

## Social farming for sustainable development

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### Abstract

Value-chain innovations, focused more on process development than on product development, are designed to develop sustainable business models by addressing context-specific issues that meet both economic and social objectives. Responsible innovation is increasingly being viewed by firms as a corporate and strategic necessity to ensure long-term sustainability. Thus, social agriculture is characterized by a multifunctional role combining the traditional productive function with the ability to generate benefits for vulnerable people. Providing innovative services, it can effectively respond to the crisis of traditional social assistance systems and the growing demand for personalization and qualification of social services.

Cà Colonna is an innovative agricultural start-up with a social vocation. It aims at organizing and innovating an integrated and sustainable agri-food supply chain for both the environment and the social role. The first investments have already been made to fine-tune agricultural production in an innovative way: recovery and reintroduction of biodiversity such as alimurgical herbs and ancient grains; land settlement with the introduction of precision farming and new techniques for the irrigation system. Food products have been made from agricultural raw materials such as the Italian traditional recipes of Artusi's book: the first book of Italian recipes. The whole production is carried out in a social agricultural supply chain with the collaboration of social cooperatives for the inclusion of people with fragilities. The first disciplinary of agricultural-social production was adopted.

The same value-chain has been extended to Africa: achievement and management of agroindustrial platforms to be implanted at Lukula in Central Congo Province (Democratic Republic of Congo). The African project was funded by the World Bank. The goal is to improve agro-industrial production in the Democratic Republic of the Congo. This country, while expressing great agricultural potential, is however decidedly lacking in the organization of the integrated supply chain between agriculture and the final market, that is the urban area. On one hand, there is a traditional agricultural territory, and on the other an urban system in strong growth which is increasingly exposed to imports to access to food.

## 1.Introduction

The current dominant supply chain is based on a linear model of short-term partnerships independent from the influence and interests of other members of the chain (suppliers, processors, retailers, and consumer). Price is the only parameter of evaluation. This model results highly inefficient with inability to respond to changes in supply and demand dynamics, with wasteful processes and environmental and social degradation.

A system of creating value requires closer cooperation and interaction between all stakeholders. Thus, the development of an agrifood value-chain depends on natural resources, human resources and their interactions representing the sustainability of the system (Bagnara, 1995).

Value-chain innovations focuses more on process development than on product development. They are designed to develop sustainable business models by addressing context-specific issues that meet both economic and social objectives. Responsible innovation is increasingly being viewed by firms as a corporate and strategic necessity to ensure long-term sustainability.

According to this objective, social agriculture is characterized by a multifunctional role combining the traditional productive function with the ability to generate benefits for vulnerable people, developing innovative services that can effectively respond to the crisis of traditional social assistance systems and the growing demand for personalization and qualification of social services. Briefly, social farming could aim to the following objectives:

- a) social and work inclusion of workers with disabilities and disadvantages, as qualified by the EU Reg. n. 651/2014, included in rehabilitation and social support projects;
- b) social services for local communities by using tangible and immaterial resources of agriculture; promotion of social and work inclusion, recreation and services for daily life;
- c) services that support medical, psychological and rehabilitative therapies, aimed at improving the health conditions and the social, emotional and cognitive functions, applying activities with animals and the cultivation of plants;
- d) environmental and food education, the protection of biodiversity, as well as the dissemination of knowledge about the territory through the organization of social and educational farms.

A theoretical debate on alternative economics (solidarity economy, de-growth, etc..) is also impacting the agroecology and sustainable food systems in rural and urban areas. Consequently, the sustainability is the approach to the whole agro-food system leading to a concept of food sovereignty<sup>1</sup> where the profile of consumer is substitute with the concept of citizen. Citizen have the rights to the food sovereignty that is to healthy and culturally appropriate produce through sustainable methods.

Consequently, food sovereignty and agroecology require the reconnection of the concepts of food and agriculture beyond geographical distance (Rabobank, 2012). Adopting a territorial approach to evaluate the agrifood system allows identifying the diversity of social actors and institutions involved in food production redesign the interdependencies in a virtuous way. For instance, a new concept of "Community of food and biodiversity of agricultural and food-related" is introduced by article 13 of the Italian Law 194/2015 "Provisions for the protection and enhancement of biodiversity for food and agriculture

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<sup>1</sup> Food sovereignty could be defined as the right of peoples, communities, and countries to define their own agricultural, labour, fishing, food and land policies which are ecologically, socially, economically and culturally appropriate to their unique circumstances. It includes the true right to food and to produce food, which means that all people have the right to safe, nutritious and culturally appropriate food and to food-producing resources and the ability to sustain themselves and their societies. (<http://www.foodsovereignty.org>).

interest." In according to this article, interests and collaborations from agreements between the main stakeholders about biodiversity of agricultural and food are defined as "food communities". That is biodiversity is not just a reserve but a value to be integrated into the socio-economic territory.

