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## Conference Paper

# Agroecological living laboratories (all-organic) from Romania "Beleza Store SRL ecological vegetable farm - Valcelele/Călărași" (case study)

## Provided in Cooperation with:

The Research Institute for Agriculture Economy and Rural Development (ICEADR), Bucharest

*Suggested Citation:* Toncea, Ion; Stanciu, Tudor; Rodino, Steliana; Toncea, Vladimir Adrian; Făltăneru, Gina (2022) : Agroecological living laboratories (all-organic) from Romania "Beleza Store SRL ecological vegetable farm - Valcelele/Călărași" (case study), In: Rodino, Steliana Dragomir, Vili (Ed.): Agrarian Economy and Rural Development - Trends and Challenges. International Symposium. 13th Edition, The Research Institute for Agricultural Economy and Rural Development (ICEADR), Bucharest, pp. 214-222

This Version is available at:

<https://hdl.handle.net/10419/301727>

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# AGROECOLOGICAL LIVING LABORATORIES (ALL-ORGANIC) FROM ROMANIA "BELEZA STORE SRL ECOLOGICAL VEGETABLE FARM - VALCELELE/CĂLĂRAȘI" (CASE STUDY)

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**Abstract:** *Since 2005 when, at the initiative of the Finnish Presidency, the European Network of Living Laboratories (ENoLL) was established, the term "living laboratory (LL)" has spread throughout the scientific and technical world because: it aims to stimulate innovation in all its complexity, it can be understood and used according to the particularities of each component of sustainable development - nature, society and economy and in different ways - as a means of stimulating innovation, a multiple approach way, a working methodology, a development strategy, a way to support the transition towards local agri-food sustainability, concept in (re)designing business models, etc. and applied relatively easily, with the help of information and communication technology (ITC), then promising and now fashionable and in full creative momentum in both urban and rural environments. The paper presents the first results of the research project "Living Agroecological Laboratories for the promotion of resilient organic production systems - ALL-Organic", code ERANET-COREORGANIC-ALL-Organic, CORE Organic Cofund financing scheme for the period November 15, 2021 - November 14, 2024, regarding the identification of the specific characteristics of the Agroecological Living Laboratory (ALL-Organic) "SC Beleza Store SRL", corresponding to the structural components of any Agroecological Living Laboratory (ALL): Mission, Activities, Resources, Participants and Context.*

**Keywords:** *living laboratory, agroecology/agroecosystem, field vegetables.*

**JEL Classification:** Q12

## INTRODUCTION

Today, perhaps more than ever in history, humanity faces many environmental problems simultaneously – climate change, especially global warming and acid rain, land degradation, biodiversity loss, air, water and soil pollution, and contamination of agricultural products and food with substances toxic, etc., economic - the financial and energy crisis and social - inequalities, especially in terms of living standards, human migration, unemployment and, at the same time, the lack of qualified labor, the health crisis as a result of *the unexpected appearance and the galloping evolution of some diseases, more or less incurable (coronaviruses, cancer, AIDS, nutritional diseases, stress, drug and alcohol addiction, etc.) and political-military crises.*

The most important examples of success in solving some of these problems are the business models based on the "Living Labs" concept, an approach suggested for the first time in 1985 by

William (Bill) J. Mitchell of Massachusetts Institute of Technology (MIT) combining the vision of a digital future with a new style of creative invention, initially in the field of smart/future homes and cities and then generalized in the scientific and technical world since Mats Eriksson et al, published in 2005, the work "*State-of-the-art in using Living Labs approach to user-centric ICT innovation – a European approach*" (Eriksson et al., 2015) and The Presidency of Finland established, in 2006, the European Network of Living Laboratories (EnoLL) with the aim of promoting the concept of living labs to influence EU policies, to improve existing living labs and enable the implementation of this concept globally. This initiative stimulated innovation by moving research out of laboratories in the real life of cities and regions, where citizens and users were encouraged to cooperate with researchers, developers and designers to contribute to the whole innovation process [8. 9]. ENoLL also lists five elements that must be present in a living lab: (1) active user involved, (2) real-life setting, (3) multi-stakeholder participation, (4) multi-stakeholder approach methods and (5) co-creation (Mc Phee et al., 2021).

