

• Different contexts will require different strategies
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