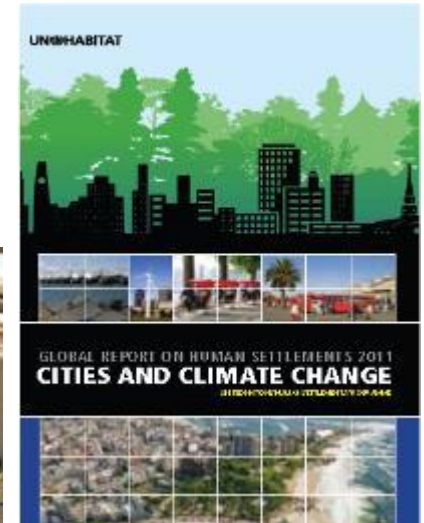


# The Role of Urban and Peri-urban Agriculture in building resilient cities



**IHS: Urban Management Tools for Climate Change**

**Rotterdam, 18 June 2018**

**René van Veenhuizen, RUAF FOUNDATION**

# Programme

- Introduction
- CC and Cities
- Role UPA
- What cities can do



*Questions and Discussion: ongoing !*



# Focus

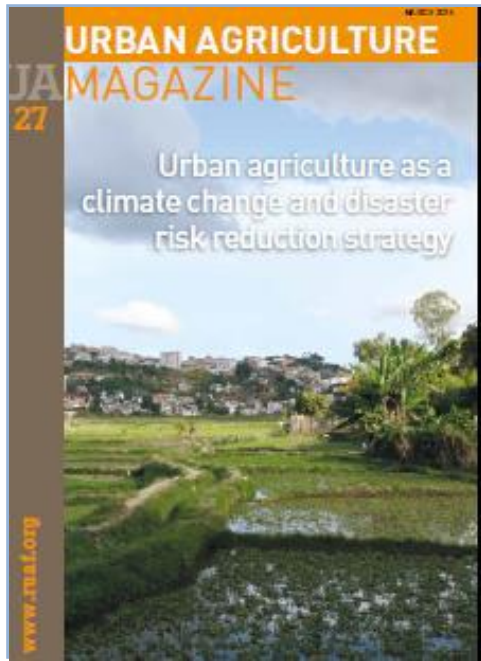
## Cities, Food and Climate Change

- Cities as major contributors
- Cities are directly and indirectly affected (esp. urban poor)
- Cities have important role to play in mitigation and adaptation (and are able to do so)
- Urban and Peri-urban Agriculture and Forestry (UPA) as an important adaptation strategy





# Reports/materials: [www.ruaf.org](http://www.ruaf.org)



Observation of low-lying flood zones for agricultural production (Antananarivo, Madagascar) by M. Duitenberg

## POLICY BRIEF

### Urban agriculture as a climate change strategy

#### Key policy messages

- Climate change impacts on cities are increasing. Cities must embrace the triple challenges of reducing the vulnerability of their population to climate change; of mitigating their GHG emissions and of providing sufficient and nutritious food for their residents.
- There is growing recognition of urban and peri-urban agriculture and forestry as an important strategy for climate-change adaptation and disaster-risk reduction, while also bringing mitigation and important developmental benefits.
- Investments in agriculture and green infrastructure have proven to be more cost-effective than other conventional approaches for climate change adaptation.
- Several cities already promote urban agriculture in floodplains, develop rooftop gardens in dense urban settlements, include urban forestry in new housing schemes and preserve peri-urban greenbelts for local food production.
- In order to build more sustainable and resilient cities, local and national governments need to better link food systems to urban planning agendas and integrate urban agriculture in their climate change strategies.
- Policy participation of all actors in the food chain, from producers to consumers, needs to be enhanced to ensure more relevant, accountable equitable and sustainable strategies.

#### Towards better integration of urban agriculture in climate change strategies

Urbanisation and climate change are closely linked. CO<sub>2</sub> and other greenhouse gasses (GHG) are mainly emitted in urban areas.

Cities, and their sheer number of inhabitants, are at the same time also directly and indirectly affected by climate change. Key issues include rising temperatures, increasing rainfall, flooding and urban food insecurity. Rapid urban growth will only increase the number of highly vulnerable urban communities.

Cities have an important role to play in climate change mitigation and adaptation, while at the same time they need to ensure adequate access to basic urban services such as water, food and energy to their growing populations.

Negative climate change impacts on food production and productive arable lands will impact cities with heavy reliance on food imports. The urban poor will be most affected by disruptions in food supply and increasing food prices.

Different forms of urban and peri-urban agriculture and forestry are being adopted by cities such as Bobo-Dioulasso (Burkina Faso), Rosario (Argentina), Kesbewa (Sri Lanka), Kathmandu (Nepal), Dumangas (Philippines) and New York (USA) to respond to these challenges.

This brief will provide concrete examples and related policy support measures to serve as a source of inspiration.

# RUAF Global Partnership on Sustainable Urban Agriculture and City Region Food Systems

- ✓ Members: Quito, Ghent and Toronto, IWMI, the Chinese Academy of Sciences, the Centre for Sustainable Food Systems, Mazingira and Está
- ✓ Projects and programmes in over 50 cities, since 1999



- Food Security and Social Inclusion;
- Productive Reuse of Wastes / WASH
- Planning Resilient Urban Food Systems
- Short Food Chains, Local Economy
- City Adaptation to Climate Change



Location



Type



Scale



# Diversity of types of Urban & Peri-urban / Near rural Agriculture

Subsistence



Professional/hobby



Individual/collective



Type of market orientation



Institutional/educational





# Urban and peri-urban agriculture

- **Agricultural production** (crops, trees, livestock, fish) **in and around urban areas** for food (vegetables, eggs, milk, meat, ..) and other products (e.g. medicinal and aromatic herbs, fodder, fuel, flowers and ornamental plants, water storage, a/o)....
- And related **inputs supply, transport, processing, marketing** and support services...
- Often combined with **other functions** (recreation, urban greening, recycling of wastes, capturing CO<sub>2</sub>, etcetera), as part of the **urban system**









### **Food System 1.0**

Local, small scale production,  
informality

### **Food System 2.0**

Larger dependence on national and  
global trade, centralized chains



### **Food System 3.0**

Relocalized, resilience, balancing  
rural and urban, multifunctional

# WHAT TYPE OF FOOD SYSTEM DO WE WANT?

# Short Introduction

How and why should food be considered within the climate policies of cities?

<https://www.youtube.com/watch?v=zoBhghBVGhA>

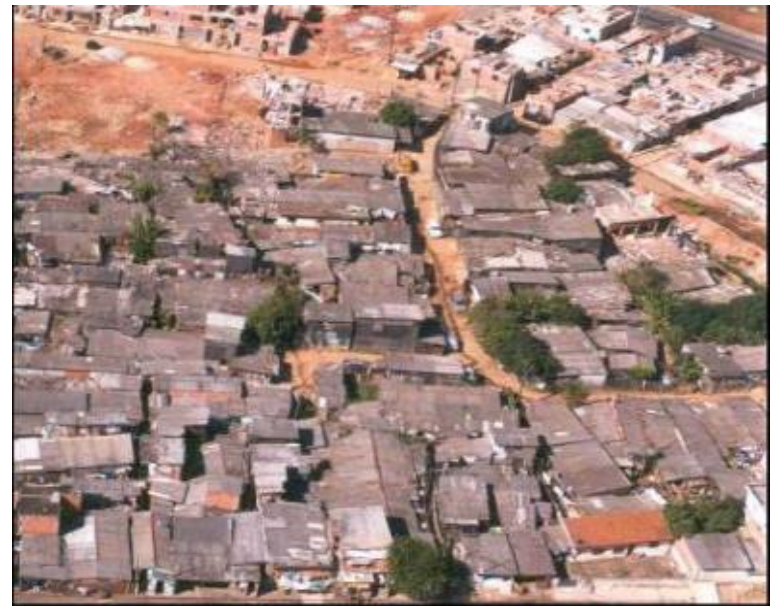
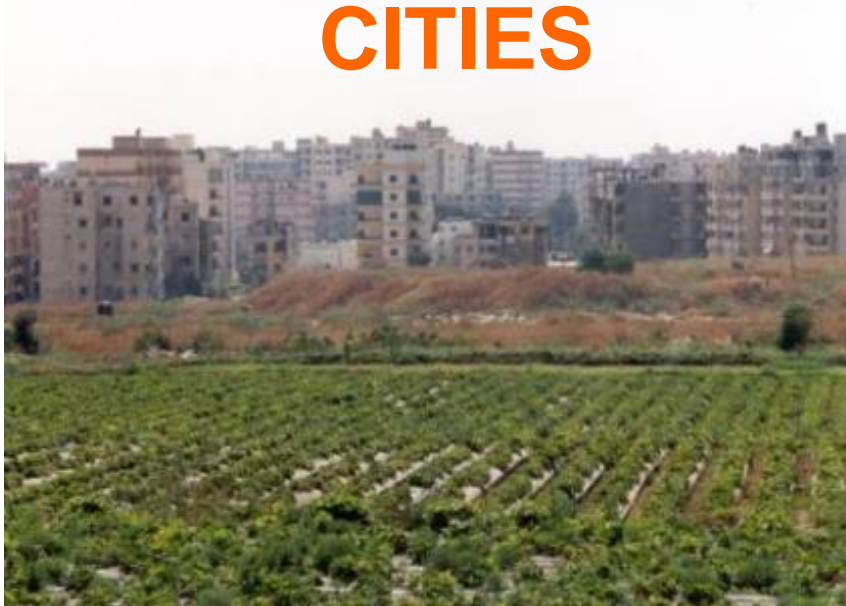
3 minutes

By: UNEP (UN HABITAT, FAO, supported by RUAF)



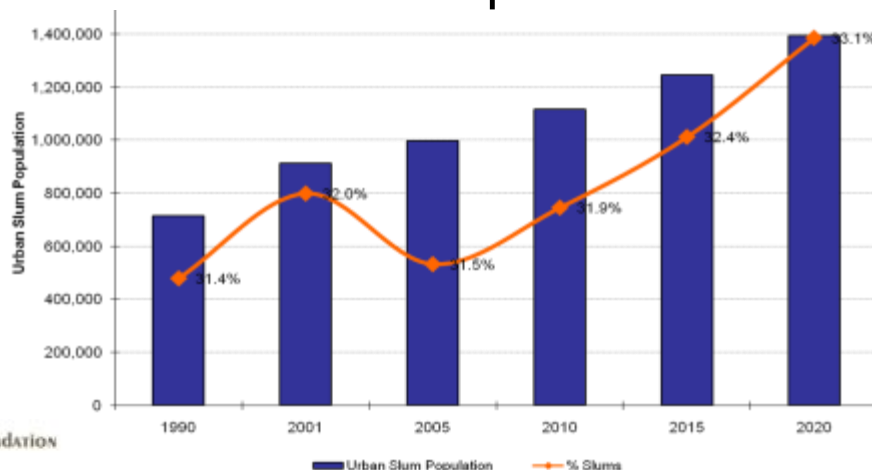


# CITIES



# Increased attention for urban food insecurity

- Since 2008 majority of world population lives in cities
- Urban population to double before 2050
- by 2030, 60% of the world's population will live in cities
- 95% of the urban growth will take place in cities of the South
- Neglect of national investments in rural agriculture; Growing dependence on imported food and macro food retailers; Migration to cities and abroad.
- Shift of poverty to urban areas; High vulnerability of the urban poor to increases in food prices and economic crisis; Decreasing access of urban poor to fresh and nutritious food