Another important achievement regarding the characterization of living labs in general and urban living labs in particular is the book "Urban Living Labs - A living lab way of working" written and published in July 2017 by Kriss Steen & Ellen van Bueren from the University of Technology from Deft(Steen and Van Beuren, 2017). Based on a literature review of living labs, urban living labs and a number of 90 local innovation projects in the Amsterdam region, the following defining characteristics of urban living labs (LLUs) were identified:

**Table 1. Defining characteristics of real-life urban living labs**

	<b>Characteristics</b>
<b>PURPOSE</b>	<b>Innovation</b> <i>New product development to find new solutions to existing or new problems</i>
	<b>Developing knowledge for replication</b> <i>Producing and sharing knowledge about products and the processes developed to make these products</i>
	<b>Increasing urban sustainability</b> <i>Sustainable development emphasizes the need for sustained local solutions</i>
<b>ACTIVITY</b>	<b>Development of innovation</b> <i>Living labs aim to develop an innovation or product and not only, for example, test or implement a pre-developed solution</i>
	<b>Co-creation</b> <i>Participating actors together shape the innovation process</i>
	<b>Iterate between activities</b> <i>Feedback gathered from product usage and evaluation is used for further product development</i>
<b>PARTICIPANT</b>	<b>Users, private actors, public actors and knowledge institutes</b> <i>Actors in these four groups actively contribute to the innovation and development process that takes place in a living laboratory</i>
	<b>The power of decision</b> <i>All participants, including users, consumers, have decision-making power in the different stages of the innovation process</i>
<b>CONTEXT</b>	<b>Real-life usage context</b> <i>The activities of the living lab are implemented in a real usage context</i>

Source: Steen & vn Buearen, 2017

From these scientific reference works mentioned above it is clear that the theoretical and applied achievements in the field "Living Labs (LLs)" refers to:

**1) Definition:** LL is a user-centered research methodology for detecting, prototyping, validating and refining complex solutions in multiple and evolving real-life contexts(Eriksson et al., 2015); or LLs are ecosystems user-centered open innovation based on a systematic user co-creation

approach that integrates research and innovation processes into real-life communities and environments - ENoLL cited by (Mc Phee et al., 2021) and more comprehensive: LLs are open innovation ecosystems in real-life environments that use iterative feedback processes throughout an innovation's lifecycle approach to create sustainable impact. They focus on co-creation, rapid prototyping and testing and scaling up innovations and businesses, delivering (different types of) shared value to the stakeholders involved. In this context, living labs function as intermediaries/orchestrators between citizens, research organizations, companies and government agencies/levels (MIT) .

From a methodological perspective, living labs are networks composed of heterogeneous actors, resources and activities that integrate user-centered research and open innovation (Leminem et al., 2012) , and from an infrastructure perspective, they can be seen as facilities that enable experimentation and co-creation with users from real-life environments (Sundramoorthy et al. 2011).

Also, "Living Lab" concept can be understood in other ways - tool to stimulate innovation, multiple approach, work methodology, development strategy, way to support local transition to agro-food sustainability, concept in (re)designing business models, etc.