Briefly, sustainable agroecological models, including agro-biodiversity and social farming, need to be developed and embedded in an enabling socio-political and economic context leading to the concept of corporate responsibility. However, responsibility is viewed as a negative or costly externality of natural and social environment to the entrepreneurship, thus a positive and more challenging perspective is the notion of corporate value as an intangible asset the enterprise.

The aim of this paper is to define a theoretical framework to address social issues as part of the assets of sustainable agroecological models in order to move from a concept of protection to a value-chain generating value. A first part the paper is dedicated to focus on the concept of agri-food value-chain. A hedonic economic model is developed to connect production agro-ecosystem to identify the function of sustainability. The main idea is based on the role of sustainability as interaction between natural territory and economic territory that is market. A second part of the paper analyses applications of the theoretical framework to business models.

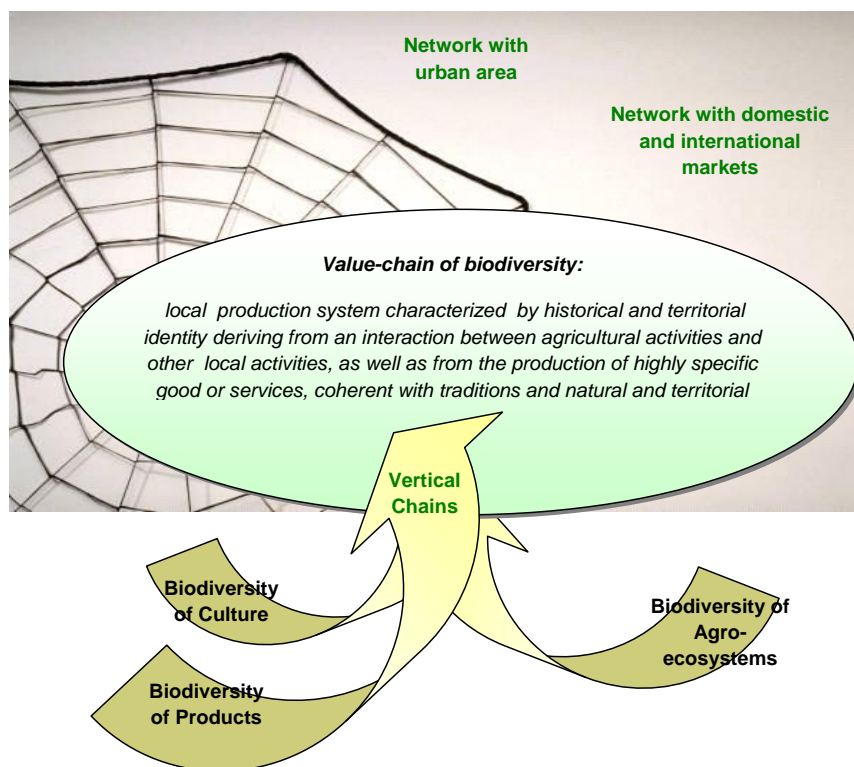
## **2.Theoretical framework of sustainability of development**

The value-chain is a link between the territory, of the agricultural production, and the final consumer: health of products and environment are the drivers of the sustainability of agriculture (food safety and environment); life styles of consumer shape the services to products; and corporate values are the driver to build trust with final consumer/citizen (food sovereignty).

Thus, this idea of sustainability includes the differentiation and recovery of biodiversity. The concept of biodiversity (figure 1) should not be restricted only to the genetic resources or conservation of threatened species. Biodiversity, indeed, is the variety of life and its processes: links between living organisms, ecosystems and landscapes. Consequently, three networks of biodiversity interact constituting a local system:

- a) biodiversity of products based on genetic diversity - the variety of genetic among individual representatives of a species;
- b) biodiversity of agro-ecosystems, based on the variety of ecosystem diversity, that is the variety of species and ecological functions and processes;
- c) biodiversity of culture, based on historical process of accumulation of human stock, heritage, leading to the capability to use and manipulate the biodiversity and a sustainable respect of the ecosystem.