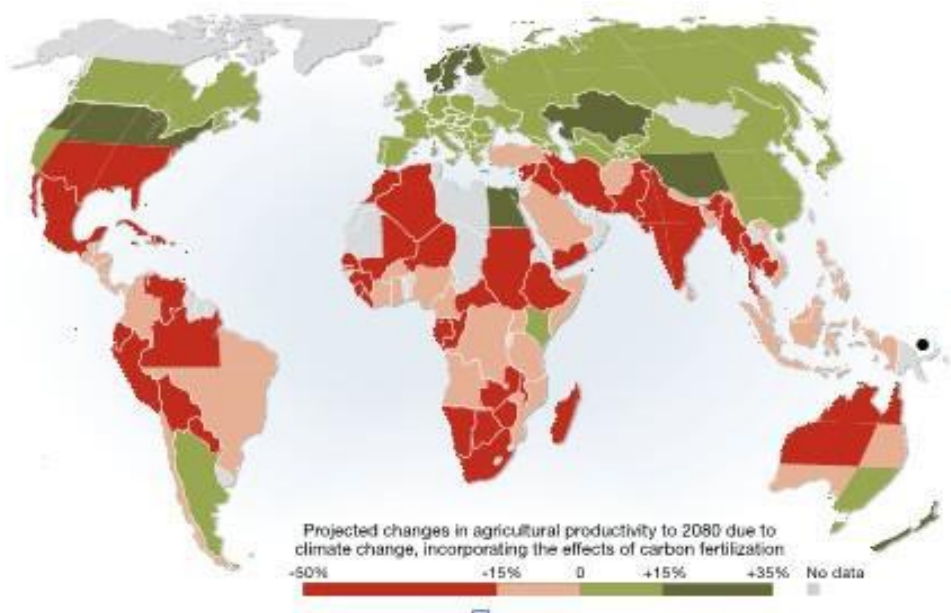




# Climate Change

Increases in means: temperatures, precipitations, sea level

Increases in extremes (more frequent and intense): rains, heat or cold waves, drought, abrupt climate changes



Effects on food supply:

- Lowering production in rural areas
- More frequent / serious disruptions in transport
- Climate refugees



# Cities: are part of the problem; feel the impact, and are part of the solutions



The **contribution** of cities to GHG emissions, and hence climate change



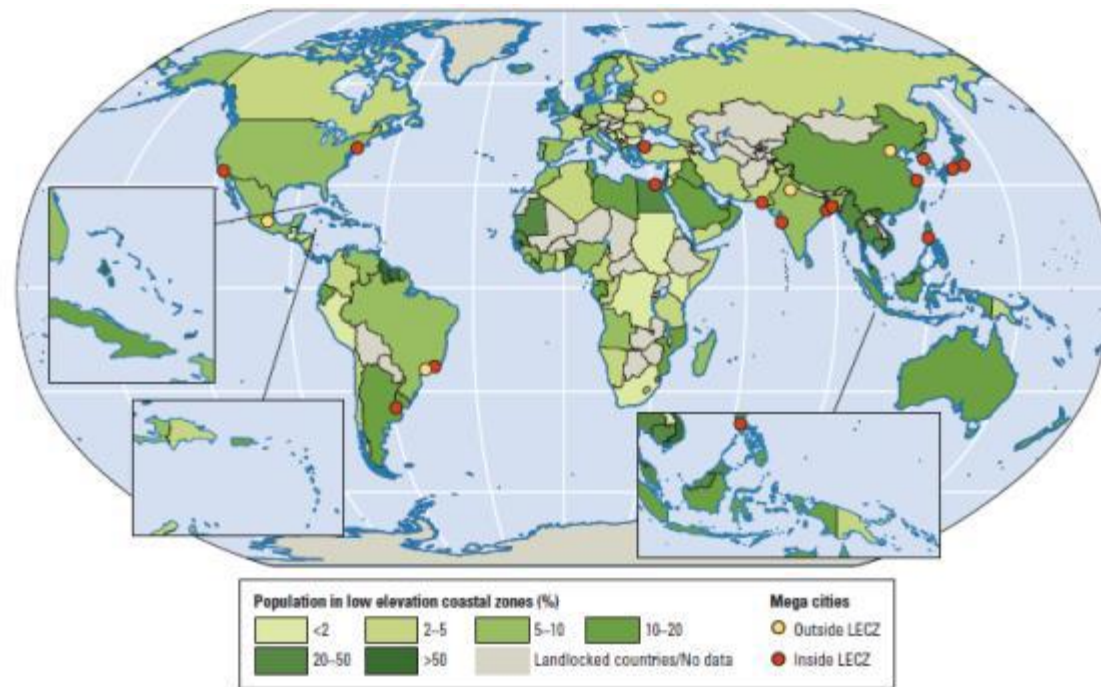
The direct and indirect **impacts** of climate change on cities, and the sheer number of people affected by it

*“Increasingly, food insecurity is one extreme weather event away and **urban centres are highly vulnerable**.*

*In the context of urbanization and agriculture, the role of **cities** is becoming more prominent in creating more **resilient urban food systems** (Statement made at UN General Assembly on Food and Nutrition, 2013).*

## Most affected cities

- **CITIES IN REGIONS WITH HIGH IMPACT:** tropical, sub-tropical eco-systems, arid and water-stressed countries, island states
- **COASTAL CITIES:** all coastal cities, particularly those in deltaic environments, those with high levels of land-reclamation
- **CITIES IN LESS DEVELOPED COUNTRIES:** where institutional resilience, financial resources and technical capacity are scarce





# Impacts of climate change on cities

## DIRECT EFFECTS

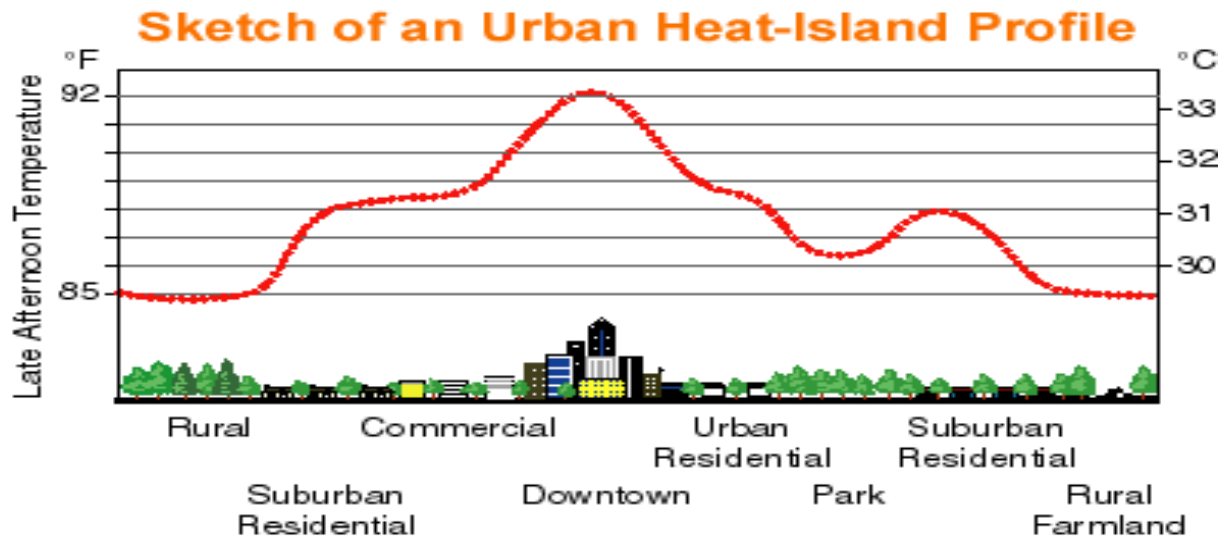
1. In areas with *higher rainfall*: increased risk of **floods** and **landslides**, leading to **human losses**, **damages of infrastructure**, **houses**, **economic losses**, **more poverty** and **epidemics**



# Impacts of climate change on cities

## DIRECT EFFECTS

2. In areas where CC increases *temperatures*: enhanced **urban heat island effect** and **heat waves** leading to **more energy used for cooling and refrigeration**, **more smog and air pollution** and **more health problems/higher mortality**





# Impacts of climate change on cities

## INDIRECT EFFECTS

- CC may **lower agricultural production in the hinterland** due to changes in average temperature or precipitation and more extreme events (storms, floods, droughts, hail)
- **Transport to urban areas may be disrupted** more frequently by storms or floods
- Leading to **higher food prices**
- **Inflow of displaced households** from affected rural areas
- Cities' **fresh water resources** may be negatively affected (quality and quantity)

# Cities are almost exclusively dependent on food imports

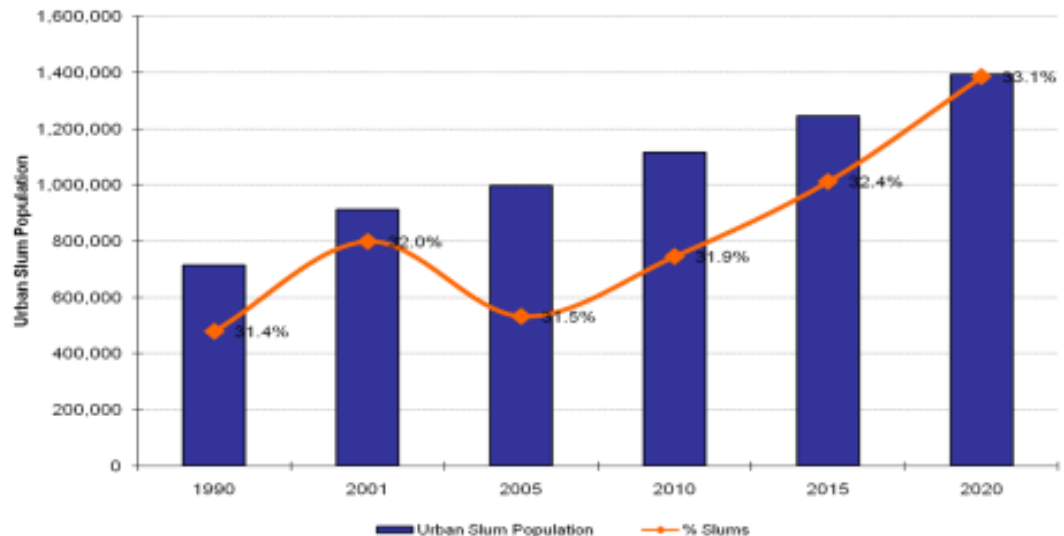
- Cities like London only have a 3-day supply of food
- High vulnerability to food price hikes/changes
- High vulnerability to disruptions in food supply
- Cities are major contributors to GHG emissions (80%), with 25-35% of global emissions related to food





# URBAN POOR ARE AT GREATEST RISK

- Vulnerability due to their **location**: in areas that are **prone to floods or landslides** and with poor housing, sanitation, drainage
- **Low/irregular income; informal jobs**; high vulnerability to changes in food and fuel prices
- Vulnerability due to **poor nutrition and health** of the urban poor
- **Low capacity** of the urban poor to cope with the effects of climate change



## **Need for policy re-orientation**

- Role and responsibility of cities
- From sectoral to territorial policies, seeking synergies and enhance urban – rural linkages.
- From emphasis on increasing production as a rural issue, to include the diversity of urban and rural based production and consumption.
- Include the variety of actors, along formal and informal value chains.
- Address a mix of drivers (economic but also social and environmental: include employment generation in the changing food system).

