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Announcement

"SmartGrids for Urban Food Systems"

17-19 July, 2018 - Bari

WG FOOD

National Research Council of Italy

Workshop on Simulations Studies of SmartGrids for Urban Food Systems (UFS), Bari*, July 17-19*.

Current food systems (FS) are at risk primarily because they are dependent on natural resources, and these resources are currently not fully managed sustainably and efficiently [1]. In the future, their availability could be further reduced due to climate change. Moreover, a growing population, rising income, urbanization, a more aged and more educated population, as well as migration, are all factors that will put pressure on the FS and encourage dietary changes toward foods richer in animal proteins [2]. Current FS are also increasingly exposed to global instability, due to the links between climate change, extreme events, resource degradation and social, economic, and political crises [3]. Foresight studies [4] confirm that there is an urgent need to address critically the shortcomings of the present agri-food sector and that substantial changes throughout the whole system will be required.

As a result of two workshops organized by the CNR Foresight Group, international experts proposed, the development of a **SmartGrid for food systems**. The grid would be based on the criteria of sustainability and health and would connect different FSs in a dynamic way. The SmartGrid, generated through the application of existing and emerging technologies as well as innovative processes, would allow the exchange of information and knowledge, supporting a system that matches needs (not necessarily demand) and production, while optimizing the use of resources and allowing for sustainable compensation of goods among FSs.

SmartGrid Criteria:

- **Match** supply and variety to needs (nutritional needs, social needs, economical needs)
- **Optimize** use of resources (soil, water, energy, genetic resources, human resources) in terms of efficiency and sustainability
- **Balance** sustainable production and needs through sustainable movements of goods among different FS ("over"production in one FS is used to **compensate** deficiencies in another one)
- **Support** agricultural ecosystems and ecosystem services

SmartGrid Functions:

- monitor and evaluate local and regional key supply chain data;
- connect capacities and needs through distribution networks at various levels;
- integrate different agri-food value chains within the FSs connecting them to each other
- monitor, and eventually predict response to future climatic, environmental and socioeconomic conditions, and respectively connect different FS in order to dynamically respond to needs
- adapt production processes and technologies to resources.

SmartGrid Characteristics:

- Two-way communication
- Smart/Responsive
- Accessibility of old data; collection of new data; integration of food chains data into FSs

1) Simulation studies on UFS

For the scope of the meeting we will limit ourselves to a **case study simulation,** acquiring **key indicators** on the UFSs (see suggested list below). A SWOT analysis based on the key indicators, consideration of UFS's characteristics and challenges, as well as adherence to the SmartGrid criteria, will support researchers in identifying intervention points and propose actions, tools, and research priorities.

2) *Why UFS?*

According to the UN "World Urbanization Prospects" (2014), by 2050 approximately 66% of the population will be leaving in urban areas, and while there are great differences in patterns of urbanization, all major areas will be urbanized: Africa 56,0%; Asia 64,4%; Europe 82,2%; Latin America and the Caribbean 86,0%; Northern America 87,3%; Oceania 74,0% [5]. Already by 2030 more than one in four people worldwide will live in a city with more than 1 million inhabitants, even though less then 9% will reside in mega cities (more than 10 million inhabitants). The overwhelming majority of the world's cities, have fewer than 5 million inhabitants; here resides 43,5 % of the world's population. It is also interesting to note that most of the world's fastest growing cities are located in Asia and Africa [6]. Urban food markets already consume up to 70% of the food supply [7] and cities consume over 75% of the world's resource**,** while only 3% of the earth's land surface is occupied by urban areas [8].

3) *Which are the challenges and characteristics of an UFS?*

All UFS, whether related to mega cities or small cities, face development, governance and sustainability challenges.

In particular we should consider the following **challenges**:

- The **use of resources**.
- **Growing inequalities** in wealth, health, access to resources, and availability and affordability of services connected to food security.
- **Environmental pollution**, one of the most serious consequences of urbanization.
- Social and physical impact on the global environment of **food provisioning** in the cities [9].
- **Rationalization** of the nutritional and health value of foods and their consumption in an urban system
- **Mitigation** of the impact of rare detrimental events in urban food supply system (flooding, new pathogens, etc.)