Figure 1. A value-chain based on biodiversity



### 2.1. The conceptual model

This conceptual framework is approached by hedonic demand theory and it is the further development of the model initially applied by Bagnara in 1995. Consequently, environmental features and social system affect changes in the local agrifood system as follows:

Let's take a territory with production chain A and agri-ecosystem B:

$$\text{Territory} = (A + B)$$

The objective aims to implement a strategy of development:

$$\text{Territory}_{\text{dev}} = (A+B)^2$$

So, expanding it:

$$(A+B)^2 = A^2 + B^2 + 2AB$$

That is:

$A^2$  = capability of investments in the production sector A aimed at generating economic cash flow;

$B^2$  = capability of tutelage of the agri-ecosystem B aimed at preserving natural resource;

$2AB$  = *sustainability of the development* (integration of supply chain, network of enterprises, partnerships, joint ventures, etc...) where the public institutions and producers' organization should play a role of "enzyme" of the development in order to make it sustainable. This could be defined as the hedonic value of territory

Otherwise: if  $A^2 + B^2$  without  $2AB$ , we have growth of A or strict tutelage of B but no sustainability in the long run. However, if a production sector prevails over the tutelage of the ecosystem:

$$\text{Territory}_{\text{dev}} = (A - B)^2$$

Expanding it:

$$A^2 + B^2 - 2AB$$

That is:

$$-2AB = \text{unsustainable development} = \text{negative hedonic value of territory}$$

According to these concept notes, a hedonic value model has been developed (Bagnara 1995). The food product ( $\text{PROD}_{\text{food}}$ ) is defined as the integration of agricultural production ( $\text{PROD}_{\text{agr}}$ ) and added services ( $\text{PROD}_{\text{serv}}$ ):

$$\text{PROD}_{\text{food}} = \text{PROD}_{\text{agr}} + \text{PROD}_{\text{serv}} \quad (1)$$

Natural resource endowment ( $\text{RES}_{\text{natur}}$ ) is emerging increasingly important in agricultural production due to the decrease of public subsidies to agricultural production and the reduction of use of production inputs (chemicals, fertilizers, energy,...); this relationship is as follows:

$$\text{PROD}_{\text{agr}} = f(\text{RES}_{\text{natur}}) \quad (2)$$

Services ( $\text{PROD}_{\text{serv}}$ ) are the element in food production which has increasing economic interest and can be identified in the spatial dimension of the distance between rural and urban areas ( $\text{AREA}_{\text{rur-urb}}$ ):

$$\text{PROD}_{\text{serv}} = f(\text{AREA}_{\text{rur-urb}}) \quad (3)$$

Services play a direct role in the price clearing of the final food product ( $\text{PRICE}_{\text{food}}$ ) so that:

$$\text{PRICE}_{\text{food}} = f(\text{PROD}_{\text{serv}}) \quad (4)$$

On the whole, the differential rent of the agro-food production ( $\text{RENT}_{\text{agrofood}}$ ) of a particular region is assumed to depend on the agricultural productivity ( $\text{PROD}_{\text{agr}}$ ) and the food price ( $\text{PRICE}_{\text{food}}$ ) as follows:

$$\text{RENT}_{\text{agrifood}} = f(\text{PROD}_{\text{agr}} + \text{PRICE}_{\text{food}}) \quad (5)$$

Thus:

$$\text{RENT}_{\text{agrifood}} = f(\text{RES}_{\text{natur}} + \text{AREA}_{\text{rur-urb}}) \quad (6)$$

Hardly any of the market price reflects the true cost of a product including both production costs and external costs/assets like agro-biodiversity and social issues. Thus, a sustainable value chain should interact with the corporate assets and the value of territory.

The sustainability of an agri-food value-chain cannot be viewed just as a geographic position but it is related to relationships among flows and exchanges of human, material and intangible goods within the territory. The value of a location is due to the value of its exchanges linked to its specific spatial characteristics, that are intangibly transferable properties.

Each economic action is located within the relationship between human action and environmental characteristics of a territory. Indeed, the spatial dimension in the hedonic model is the interaction between the distance of agricultural production from urban area

and human resources. The interaction between these resources shows whether the system will remain stable over the years, that is sustainability.