# **CITY-REGION FOOD AND URBAN AGRICULTURE AND FORESTRY**





# Need for more resilient urban (food) systems

- More resistant to impacts of climate change
- Less dependent on food imports
- Less vulnerable to food price increases
- That enhance access of the urban poor to fresh, nutritious and safe food at affordable prices

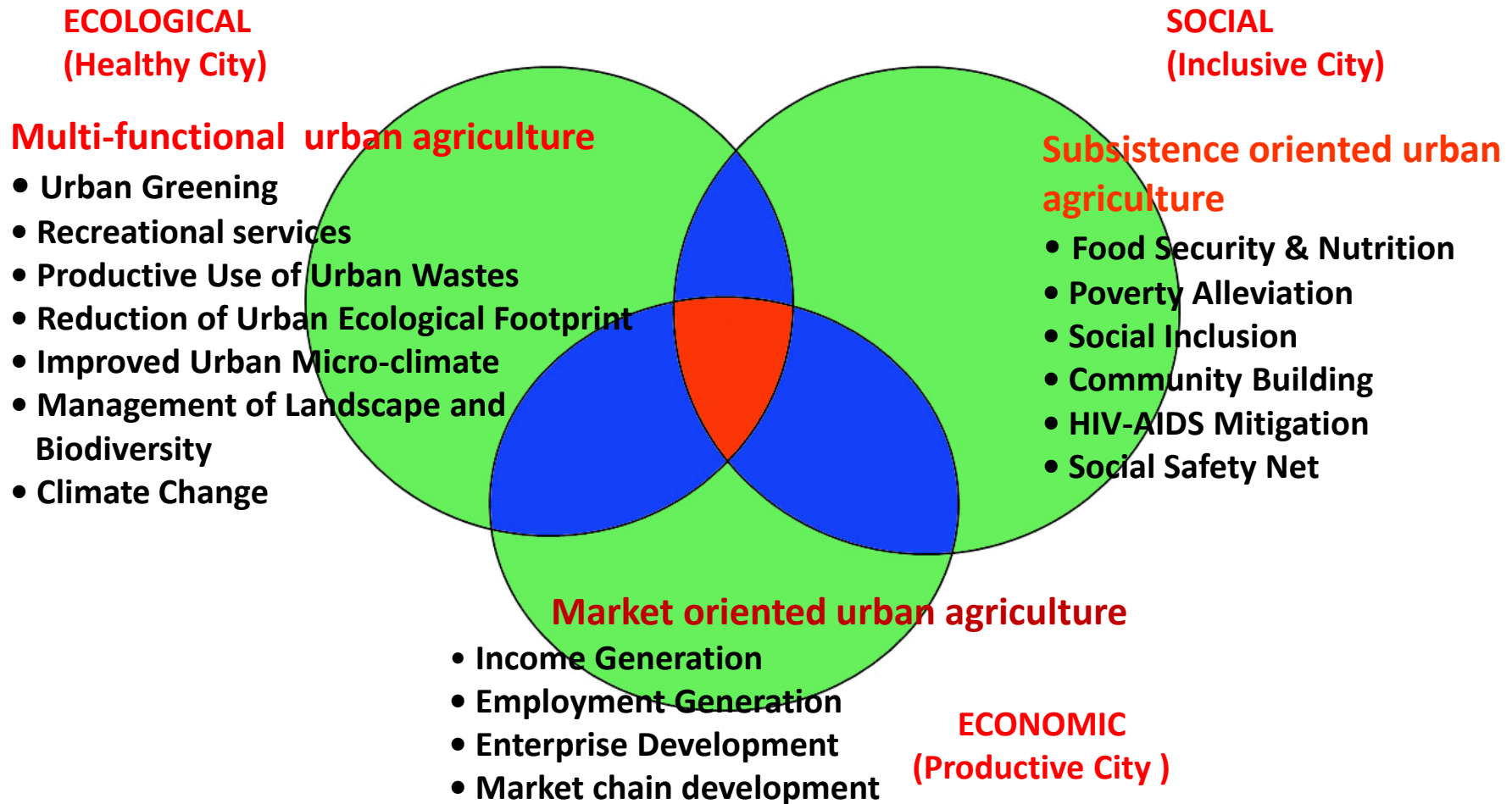


# Urban and peri-urban agriculture

- Agricultural production (crops, trees, livestock, fish) in and around urban areas for food (vegetables, eggs, milk, meat, ..) and other products (e.g. medicinal and aromatic herbs, fodder, fuel, flowers and ornamental plants, water storage, a/o)....
- And related inputs supply, transport, processing, marketing and support services...
- *Often combined with other functions (recreation, urban greening, recycling of wastes, capturing CO<sub>2</sub>, etcetera), as part of the urban system*



# Multiple Benefits of Food systems





# Impacts UPAF on climate change adaptation and mitigation

- Reduce vulnerability at **city level** (resilient urban food system)
- Reduce vulnerability at **HH level** (diversify food and income sources)



# Impacts UPAF on climate change adaptation and mitigation

-Reduce impacts of increasing temperatures/ UHI



-Reduce vulnerability to flooding



# Impacts UPAF on climate change adaptation and mitigation

-Reduce food transport, storage and packaging

-Recycle organic wastes and wastewater





# Impacts UPAF on climate change adaptation and mitigation Depend on

- Type of UPAF and location
- Production systems and technologies used
- Trade offs (e.g. consumer transport)



## ***RUAF/CDKN: Kesbewa (Sri Lanka)***

### **Local climate change challenges:**

- (Expected) increase in **rainfall**/ flash rains
- Urbanisation of low lying agricultural lands: increase in **flood** risks
- Increasing dependence on **food imports**
- Increasing urban temperatures



### **UPAF responses:**

- Productive use of abandoned paddy fields and **flood areas** with salt resistant paddy and mixed vegetables
- Agroforestry type of space-intensive **home gardening**



## ***RUAF/CDKN : Rosario (Argentina)***

### **Local climate change challenges:**

- Increased **flood** incidences
- Increasing **temperatures** and energy use
- Increasing dependence on **food imports**



### **UPAF responses:**

- Preservation of peri-urban **greenbelt** for local food production
- Promoting (productive urban) **greening**
- Integrating UPAF in watershed management





## ***RUAF/CDKN : Kathmandu (Nepal)***

### **Local climate change challenges:**

- Vulnerability to disruptions in **food supply**
- **Smog**
- Urban **waste** management

### **UPAF responses:**

- Promotion of **rooftop gardens** and household **waste recycling**/rainwater harvesting



# ***RUAF/CDKN : Bobo Dioulasso (Burkina Faso)***

## **Local climate change challenges:**

- Increasing **temperatures**
- Vulnerability to disruptions in **food supply**

## **UPAF responses:**

- Multifunctional use of **greenways**
- Preserving peri-urban **forestry**



# Baltimore, USA

What can the city and its community partners do to ensure that, after a Disruption:

1. food is *available* to residents?
2. food is *accessible* to residents?
3. food is *acceptable* (i.e. safe, nutritious, and culturally appropriate) to residents?





# Melbourne

## The Foodprint Melbourne project

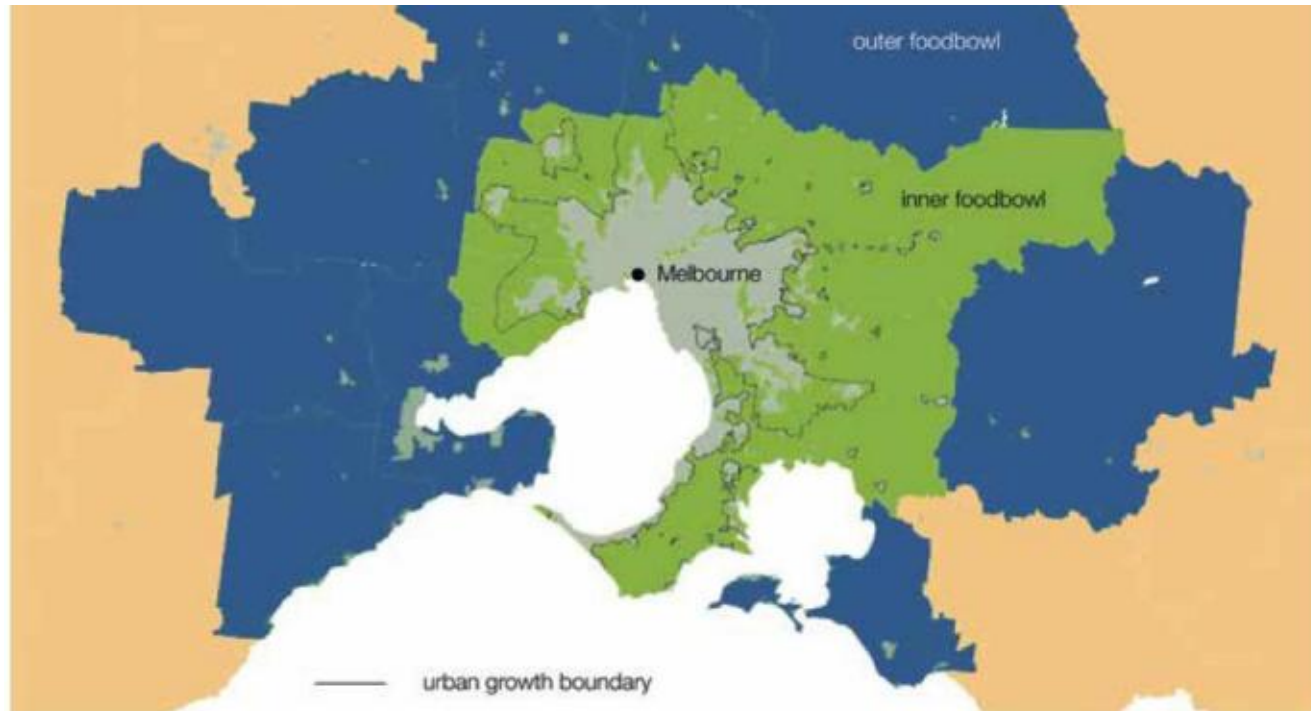


Figure 1: Melbourne's foodbowl

### Assessing the capacity of Melbourne's foodbowl

Melbourne's foodbowl can meet about 41% of Greater Melbourne's food needs and up to 82% of the city's vegetable needs.