**2) Characteristics:** There are NO standard LLs (Eriksson et al., 2015), because there are no standard users either,

**3) Focus on 3 key areas:** User (client, source and provider of ideas, knowledge and practical experience and with innovation skills), Technology (including IT) available and Business (Models) (Osterwalder and Pigneur, 2017);

**4) Unreserved and widespread use of Information and Communication Technology (IT):** as a tool for participatory (re)design of Living Labs and sustainable development of society in which users/citizens are involved (Eriksson et al., 2015);

**5) Integration of Research and Innovation in real life, according to their characteristics** summed up in the following quote from Per Eriksson „research transform money to knowledge and competence; innovation, on the other hand, transforms knowledge and competence into money and value”. Knowledge from research and real life and IT are the most important components in the innovation process, but they are optimally leveraged only if the participants in this process have the ability to cross-interact (Eriksson et al., 2015);

**6) Value creation, perhaps unique and/or customized–** because if *"You will create, you will have"*, and if *"You will not create, you will not exist"* [Octav Onicescu], and value is understood as something good, desirable and important for Nature, Society and Economy (especially in Technology and Market).

**7) Establishment of science parks in the vicinity of Universities and Testing & Experimentation Platforms** strongly stimulated the innovation process and was successful as a result of the creation of new businesses, probably of the Living Labs type, in high-tech fields (Eriksson et al., 2015);

The rather gloomy international context, described at the beginning of this chapter, is also noticed in countries that support their economy, in particular, on agricultural production, such as Romania, but less so in those with developed ecological agriculture, since this can contribute, at least in part, to solving the big contemporary problems (Toncea et al., 2011) , because it is the most strictly regulated and controlled agricultural system in terms of land cultivation technologies, animal welfare, the quality of agricultural and food products and the quality of the environment, and the only source of certified "living food" (Toncea et al., 2011) . The problem is that organic agriculture does not produce food and agricultural products according to the demand, taste and own budget of

consumers/users/citizens, because: only part of the agricultural area (maximum 25% in the European Union) is cultivated in an organic system, the wishes of all consumers and retailers are not known, the processing of agricultural products is poorly developed and often takes place far from the place of agricultural production and trading centers, and because it is not supported to cope with the fluctuation of the market for agricultural products and certified organic food.

In the field of Agroecology, a first significant step was taken by the International Working Group made up of scientists from the G20 (19 countries + the European Union) in the field of agroecosystems, established at the proposal of the Canadian government in 2018 (Mc Phee et al., 2021). In 2019, the G20 Group concluded that both the Canadian and French case studies are representative of the definition of an agroecosystem Living Laboratory, or agroecosystemic, and identified, based on the Steen & van Bueren (2017) template, the defining characteristics of Agroecosystem Living Laboratories, or regarding Agroecosystems (Mc Phee et al., 2021):

***ALLs - Agroecosystem Living Laboratories or Agroecosystems are transdisciplinary approaches involving farmers, scientists and other interested partners in the co-design, monitoring and evaluation of new and existing agricultural practices and technologies to improve their effectiveness and early adoption***(Mc Phee et al., 2021).

For the expansion of the concept of Living Labs (LL) in agriculture, substantial support is expected from the project "The European Agroecology Living Lab and Research Infrastructure Network (ALL-Ready) - preparation phase" financed by the European Union through the Horizon 2020 Program for research and innovation, grant agreement no. 101000349, for the period November 2020 – October 2023 and coordinated by Dr. Heather McKhann from INRAE/France. The main objective of this project is to prepare a framework for a future European network of Living Labs – LL (Living Labs) and Research Infrastructure (Ris), which will be called "AgroEcoLLNet" and will enable the transition to agroecology throughout Europe(ALL Ready project) .

For the Agroecological Living Laboratories (ALLs) in Romania, the project is also important ***Agroecological Living Laboratories for the promotion of resilient organic production systems - ALL-Organic***", code ERANET-COREORGANIC - ALL-Organic, which takes place between 15 November 2021 and 14 November 2024 and in which the Romanian Association for Sustainable Agriculture (ARAD) is a partner (<https://uefiscdi.gov.ro>). The general objective of the ALL-Organic project is to build a functional network of experiences, models and farms capable of promoting and supporting the development of diversified ecological agri-food systems, with the aim of obtaining productions of robust and resilient ecological crops, by involving actors in the agri-food system "from field to fork". The project will be based on a network of Agroecological Living Laboratories or Agroecology (ALL) in organic agriculture aimed at implementing and scaling up systemic agroecological innovations. Such socio-technical innovations are aimed at strengthening local sustainable, diversified, low-input agri-food productions through transdisciplinary and multi-actor activities [11]. An important guide for the characterization of Agroecological Living Labs is also the scientific work "The Defining Characteristics of Agroecosystem Living Labs", authors Chris McPhee, Margaret Bancercz, Muriel Mambrini-Doudet, François Chrétien, Christian Huyghe and Javier Gracia-Garza, published in 2021 (Mc Phee et al., 2021).