Briefly, according to this hedonic economic model, the development of an agrifood value-chain depends on natural resources available (i.e., climate, agro-biodiversity, etc.), human resources (both managerial ability and service accessibility) and their interaction that represents the sustainability of the economic system. Indeed, the interaction between these resources shows whether the system will remain stable over the years.

## **2.2. Implications for a business approach of a sustainable value-chain**

The theoretical framework highlights the role of human resources and their interaction with natural resources as a strategic asset for mainstreaming agrobiodiversity in food value-chain. Thus, a sustainable value-chain requires a proper business management model with a vision that transcends the boundaries of the enterprise. Thus, the processes of social learning play a major role where stakeholders are connected in flexible networks and where the capacity and trust is developed to collaborate in a wide range of formal and informal relationships from formal legal structures and contracts to informal, voluntary agreements (Pahl-Wostl C., 2009).

This paper, indeed, proposes to replace the concept of parameter-control with the idea of synergy measured by interaction. Applying it to the agrifood value-chain, territorial assets and socio-technological assets are the areas to interact (figure 2). Corporate value is thus the final step of a value-chain based on partnering for sustainability.

Resources, technology and access to market are the three assets of corporate value within a sustainable value-chain. Resources are already in the local territory, like natural and human and institutional resources. Technology and related knowhow are achievable in the world market, but they have to be adopted and adapted to local territorial systems with respect to natural resources. The interaction process integrates these two assets to access markets organizing an integrated value-chain (production, processing, logistic and marketing) representing the sustainability of the economic process.

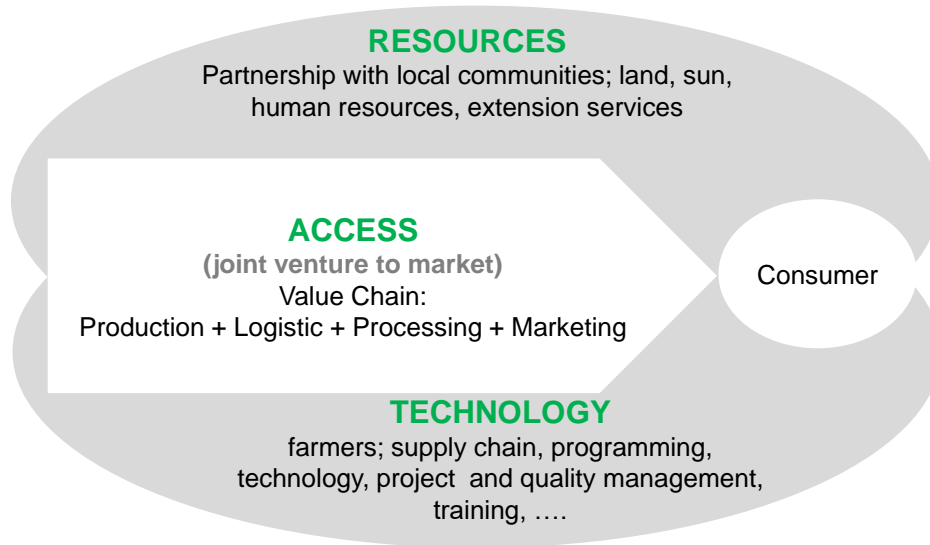
The innovation systems approach should involve a larger number of stakeholders in order to be an effective open innovation system<sup>2</sup>. Research is no longer the only source of innovation (Martin A., 2013) but a contributing factor and it is also used to verify the relevance of innovative ideas or overcome obstacles. Innovation is now less the result of a breakthrough knowledge and more the result of mobilising and adapting existing knowledge in different forms. It comes more from an interactive, bottom-up and social process than from the dissemination of scientific results.

Switching to a new value-chain model requires a dedicated supply chain with closer cooperation to transform the partnerships from transactional ones, that are centred around chasing price, to a system focused on creating value (Sherrard J., 2013). A closer cooperation, that is interaction, involves both the supply chain with suppliers, origin governments and NGO's, and across the supply chain with other manufacturers. Food retailers will primarily focus on making, in cooperation with suppliers, the whole supply chain more sustainable.