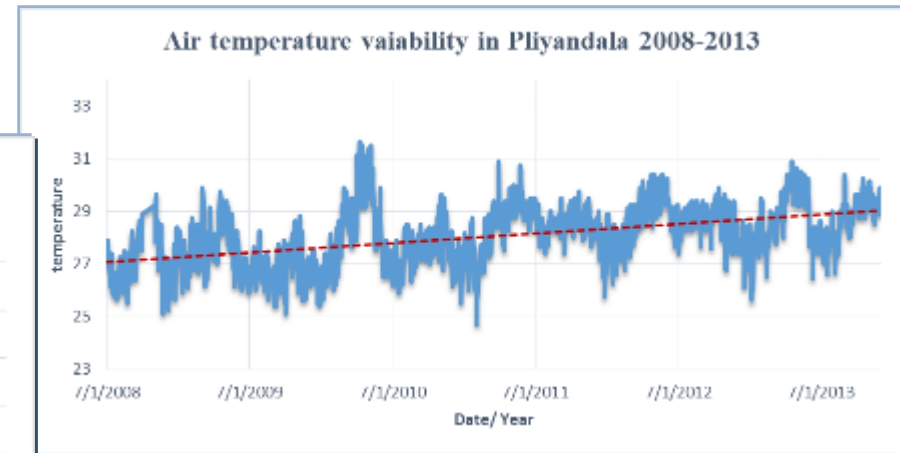
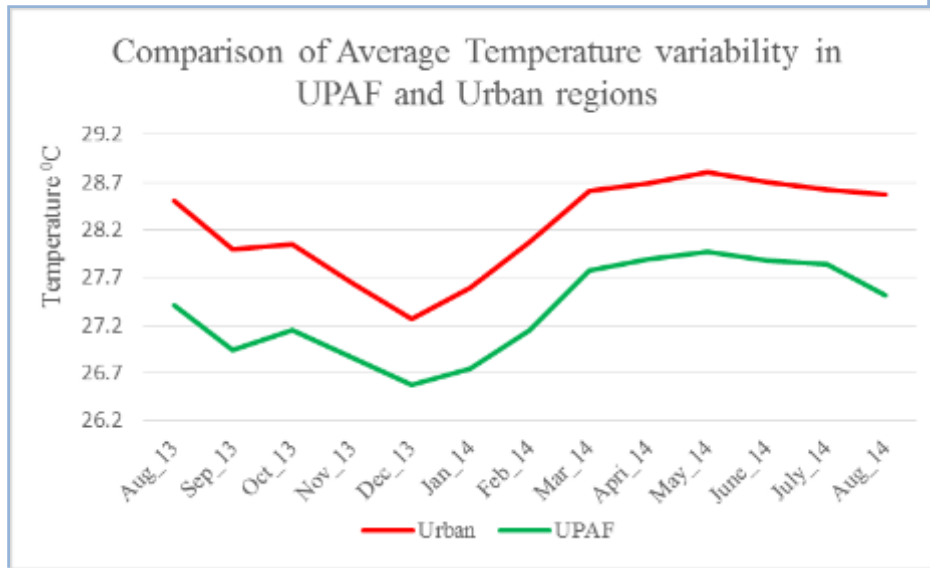
### Assessing economic value

Melbourne's foodbowl contributes about AUD 2.45 billion per annum to the city's regional economy and roughly 21,000 jobs.

# Findings Study (UN Habitat/RUAF)

## Kesbewa/ air temperature

- (a) Air temperature in city centre increased with 2°C over the years 2008-2013.
- (b) Mean –and statically significant- **temperature differences** between UPAF and non-UPAF areas were 0.88 °C, with maximum differences of over 1 °C found in August and February.



- (c) Overall, the urban (non-UPAF) areas had warmer temperatures during both day and night as compared to the UPAF areas.

# FINDINGS (cont.)

## Kesbewa/ food miles

- a) Average distance travelled is **236 km/ton for 5 most consumed vegetables/fruits**; 93,456 litres of diesel are needed per year.
- b) Such transport accounts for **500 ton of CO2 equivalent GHG emissions/year**.
- c) Current production of the studied crops in urban areas (home gardens) in Kesbewa is **2.894 tons/year**. **This local production currently saves 0.44 tons CO2 eq/year in food transport.**



- (a) At present however, **only 0.59 % of all available areas for home gardens is cultivated** in Kesbewa.
- (b) If all available home gardens were cultivated with the selected crops-under current production practices, total production would be **484.0 tons** (providing for 15 % in the current need of the five product groups),
- (c) This would reduce fuel use with 16 089 litre diesel/year and 74.1 tons CO2 eq/year
- (d) **With improved production techniques, 30% of total urban food demand for the 5 crops would be met and emission savings would add up to 148.2 ton CO2 eq./year**



# FINDINGS Cont.

## Rosario / air temperature

- a) UPAF presence statistically lowered the UHI, decrease in cooling days and energy demand for cooling
- b) However vegetative tree cover in winter hampers soil radiation to reach the surface and building walls, and resulted in increase in heating days and thus energy demand for heating
- c) With projected temperature increase in the coming 25 years, future differences in cooling demand will become larger than differences in heating demand.

## Rosario/ run off

- a) Predicted higher risk of flooding could go up to 5 times higher flood risks.
- b) This would reduce flood risk with 0.72 times. These values imply that no further expansion of drainage infrastructure is needed



# FINDINGS (Cont.)

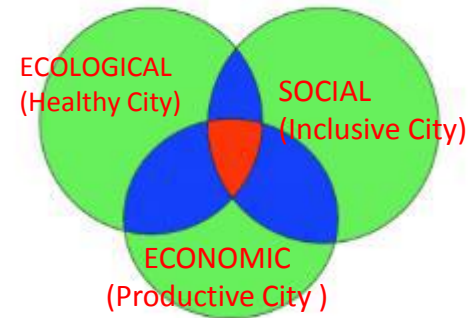
## Rosario/ food miles

- a) **Potatoes are mainly imported from a region located at about 630 km** from Rosario. They are moved by trucks of 20 tonnes. 10% of food is wasted.
- b) To supply all the potatoes needed to feed the Rosario inhabitants, such transport represents a **CO2 output of 3,813 tonnes per year**.
- c) If potatoes were to be transported by train and truck, instead of road transport only, CO2 output would equal 2,038 instead of 3,813 tonnes per year.
- d) If potatoes were **produced close to Rosario** (at 30 km from the city), CO2 output related to food transport would add up to 182 tonnes per year, **thus saving 95% of CO2 emissions**. Or the yearly CO2 emissions of 636 Argentinians
- e) 6151 ha of land will be needed to produce the total required volume of the 6 vegetables. This entire 6151 ha of land can indeed be found in the urban and peri-urban zone of Rosario.
- f) Local production potential will be determined by future land use (plans), land prices and speculation, and economic return on production.

# URBAN AGRICULTURE and FOOD ADDRESSES ACTUAL URBAN CHALLENGES

1. Growing need to enhance resilience of the cities and reduce climate change/disaster risks and ecological foot print
2. Growing urban poverty and social exclusion
3. Growing food insecurity and malnutrition in cities
4. Growing waste management problem
5. Growing need for green spaces and recreational services for the urban population

## Multiple Benefits





# Trends: local and ecological production

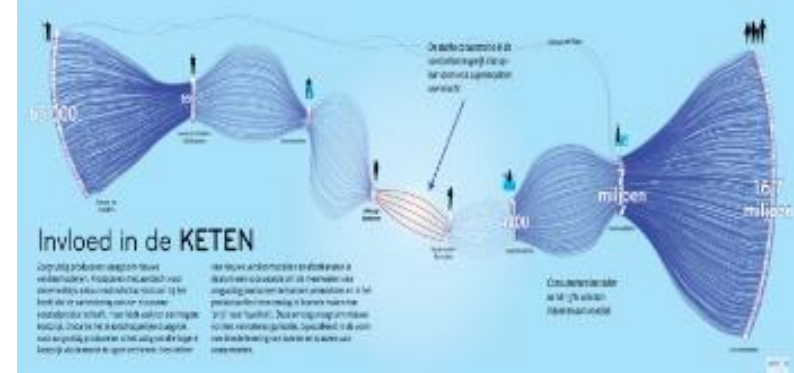




## Trends: professionalization and intensification



# Short food supply chains

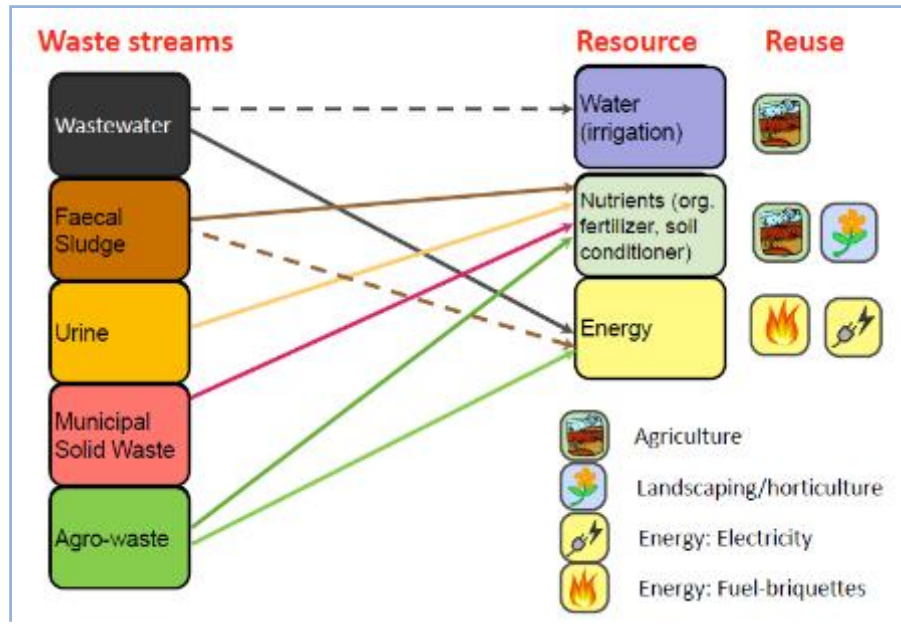


- **Increasing number of “social enterprises”, many set up by youth**
- Value addition through branding (local, safe, healthy, social, organic, quality)
- These can be built on trust (government accredited; participatory guarantee schemes; direct contact with producers)
- Need for market diversification (farmers markets; institutional schemes; supermarkets; consumer boxes) and stable linkages to consumer groups





# Reducing food waste and using residues



# Urban

# Peri-urban

# Rural



Food, water, fuel, raw materials

Urban resilience vs.

- Population growth
- Climate change
- Economic crisis
- Political crisis

Hotspot of  
resource  
depletion,  
pollution and  
urban growth

Rural resilience vs.

- Resource depletion
- Urban waste streams
- Climate change



Food waste, wastewater, solid waste

- Analyzing CRFS, resilient food flows and food sheds
- Feasibility studies for resource recovery businesses

## **Resilient urban (food) systems include mixes of local, rural or global production**

- Less dependent on food imports
- Less vulnerable to food price changes
- That enhance access of the urban poor to fresh, nutritious and safe food at affordable prices
- More resistant to impacts of climate change





# WHAT CITIES CAN DO?



# Why include UPAF in city climate change/development strategies?

1. Cities are major contributors to climate change
  - **Cities** produce ca. 70 % of GHG emissions worldwide
  - 90 % of the expected increase in GHG emission will be from cities in **developing countries**
2. UPAF makes important contributions to cities' **adaptation** to climate change and enhances city resilience
3. UPAF makes some contributions to CC **mitigation**
4. The **co-benefits** of UPAF are substantial (poverty alleviation, enhanced food security, improved urban environment )

# POLICY UPTAKE

## Kesbewa

- (a) Including UPAF zones in **city development plan**
- (b) Paddy act allows for new forms of productive use of **flood zones**
- (c) UPAF integrated in **biodiversity plan**
- (d) New **incentives** for rainwater harvesting

## Kathmandu

- (a) Rooftop garden programme **included in municipal budget**
- (b) By end 2016, **20% of all** HH rooftops should be under production (agreement between Ministry of Federal Affairs and Local Development and KMC Chief Executive Officer)



### Policy for Roof Top Gardening in Kathmandu Metropolitan City

12-Feb-2014

*Prepared by:*

Nepal Forum for Environmental Journalism (NEFEJ)

*With support of:*

The International network of Resource centres on Urban Agriculture and Food security (RUAF Foundation) and UN Habitat

*Submitted to:*

Kathmandu Metropolitan Council (KMC)