The **specific characteristics of a UFS** influence how we address the challenges:

- **Nutrition transition** → *Availability and Accessibility* of nutritious and diverse food
- **Food deserts** → *Accessibility*
- **Hybrid food provisioning system** → urban and peri-urban dynamics but also dynamics at a distance - regional, national, global
- **Diversities** → Cultural *Apropriateness*
- **Urban agriculture** → development within the UFS

4) *How can a SmartGrid help?*

- **Support identification of needs** (nutritional, economic, environmental) and **connect them to the available resources** in order to optimize their use.

- **Connect different flows** allowing not only resources and needs to be connected, but also considering (city)waste as a resource and recovering it as added value.
- **Connect rural areas and urban markets** to support full participation of small-scale producers in responding to the cities' demand.
- **Support organization and communication** among urban agriculture activities, which are generally characterized by low level organization
- Connect all actors and **support the creation of urban hubs and agro-clusters** to address common challenges.
- **Provide access to knowledge and information** in order to support adoption of innovation, which can enhance productivity and incomes also for local/small scale farmers.
- **Overcome the current dichotomy** between rural and urban realities (including policies) through a bridge built on communication and knowledge sharing.

5) ***At which level could technological innovation bring benefits?***

- **Innovation can support better use of resources:** energy, water, soil
- **Connect flows:** decentralized low-tech systems to connect flows of consumption (needs) and production (resources).
- **Health:** create tools to collect data about nutritional needs and dietary needs. *Make this information available to producers.*
- **Food production:** create tools to collect data about resources (soil, water, biodiversity etc.) and able to correlate them with the nutritional/dietary needs of the urban population. (→ **Health**) *Create tools to inform the consumers about the local production*. Provide support to farmers.
- **Food Processing:** An UFS should take advantage of the proximity of production to consumption sites and provide fresh and nutritious food to the urban population. These products are mainly perishable products. Innovative processing methods, or adapted traditional ones, that can enhance the nutritional quality avoiding waste, while taking advantage of this proximity should be prioritized.
- **Distribution/Storage:** Peri-urban and urban food producers can reach consumers through innovative (short) distribution tools and chains.
- **Consumption:** In UFS diet-related ill-health has proven to be one of the main drivers for change.
- **Connection**: Connect consumers and producers, creating a bidirectional communication grid. Create adequate tools that support a knowledge-based decision-making process: nutritional needs and a diverse diet should be the drivers for production and not simply consumers demand.
- **Wastes:** Use of urban resources is a characteristic of UFS.
- **Resilience:** Producing more around the cities can enhance resilience creating less dependence from more distant, global supply. Urban agriculture also helps mitigate the impact of climate change. Support local biodiversity.

6) Planning process for the simulation

City region level. We decided to consider the city and its peri-urban surroundings.
In particular, in Italy we chose the **metropolitan city of BARI**, covering an area of 3825 km² and including 41 municipalities. As for the African studies **ACCRA (Ghana)** and **DAKAR (Senegal)** are being considered by GG.

The participation of local actors will facilitate the collection of the key indicators and help us better define the focus.

[1]www.unep.org/resourcepanel/KnowledgeResources/AssessmentAreasReports/Food/tabid/133335/Default.aspx
[2] Foresight. *The Future of Food and Farming* (2011), www.gov.uk/government/publications/future-of-food-and-farming (2011), A Foresight Report
[3] European Commission, Directorate-General for Research and Innovation Strategic foresight. Towards the third strategic programme of Horizon 2020, ISBN 978-92-79-53672-4.
[4] Quentin Grafton, R., Williams, J., Jiang Q., (2015) *Food and water gaps to 2050: preliminary results from the global food and water system* (GFWS) platform. *Food Security*,7(2), 209-220.
Bartolucci, C., (2016), Report "*Diversified Adaptable Food*", Science and Technology Foresight, National Research Council of Italy, www.foresight.cnr.it
[5] United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352)
[6] United Nations, Department of Economic and Social Affairs, Population Division (2016). The World's Cities in 2016 – Data Booklet (ST/ESA/ SER.A/392)
[7] FAO The State of Food and Agriculture, 2017; http://www.fao.org/3/a-I7658e.pdf
[8] GRUMP http://www.earth.columbia.edu/news/2005/story03-07-05.html
[9] Steel C., 2008, Hungry city: How food shapes our lives. London: Random House.