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<sup>2</sup> "Open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology." Henry Chesbrough, *Open Innovation: Researching a New Paradigm* (2006)

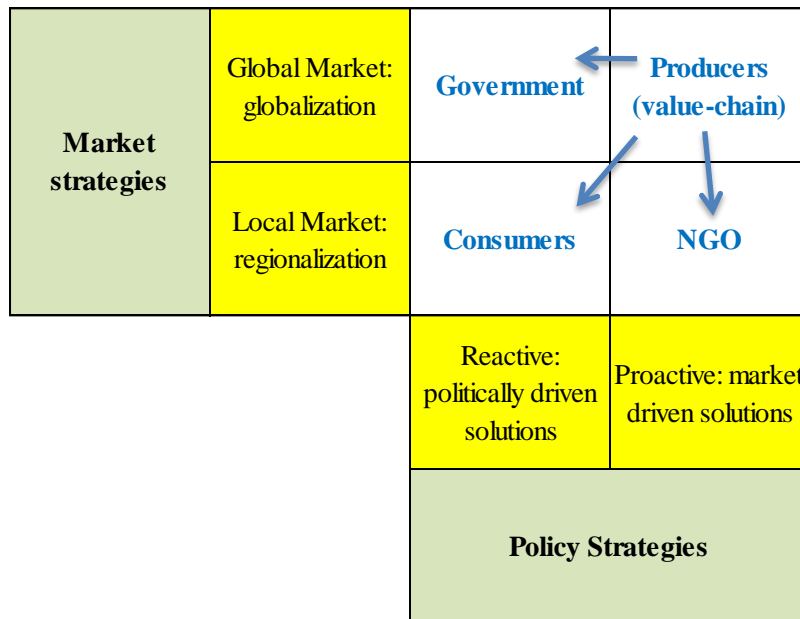
Figure 2. Partnership for sustainability



For that purpose, market and policy strategies are synthesized in a matrix in figure 3. Market strategies are articulate in globalization, to approach global market, and regionalization to focus on local markets. On the other side, policy aims to manage crisis and searching solution, that is a reactive response, or looking for market driven solutions (proactive responses and holistic approach).

According to this matrix, the agenda of innovation is determined by main players or influential parties. Strategy of integration is pushed back and forth between the two (left and right) sides of the matrix: on the right-hand side, there is more flexibility between players, with much less on the left. Government, adopting a reactive approach, has to create market opportunities in a global market. Producers, adopting a proactive approach, should face the global market with innovation based on technology pulling. Further actors of the value chain are consumers with reactive approach but a focus on local market, that is a conservative approach, and micro and specific collaboration are pulling. NGOs are also promoting activities with a proactive approach focusing on localization. Thus, the interaction process can be based on the value chain of sustainable development and corporate values. Producer organizations, in order to integrated the value chain, have to interact with: a) governments and public institutions to exploit market opportunities in a global market; b) consumers (reactive approach) with focus specialization and segment on local markets; c) NGOs to anticipate (proactive approach) local market debates and issues.

Figure 3. Matrix of players of sustainable development and interaction processes: value chain of sustainable development and corporate values



### 3. An empirical business model: from farming to agro-food park to organize a value-chain

Agro-industrial parks or technopoles, also called agropole/agropolis, are shared facilities and services built explicitly for the processing of agricultural products. An agro-park is a structured community dedicated to the development of agrifood innovation, bringing together in one location, or in multiple nearby interrelated locations, the required elements for making innovation happen: agro-industries, research and training institutions, and related input and service providers. Thus, an agro-park has to fit in a network containing three strategic functions:

- Rural Transformation Centre: combining collection and storage of farmers products with rural development services
- Agro Production and Processing: combining production, processing, collection, R&D, trade and social functions. An Agropark delivers its products throughout the year as independent as possible from season and land
- Consolidation Centre: serves a metropolitan market in a consumer responsive way throughout the year. Seasonal products not available from local producers are being supplied from storage or by trade.