# POLICY UPTAKE

## Bobo Dioulasso

- (a) Productive use of greenways acknowledged
- (b) Municipal greenway committee formed by law**
- (c) Municipal budget made available**

## Rosario

- (a) Choice tree species determined on basis of temperature impacts
- (a) **New area preserved for peri-urban production**
- (b) Sales agreement signed with restaurants**
- (c) UPAF proposed as part of **watershed management**



# Cities designing urban food strategies...

- Take an active role in facilitating and strengthening the food system of the city region: Shift in **urban planning**;
- Commission the **mapping** and analysis of **the city region food system**
- Establish of a **Multi-stakeholder Forum** on Urban Food & Agriculture
- Visioning and scenario building: Defining sustainable urban food strategies
- **Zoning and Food Systems Planning**
- Creating the **legal, operational and financial framework** for coordinated actions re. food and agriculture



RUAF Foundation  
Resource Centres on Urban Agriculture and Food Security

## URBAN AGRICULTURE POLICY



# City-Region Food Systems

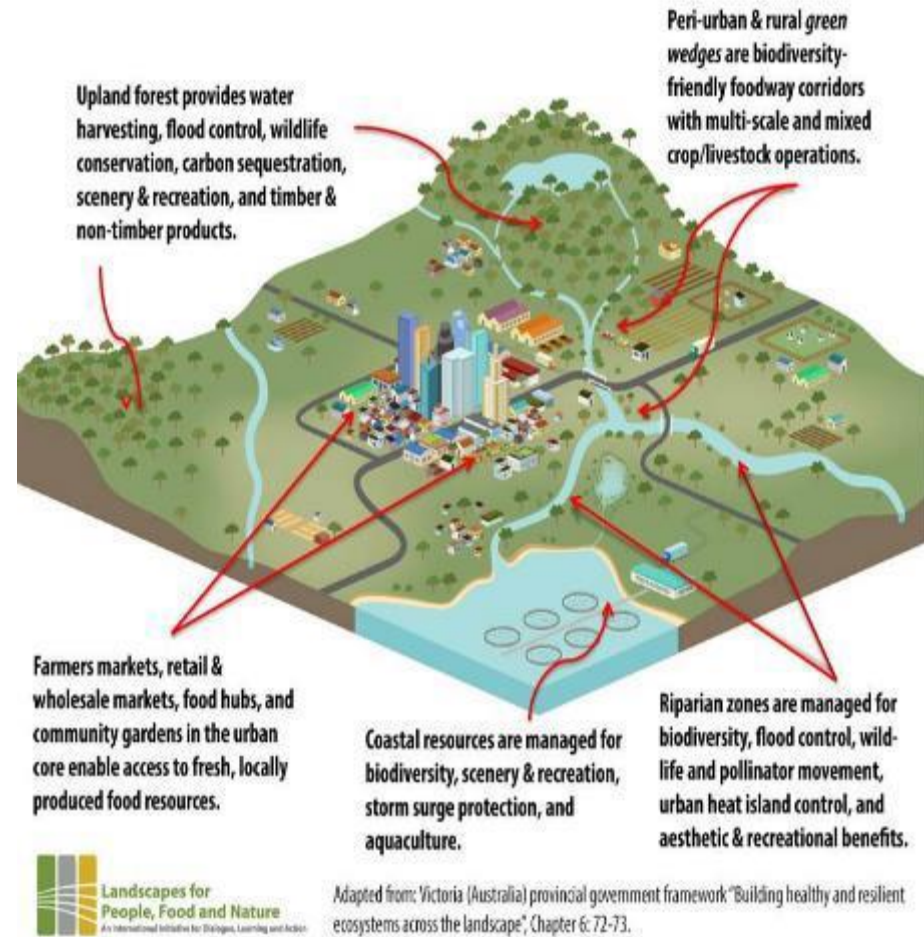




# City-Region Food Systems

- ✓ Complex network of actors, processes & relationships involved in food production, processing, marketing, consumption, disposal & recycling within a geographical region
- ✓ Exchange and flows of food, people, goods, nutrients/waste and ecosystem services (urban metabolism)
- ✓ Urban-rural linkages; nexus agriculture, biodiversity, water and energy

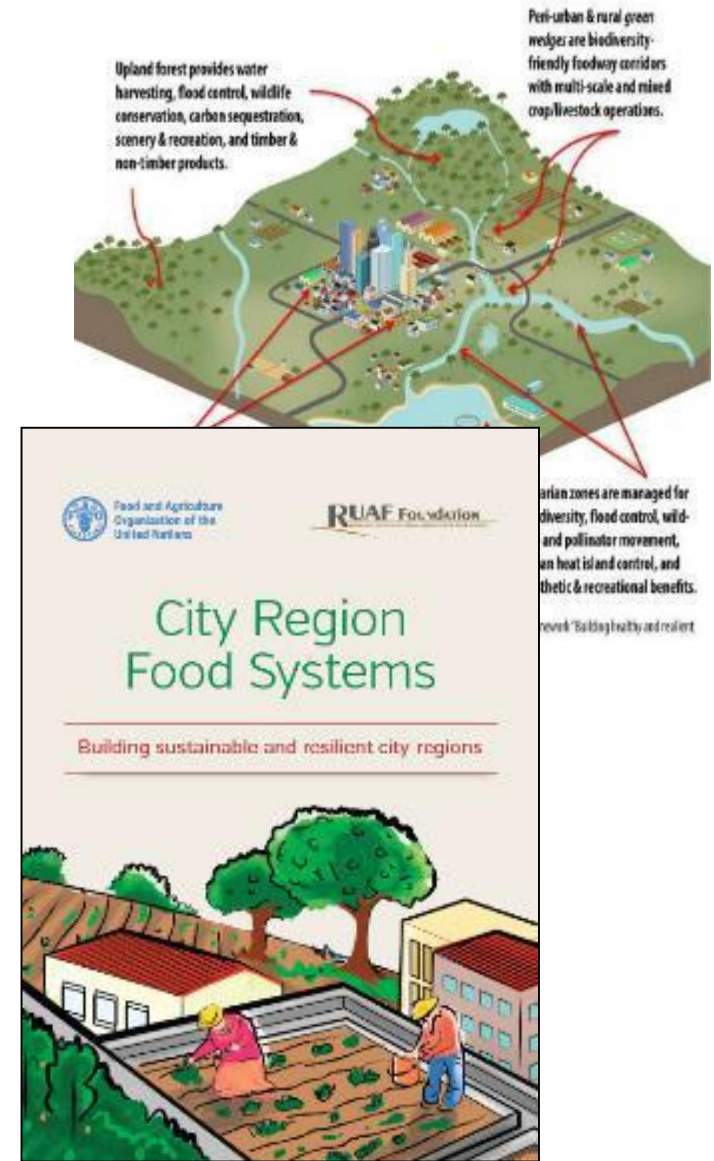
[cityregionfoodsystems.org](http://cityregionfoodsystems.org)



# City-Region Food Systems perspective

- ✓ Where is the food coming from,
- ✓ Who feeds the city
- ✓ What are the strengths and vulnerabilities
- ✓ Is it resilient to shocks
- ✓ Is it functioning to provide jobs, absorb new comers, maintain ecosystem functions
- ✓ What are key locations, groups of citizens, areas of concern
- ✓ Determine priority areas
- ✓ Involve Citizens
- ✓ Multi-level and sectoral

[cityregionfoodsystms.org](http://cityregionfoodsystms.org)





# SUSTAINABLE DEVELOPMENT GOALS

17 GOALS TO TRANSFORM OUR WORLD

HOME ABOUT SECRETARY-GENERAL GOALS TAKE ACTION KEY DATES MEDIA WATCH AND LISTEN

Goal 11: Make cities inclusive, safe, resilient and sustainable



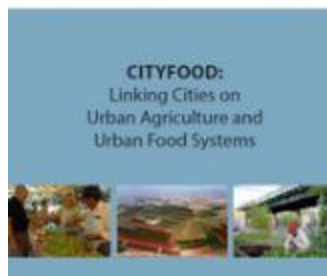
**City Region Food Systems**  
Sustainable Food Systems and Urbanization



# MILAN URBAN FOOD POLICY PACT

RUAF Foundation

ICLEI



## Landscapes for People, Food and Nature

An International Initiative for Dialogue, Learning and Action

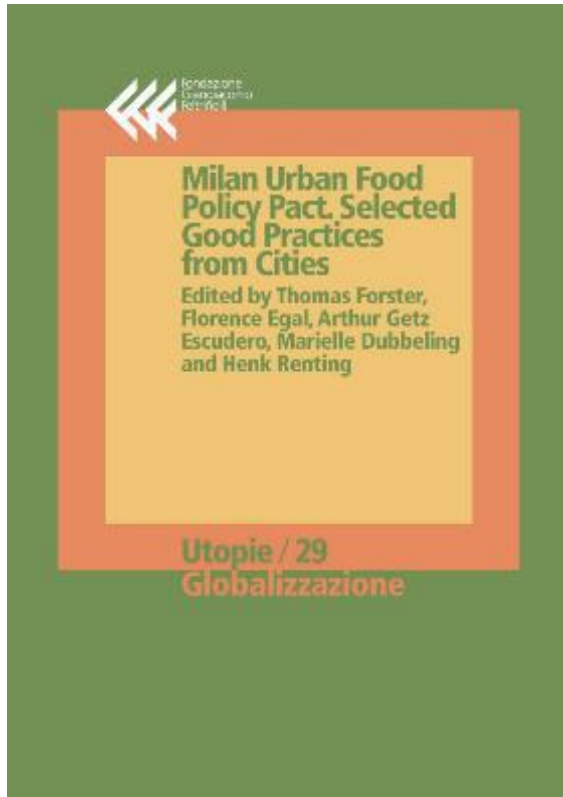


**UN HABITAT**  
FOR A BETTER URBAN FUTURE



Bellagio Communique: Harnessing urban food systems for sustainable development and human well-being





1. Governance: ensuring an enabling environment for effective action (actions 1-6)
2. Promote Sustainable diets and nutrition (7-13)
3. Encourage Social and economic equity (14-19)
4. Promote and strengthen Food production in and around the city (20-26)
5. Improve Food supply and distribution (27-33)
6. Reduce Food waste and losses (34-37)

[www.foodpolicymilano.org](http://www.foodpolicymilano.org)

[www.ruaf.org](http://www.ruaf.org)

[cityregionfoodsystems.org](http://cityregionfoodsystems.org)

# Global Database for City and Regional Food Policies

- Adopted and/or enacted policies, regulations, and ordinances on a range of food systems topics, from production to waste management.
- Coded with categorical search terms, including categories as country, policy type, food system sector, level of government, and population size, among others.



The screenshot displays the website for the Global Database for City and Regional Food Policies. The header features the University at Buffalo logo and the Food Systems Planning and Healthy Communities Lab. Navigation links include Home, About Us, Our Team, Research, Publications, Resources, and News and Events. A search bar is located in the top right corner. The main content area is divided into two columns. The left column contains a search interface with instructions on how to use the search tools, including a 'GENERAL SEARCH' button and an 'ADVANCED SEARCH' button. Below the search buttons, it mentions a partnership with the RUAF Foundation and provides contact information for RUAF-Foundation, including their address in Leiden, The Netherlands, and their website and email. The right column features the title 'Global Database for City and Regional Food Policies' and a paragraph describing the database as a resource for local and sub-national governments. It also includes a 'Submit a Policy' section with instructions on how to submit a policy and a note about the database being updated regularly. At the bottom, there is a disclaimer stating that the database is a work in progress and that policies included have not been evaluated.

University at Buffalo  
Food Systems Planning and  
Healthy Communities Lab  
School of Architecture and Planning

Home About Us Our Team Research Publications Resources News and Events

Use the search tools below to find one or more policies. GENERAL SEARCH by a keyword. Or for a more ADVANCED SEARCH, you can choose from a pre-determined set of terms listed in the drop-down menus.

GENERAL SEARCH

ADVANCED SEARCH

In Partnership With:

RUAF Foundation

RUAF-Foundation (Global partnership on sustainable Urban Agriculture and Food systems)  
PO Box 357, 3830 AK, Leiden, The Netherlands  
Website: [www.ruaf.org](http://www.ruaf.org)  
Email: [info@ruaf.org](mailto:info@ruaf.org)

University at Buffalo  
Global Health Equity  
Community of Excellence

Committee for Global Health Equity  
220 Hayes Hall  
Buffalo, NY 14214

## Global Database for City and Regional Food Policies

The Global Database for City and Regional Food Policies is a resource for local and sub-national governments to learn about food system policies from around the globe. The searchable database provides copies of the legislation, plans, funding allocations, or other public actions authorized or implemented by cities, municipalities, regions, and sub-national governments. This resource allows local and sub-national governments to learn from strategies utilized in other regions or countries, and policymakers and support organizations can search using keywords, location, language, population size, and year to find policies that are well suited as inspirations for their own communities. The database will be updated regularly.

### Submit a Policy

We welcome submissions of sub-national policy for inclusion in the database from across the world. The policy must impact the food system and be officially adopted by a sub-national government (town, city, region, etc.) outside of the United States and Canada.

Policies can be submitted by completing this form.

To search for policies within the United States/Canada, please visit the Growing Food Connections policy database. For additional global food systems resources for city and regional governments, please visit the ICLEI-RUAF CITYFOOD Network.

We recommend using the database in Chrome. For technical assistance or questions regarding database, contact the Food Lab at [foodsystems@ap.buffalo.edu](mailto:foodsystems@ap.buffalo.edu). Users may also contact RUAF with policy specific inquiries or for other resources related to international city and regional food systems at [info@ruaf.org](mailto:info@ruaf.org).

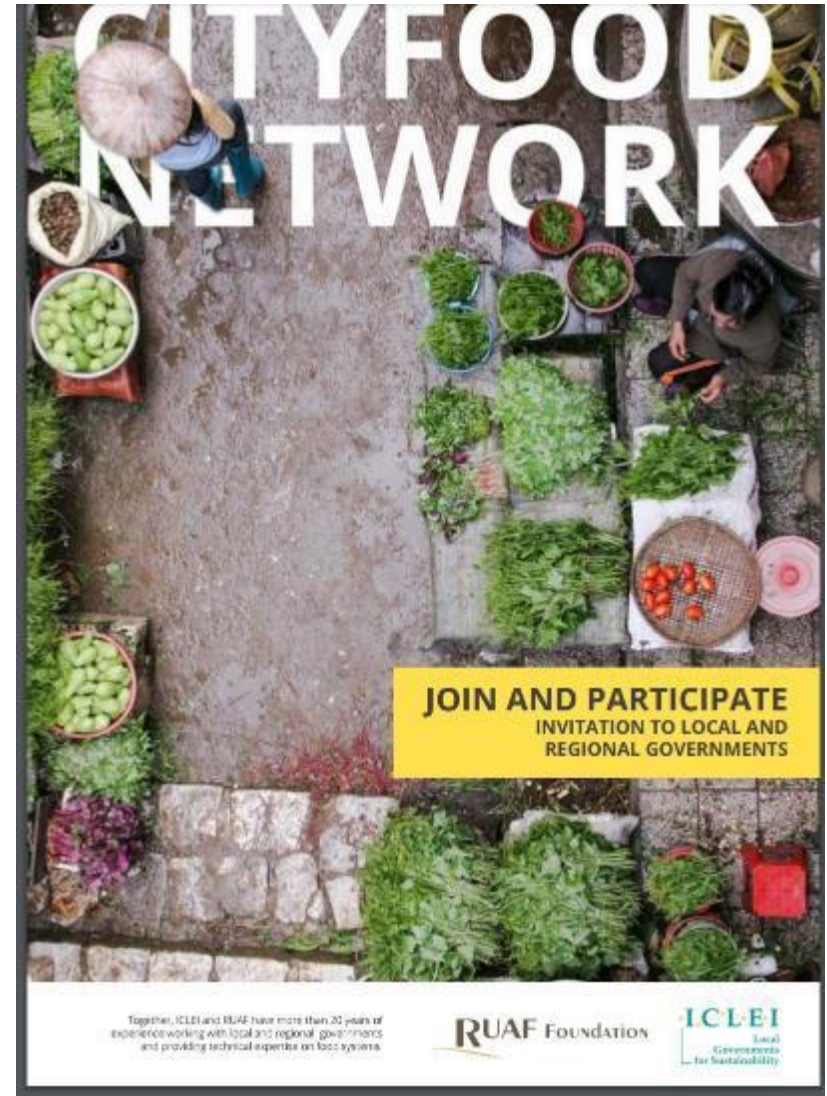
*This database is a work in progress and will be updated regularly. Policies included in this database have not been evaluated. The database is the intellectual property of the University at Buffalo and RUAF.*

## City Food Network

The ICLEI, RUAF CITYFOOD Network aims to support local and regional governments:

- Networking
- Sharing experiences
- Capacity Building
- Policy Guidance and
- Technical Advise

CRFS





# CRFS Data framework: mapping the CRFS (200 indicators)



## CRFS Indicator framework

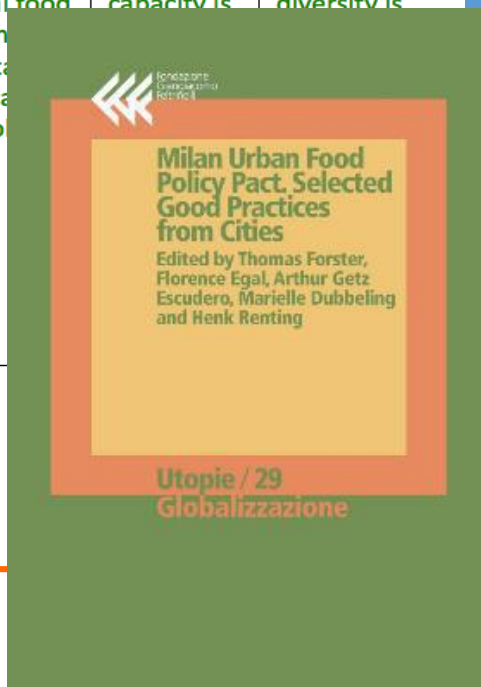
number of indicators per category



Sustainability areas /Dimensions food system	Improve health and well-being/ Social sustainability and equity	Increase local economic growth and decent jobs/ Economic sustainability	Improve stewardship of environmental resources/ Environmental sustainability	Improve governance for sustainable food systems	Reduce Vulnerability and increase resilience
Input supply and food production	8	10	15	8	11
Food storage, processing and manufacturing	7	8	5	3	5
Food wholesale and distribution	5	7	5	3	5
Food marketing, catering and retail	6	9	5	8	9
Food consumption	10	3	3	10	10
Food and organic waste management	3	3	9	4	4
(Cross cutting): City region food system policy planning	For more information see RUAF <a href="http://bit.ly/2c3dfMj">http://bit.ly/2c3dfMj</a>				3

Performance indicators to [changes needed in strategic direction](#) specially when monitored or tracked over a period of time.

Dimensions of sustainability	Social sustainability and equity	Economic sustainability	Urban-rural integration	Environmental sustainability	Food governance	Vulnerability and resilience
Overarching objectives	Improve health and wellbeing and increase access and right to food and nutrition.	Increase local economic growth and generate decent jobs and income.	Support a localized food production and supply system	Improve protection and management of ecosystems and environmental resources	Improve horizontal and vertical governance and	Reduce vulnerability and increase resilience
Key desired direction of travel changes	All rural and urban residents have access to sufficient, nutritious, safe, healthy, appropriate and affordable food.	A vibrant and sustainable regional food economy that retains the 'local food do	Local food production capacity is	Agro-ecological diversity is		



# Food Action Platform and CRFS Tool Kit

## FOOD FOR THE CITIES PROGRAMME

### BUILDING FOOD SECURE AND RESILIENT CITY REGIONS

<a href="#">Home</a>	<a href="#">Overview</a>	<a href="#">Approach</a>	<a href="#">Toolkit</a>	<a href="#">Activities</a>	<a href="#">News</a>	<a href="#">Resources</a>	<a href="#">Partners</a>
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#### Introduction to the Toolkit

More information on the toolkit

Getting Prepared

Defining the CRFS

Vision

CRFS Scan

CRFS Assessment

#### City Region Food System Toolkit



#### Partners

**RUAF** FOUNDATION

**LAURIER**  
*Inspiring Lives.*

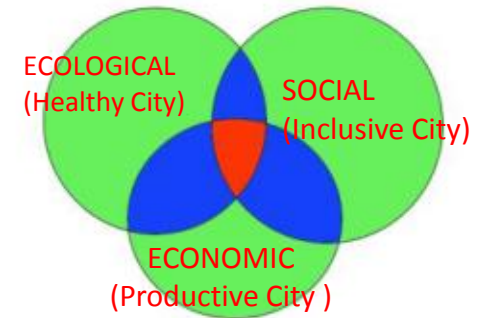
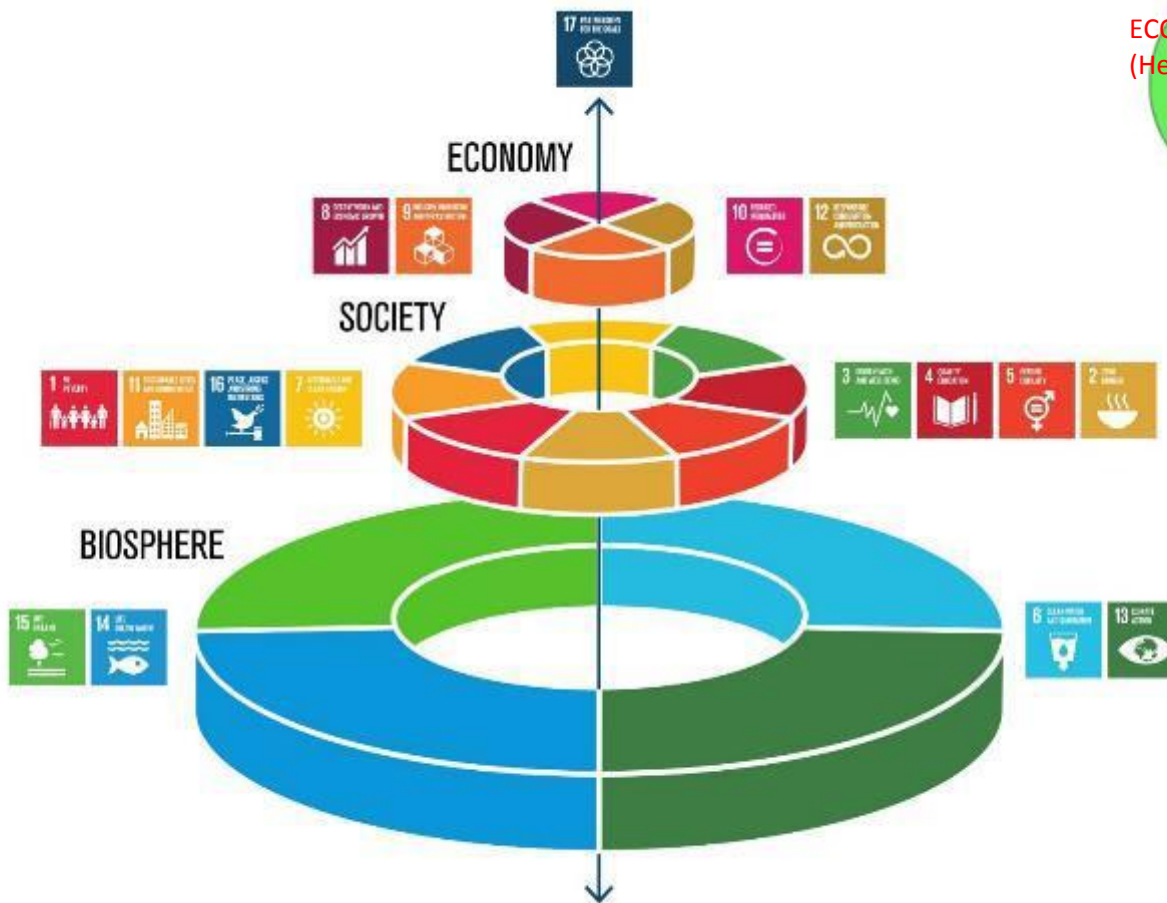
More information

Read more in depth  
information on the Toolkit.