The proposed model of agropark is a synthesis of the Italian agri-food districts based on a territorial approach of local economy<sup>3</sup>. From an economical point of view, local growth models are identified by their production and transaction costs. The advantage of local production systems or districts should also be enlarged to include the spatial contiguity and the social and cultural characteristics of a region. Rationalizing the use of resource means reducing both production and market costs. The growth of systems operating on a

<sup>3</sup> case study of OECD for governance approach of urban-rural partnership : <https://www.oecd.org/regional/rural-urban-partnerships-an-integrated-approach-to-economic-development.htm>

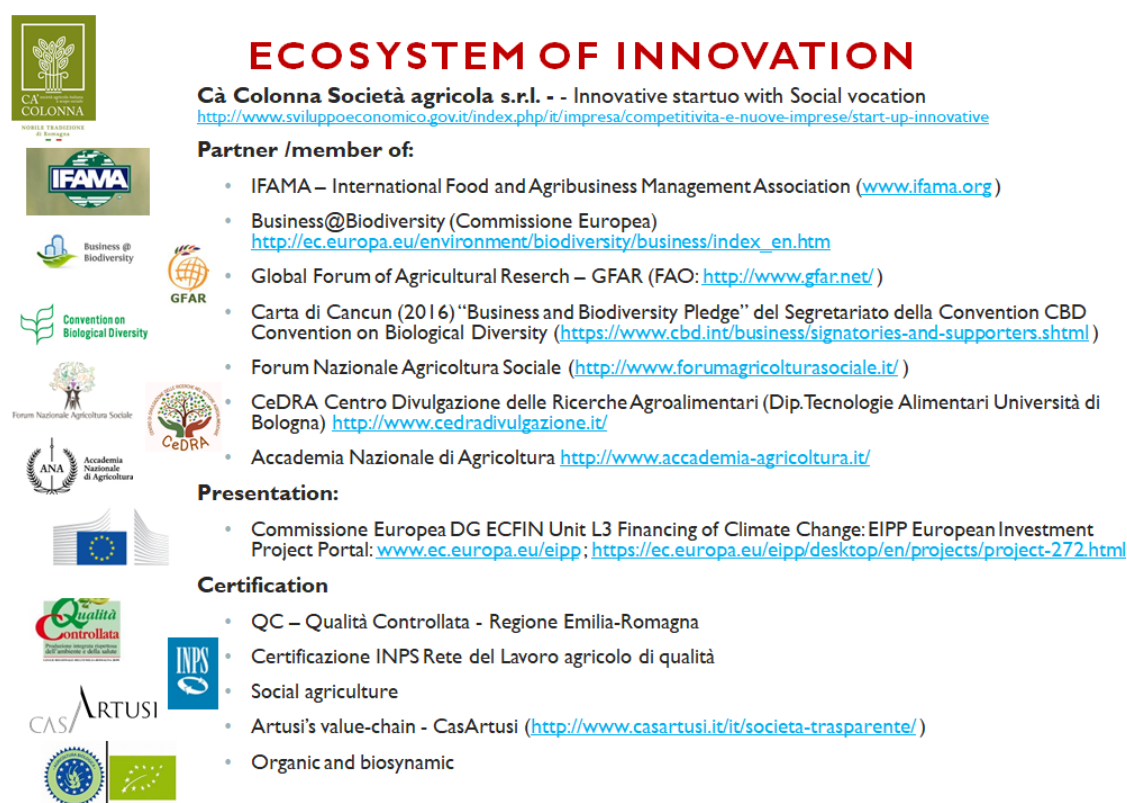


regional basis is therefore conditioned by the economies of the surrounding environment which cannot be moved elsewhere.

### 3.1. The Italian experience of social farming: Cà Colonna

Cà Colonna is an innovative agricultural start-up with a social vocation with the aim to integrate a sustainable agri-food supply chain with environmental and social role. For this purposes, Cà Colonna has organized an ecosystem of innovation (figure 4).

Figure 4. Ecosystem of Innovation



C  Colonna has realized investments to fine-tune agricultural production in an innovative way: recovery and reintroduction of biodiversity such as alimurgical herbs and ancient grains; land settlement with the introduction of precision agricultural mechanization and new techniques for the irrigation system.

Food products have been made from agricultural raw materials such as the ancient recipes of Artusi with the CasaArtusi officially approved for Italian restaurants in the world. In a single dish "culture" and "crops" are connected. Finally, vegetable products have been developed such as agri-snacks and agri-cosmetics with the aim of enhancing every part of the plant in order to reduce food waste.