# Food connects SDGs

## Multiple Benefits





*Food Connects People*



# CRFS, Climate change and Disaster Management

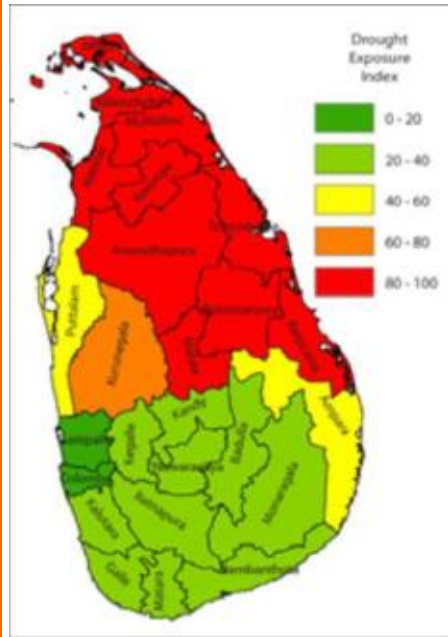
## Example Colombo, Sri Lanka



Picture by Janath de Silva



# Assessment: Exposure to Vulnerabilities = Key foodshed for Colombo



Drought

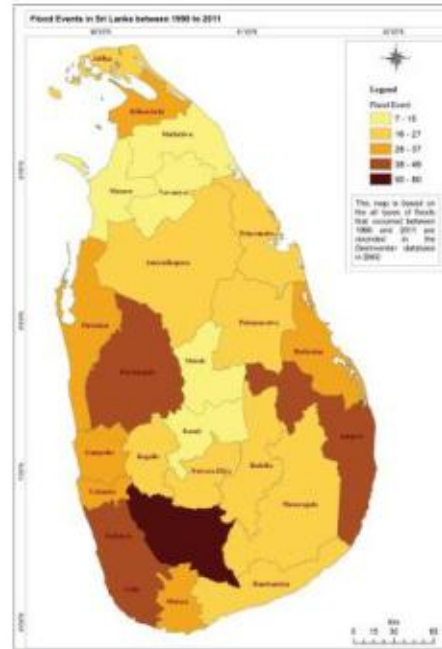
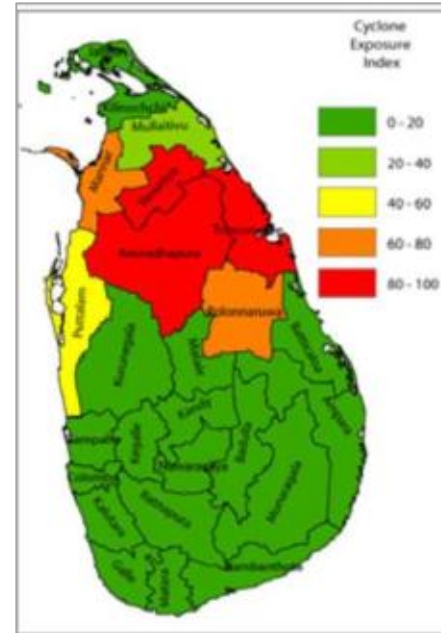
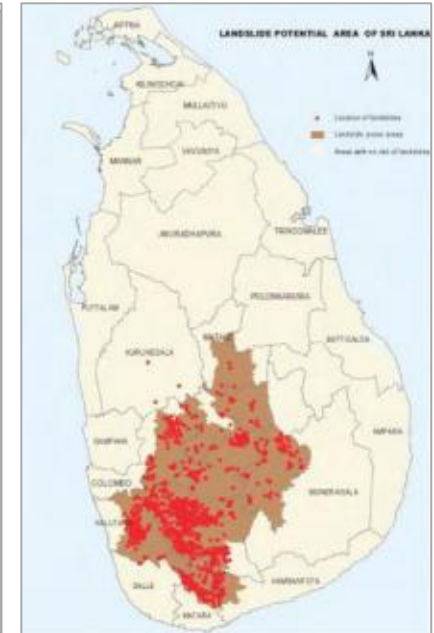


Fig 4.2 Disaster Index (Flood events in Sri Lanka from 1990 to 2011)

Flooding

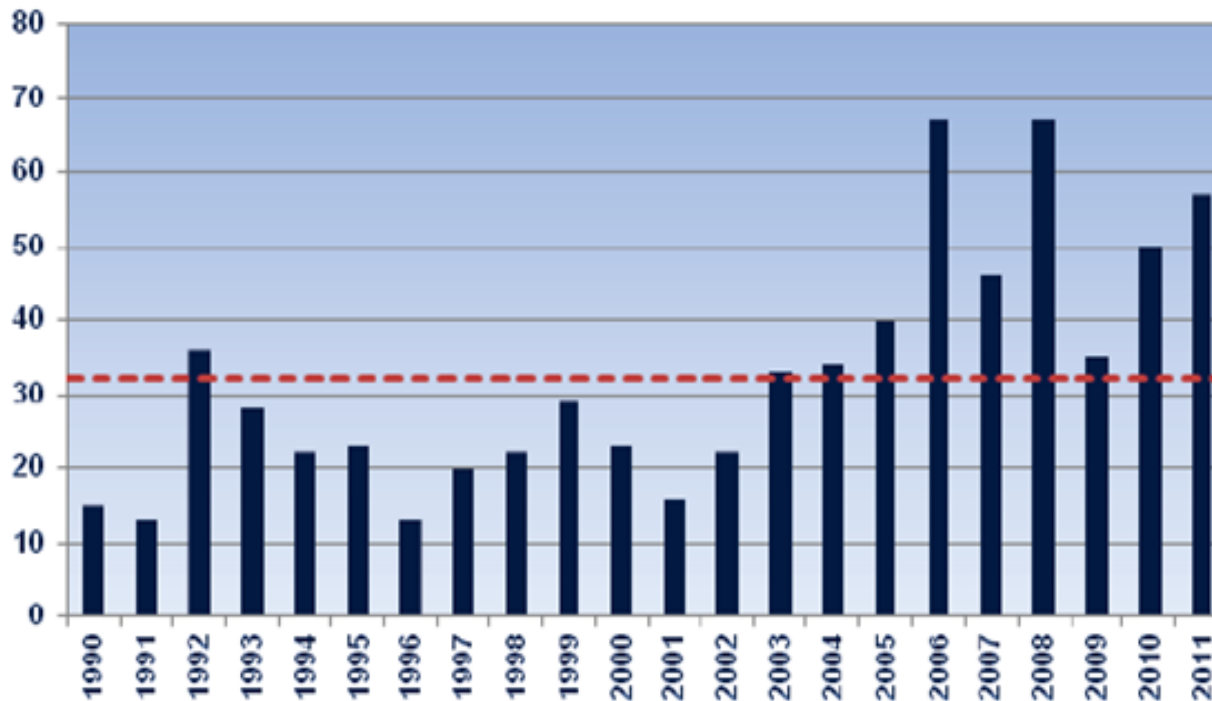


Cyclones



Landslides

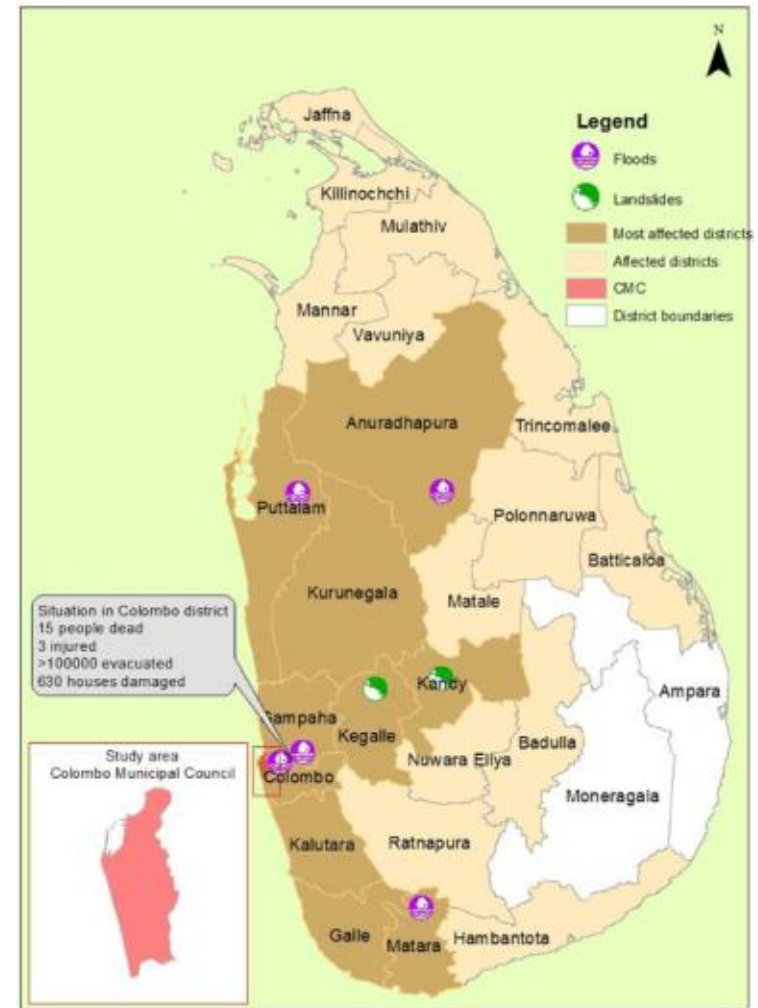
# Number of Floods appears to increase



[http://www.dmc.gov.lk/hazard/hazard/Report/UNDP%20BOOK%20CHAP%2004\\_%20Flood.pdf](http://www.dmc.gov.lk/hazard/hazard/Report/UNDP%20BOOK%20CHAP%2004_%20Flood.pdf)

# Extreme weather May 2016

- More than 95 deaths
- Over 200,000 people were displaced
- 722 houses destroyed by flooding and landslides
- **Severe impact on food supply**





## CRFS analysis for Colombo, following the May 2016 flooding

- While calorie supply remained unchanged (well organized rice storage), **the supply of nutritious food rich in protein and vitamins dropped.**
- Especially **fish and vegetables** proved to be very vulnerable, as easily affected by high rainfall and storm, and infrastructure for storage lacking.
- Many **vegetable prices increased** four times above normal; fish supply dropped by 75% as ocean fishing became too dangerous.
- Supermarket supplies recovered within two to three weeks, while supply chains of smaller traders which serves the middle and low income community took up to 2 months to recover.
- Some flood-affected beverage (beer, soft drinks) producers were out of business for 3 months after the start of the flooding.

# Impact over 1-3 months after flooding

- Empty shelves
- Unavailability of several key commodities
- Higher prices (50 to 160+ %)

## Adaptation measure

- Replacement from storage (e.g. rice)
- Search for alternative supply chains (incl. import)
- Consumers shifting to alternative dishes

## Disadvantages for

- Poorer consumers
- Smaller and medium-size retail outlets
- Farmers in affected areas



# Urban Food Supply was impacted in May 2016 by:

## 1. Loss of harvest

AP Photo/Eranga Jayawardena





## 2. Break down of rural-urban transport system



Sri Lanka Red Cross Society

## 3. Redistribution of water and food to relief services supporting affected rural areas



Deluxon Wanniarachchi/AEP

## 5. Consumer stocking up on food

## 4. Flooding of key markets



Peter van der Sluijs



**Each of the 5 factors requires another adaptation strategy.**

In general, investments in shorter/alternative supply chains and storage, are likely to increase the resilience of Colombo's food system for the benefit of the poor.

# Conclusions Colombo

- The urban food system and its regional supply chains are closely interlinked with other high priority policy objectives.
- A thorough analysis of the food system can assist in addressing these major challenges, such as urban waste management and disaster risk management.
- The City Region Food System (CRFS) approach is important in the development of resilient cities.



# Inclusion of urban agriculture in Amman “Clean Development” Plan

- **Urban agriculture & forestry** is made one of the five **components of the City Plan**
- Promotes intra- and peri-urban forestation (**applying wastewater**)
- Enhances access of urban poor to agricultural land: Identification of vacant open spaces; setting up of a Land bank
- Promotes productive green roofs



# Water – Agriculture Nexus in Freetown, Sierra Leone

**Zoning** and **allocating** low lying areas and valleys for agriculture to **reduce impacts of flooding**, storm water runoff is reduced, and excess water is stored and infiltrating in these **green open spaces**

***Political agreement brokered by Freetown Urban and Peri Urban Agriculture Platform***

- Min. of Lands maps and demarcates the areas;
- Local authorities sign agreements with farmers groups;
- Min. of Agriculture provide extension services and inputs;
- Finance and Credit Institutions accept as collaterals
- FUPAP: Conflict Mgt + Monitoring Impact



Climate change is expected to increase the frequency and severity of extreme weather events in Toronto.

These pose a significant risk to food processing, distribution and access.

The City of Toronto in building the city's resiliency to climate change and as part of its Climate Change and Health Strategy, 2017.

Assess the impact of climate change on the food system, including potential impacts on vulnerable populations.

→ **Various Tools to analyse its food system**

## Food System Components Analysed for Toronto High-Level Risk Assessment

Regional and local food production

Food processing

Food distribution

Food retail

Restaurants

Food assistance network (e.g., food banks and food pantries)

Home food storage and meal preparation

## Food System Supporting Infrastructure

Public transportation

Road network

Electrical power system

Telecommunications

Fuel supply transportation, storage and distribution



## Toronto (Canada): climate change plan includes UPAF actions

- **Financial support to community based UPAF projects** e.g. community orchards and gardens, home gardens,
- **Promotion of composting of organic wastes and rainwater harvesting**
- **Reducing the City “Foot (d) print “by:**
  - requiring that **shipping distance** are mentioned on food labels
  - promotion of **regional food products**
  - supporting **farmers’ markets**
  - **preferential procurement** of food
- **Doubling the existing tree canopy in the city by 2020**



# Almere (NL): Urban agriculture to reduce urban GHG-emissions

Planned city extension includes space for animal husbandry, fodder, horticulture and arable farming  
Production will **cover 20% daily food basket of 350,000 inhabitants, substituting “imported” products**

Leading to:

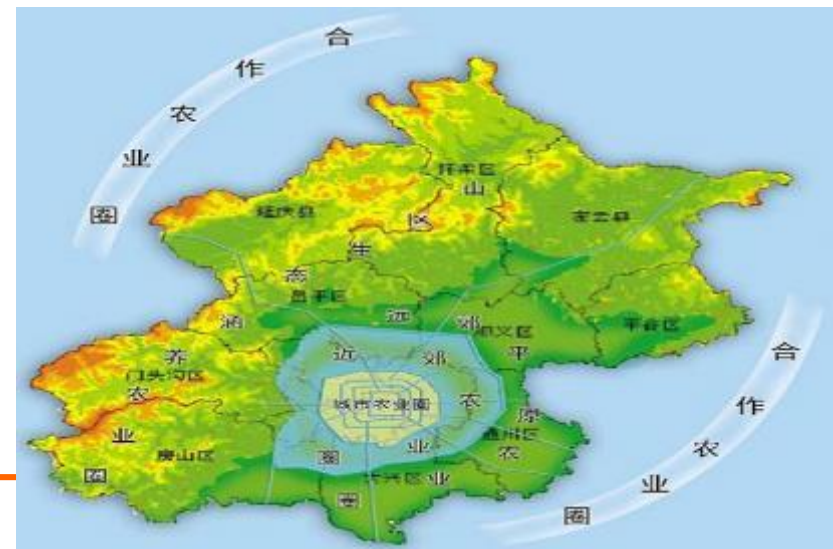
- Reduction of food related transport with 16 million km
- Reduction of energy use equal to 11.000 households /year



# Beijing (China): Protecting of agricultural and green open spaces

- Strict **protection** of agricultural land within city region
- Increased investment in sub- & peri-urban agriculture
- Promotion of various types of **multi-functional agriculture** (enterprise and community based)
- Strips of urban forests along all major roads to reduce urban heat, dust, CO2 and winds

- Intra urban: green spaces/parks, agro-exhibitions, allotment gardens
- Sub-urban: sightseeing, agro-parks, eco-education, landscape management
- Plains: intensive high tech agriculture and livestock keeping
- Mountainous areas: village based agro-tourism, ecological protection, cultural heritage





# Lima (Peru): re-use of wastewater for urban greening

- **Reuse of wastewater** to irrigate parks and urban forests
- **Enhancing access of urban producers to land:** Inventory of vacant open spaces suitable for urban agriculture; Provision of occupancy licenses; Electricity company leases land under power lines to groups of urban poor to prevent illegal building
- Participatory design of multi-functional “**productive parks**”



# Success factors (1)

- Strong **political leadership**;
- **Longer term** continuation of the process (beyond 4 years)
- **Multi stakeholder involvement** (local gov., private sector, civil society, universities) in planning and implementation
- Involvement of **various departments & disciplines**; strong and concerned coordinating department
- Generate media attention and public dialogue on food issues and the multiple roles of agriculture in urban system
- **Take sufficient time for fact finding**, dialogue, building trust and partnerships; Joint visioning and objective setting



## Success factors (2)

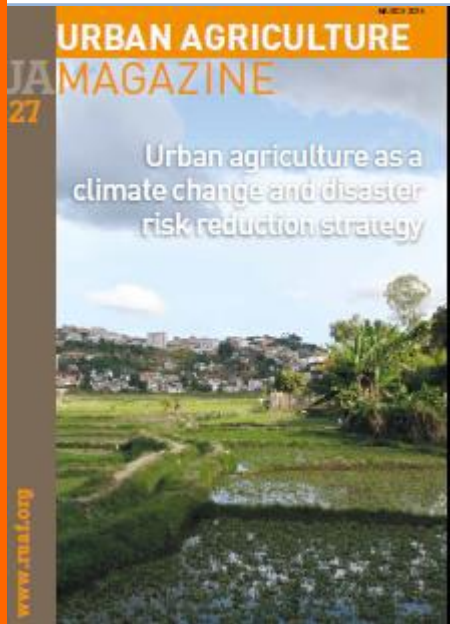
- Building on existing local initiatives; Support for community based and innovative private sector food projects; Facilitate replication and upscaling of successful initiatives.
- Combined with creation of a **facilitating legal framework** and **larger scale programmes** at City level
- Optimal use of available resources of all partners in the process;
- Proper documentation and sharing of results and costs (visibility; transparency)
- Monitoring of clearly defined indicators for the desired changes in the urban food system
- Balance between support and sustainability





# Reports/materials: [www.ruaf.org](http://www.ruaf.org)

- 3 scientific articles
- 4 manuals
- 1 RUAF policy brief
- 1 CDKN insight story
- 1 CDN background paper
- 1 issue of the UA Magazine
- 1 working paper



## Towards better integration of urban agriculture in climate change strategies

Urbanization and climate change are closely linked. CO<sub>2</sub> and other greenhouse gases (GHG) are mainly emitted in urban areas.

Cities, and their sheer number of inhabitants, are at the same time also directly and indirectly affected by climate change. Key issues include rising temperatures, increasing rainfall, flooding and urban food insecurity. Rapid urban growth will only increase the number of highly vulnerable urban communities.

Cities have an important role to play in climate change mitigation and adaptation, while at the same time they need to ensure adequate access to basic urban services such as water, food and energy to their growing populations.

Negative climate change impacts on food production and productive arable lands will impact cities with heavy reliance on food imports. The urban poor will be most affected by disruptions in food supply and increasing food prices.

Different forms of urban and peri-urban agriculture and forestry are being adopted by cities such as Bobo-Dioulasso (Burkina Faso), Rosario (Argentina), Keszawa (Sri Lanka), Kathmandu (Nepal), Dumagas (Philippines) and New York (USA) to respond to these challenges.

This brief will provide concrete examples and related policy support measures to serve as a source of inspiration.



- Nepal video :  
<http://www.ruaf.org/publications/roof-top-gardening-kathmandu-nepal>
- Nepal Uganda video:  
<http://www.cityfarmer.info/2015/02/22/city-seeds-documentary-urban-farming-in-nepal-and-uganda/>

# References

- University of Cambridge and ICLEI, 2014. Climate change: implications for cities. Key findings from the Intergovernmental Panel on Climate Change Fifth Assessment Report.  
<http://www.cisl.cam.ac.uk/Resources/Climate-and-Energy/Climate-Change-Implications-for-Cities>
- Policy brief- Urban agriculture, a climate change strategy: [http://www.ruaf.org/publications/policy\\_briefs](http://www.ruaf.org/publications/policy_briefs)
- Urban agriculture as a strategy for climate change adaptation and mitigation. The case of Kesbewa, Sri Lanka and Rosario, Argentina: <http://www.ruaf.org/publications/research>
- Urban agriculture as a climate change strategy: RUAF UA Magazine No 27 <http://www.ruaf.org/publications/urban-agriculture-magazine-english-0>



[www.ruaf.org](http://www.ruaf.org)



# Title

text

# Resume

How and why should food be considered within the climate policies of cities?

<https://www.youtube.com/watch?v=zoBhghBVGhA>

3 minutes

By: UNEP (UN HABITAT, FAO, supported by RUAF)