The whole production is carried out in the social agricultural supply chain with the collaboration of social cooperatives of the Romagna area for the inclusion of people with fragility. The first disciplinary of agricultural-social production was drawn up. The challenge is then the extension of this project at national level

**Figure 5. awards received.** *The sustainability leadership award is given to an operator who leads in various aspects of sustainability. The organisation should display overall leadership in sustainability and not be mastering a few areas. To be eligible, the food, ingredient, packaging or related firm should be able to demonstrate why it is a leader in various areas. Cà Colonna is a social farming enterprise that is integrating biodiversity into agri-food supply chains.*



### **3.2. The African experience of social farming: Texere**

The trend of global urbanisation is in full swing, with the last 100 years seeing remarkable change in attitudes to city life. In the past, urban living was an infrequent occurrence; for instance, in 1900 only 15% of the globe's population resided in cities. In 2008 over half of the world's population lived in urbanised conurbations (UN, 2014). The trend sees no end at least in the medium term as current projections suggest 60% of the world's population to be urban by 2030. In 2017, 26 of the 33 megacities were in developing countries. Developing countries will dominate the megacity scene over 2030, adding five of the six new megacities in the period. African megacities will lead population growth, reflecting its position as the last major continent to undergo urbanisation.

Using a Food Insecurity Risk Index (FIRI) as the outcome variable, the results confirm a significant negative impact of urban growth on food security at the country level (S.Szabo, 2015). Rapid urban growth and an increasing number of megacities imply that more food will have to be available to people who live in an environment that has traditionally been perceived as inappropriate for the local agriculture. Almost all urban dwellers are net buyers of food but not supplied by local small-scale farmers. In developing countries, on the other hand, access to food due to inadequate infrastructure can be a major problem.

Thus, the mission is to organize an integrated agrifood supply chains to guarantee food access. To achieve this goal, the supply chain has to be completely integrated in order to internalized the cost and protect them from the volatility of international markets.

The bottom-up approach was used by Texere, an Italian partnership with local players, in Kongo Central (DRC). It means that local actors participate in decision-making about the strategy and in the selection of the priorities to be pursued in their local area. The involvement of local actors includes the population, economic and social interest groups and representative public and private institutions. Texere conceives the local people as the best experts on the development of their territory. "The valuation of local skills and knowledge does not only boost the self-awareness of local people and changes their perception of the area in which they live, it also fosters innovative solutions and competitive advantage of value-adding activities, ultimately of the territory itself." (Lukesch & Schuh 2007).

The project of the agroindustrial platforms to be implanted at Lukula in Central Congo Province (Democratic Republic of Congo) was funded by the World Bank with a grant of 12 million dollars. The goal is to improve agro-industrial production in the Democratic Republic of the Congo. The Country, while expressing great agricultural potential, is however decidedly lacking in the organization of the integrated supply chain between agriculture and the final market, that is the urban area. On one hand, there is a traditional agricultural territory, and on the other an urban system with a strong growth but increasingly exposed to imports of food. This project will involve about 1,000 family farms and about 4.000 Ha in partnership with Texere



Governance: relationship between private stakeholders and Public Institutions				
<b>Private business</b>	<b>Business Development Services:</b> Crops and vegetables post-harvest for grains	<b>Business Development Services:</b> Fortified flour	<b>Business Development Services:</b> .....	<b>Business Development Services:</b> .....
<b>Public-private partnerships</b>	Quality control and lab for food safety			
	Extension service and technical services			
	nursery and experimental fields for varieties			
	Animal feeds: storage for grains, milling, logistics			
	Market Information Services			
Facilities: energy power; water and waste management				

Figura 6. Agropark in Africa



The Italian group is in charge of restructuring the industrial plants (former “Société forestière Agrifor” Lemba-Lukula) and supplying the machinery to produce palm oil, cassava flour and peeled rice for the domestic market. The construction phase will last about one year, following which the group will undertake to manage the agro-industrial platform for further three years. During this period, the group will be in charge of ensuring: the operation of the plant, the maintenance of the platform, organizing the agricultural producers and the logistics of supplying a sales network with the processed products.

A further innovative aspect of the project is given by the procedure of the World Bank tender: the Italian partnership is responsible for the design of the plant, structural implementation but also management and organization of the entire food chain. Furthermore, to strengthen the relationship with the social territory, the grouping of companies involved the Diocese of Boma as an operating partner of the Company TexereCongo. To this end, the group will act as a contracting entity delegated on behalf of the Cellule d'Exécution des Financements des États Fragiles - CFEF. The CFEF is an operational structure of the Ministry of Finance of the DRC.



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