## MATERIALS AND METHODS

The studies were carried out in the period 2020-2022 and were of two types - documentary or office research, based on written documentary sources, especially articles and other scientific and

informative publications related to the keywords of this scientific report: living laboratory, agroecology /agroecosystem, characteristics, field vegetables and field research, in the farm of field vegetables cultivated in an ecological system of "Beleza Store SRL", work point located in Vâlcelele commune (NUTS 4), Călărași county in the South Region - Muntenia, in a very large plain with chernozem type soil and arid climate. Also, in this region, in the year 2021, about 98 ha were cultivated in an ecological system with field vegetables, including melons and strawberries, (table 2), which, compared to the regional average area of 153 ha (MADR data) and above all, with the agroecological potential (8559 – 12836 ha) and with the total number (3274525) and from the rural environment (1925335) of inhabitants, potential consumers of ecological vegetables in the region, it is an insignificant surface. What seems encouraging is the fact that, according to MADR data, of the 98 ha area cultivated with vegetables, 41% is under conversion and, with proper counseling, could be true ALLs.

**Table 2. The area cultivated with field vegetables, including organically certified melons and strawberries in 2021, the agroecological potential and the total number of inhabitants in the rural area in the development region "Sud-Muntenia"**

County	Area cultivated with field vegetables in ecological system (ha)		Agroecological Potential (Vegetables 2008)		Residents <sup>xx</sup> (2008)	Villagers <sup>xx</sup> in the countryside (2008)
	(Ha)	(%)	Minimum (ha)	Maximum (Ha)	No.	No.
Arges	1.34	1.37	929	1393	643762	337266
Calarasi	13.88	14,17	506	760	313626	193268
Dambovita	13.87	14,15	2514	3770	520849	366607
Giurgiu	20.42	20.84	1024	1536	282554	194952
Ialomița	12.52	12.78	1697	2545	288725	156446
Prahova	30.99	31.63	785	1177	817632	405428
Teleorman	4.96	5.06	1104	1655	407377	271367
<i>Total</i>	<i>97,98</i>	<i>100</i>	<i>8559</i>	<i>12836</i>	<i>3274525</i>	<i>1925334</i>

Source: www.madr.ro - ecological agricultur ex and Statistical Yearbook of Romania 2009xx

The research carried out focused on the distinctive characteristics of "SC Beleza Store SRL" regarding the mission, activities, resources, participants and context, structural components identified in the majority of Viu Agroecological or Agroecosystemic Laboratories in the specialized literature. A good part of this information was collected on the occasion of the "Seminar and Study Visit" event organized on 18.07.2022 by ARAD at the organic vegetable farm "Beleza Store SRL" Vâlcelele, Jud. Călărași, which was attended by researchers (8), farmers (4), consultants (2), councilors (2), students (1), representatives of the local administration (1) and ARAD (1), traders (1) and consumers (1).

## RESULTS AND DISCUSSION

According to art. 6 of the Constitutive Act Updated on 18.08.2021, the commercial company "Beleza Store SRL" has the field of activity GROUP 011 "Cultivation of non-permanent plants" and as its main activity CLASS 0113 "Cultivation of vegetables and melons, roots and tuberculiferae".

According to Fig. 1, the "Beleza Store SRL" business model has 5 (five) structural components - Mission, Activities, Resources, Participants and Context, each having 2-3 distinctive characteristics.

**MISSION**"Beleza Store SRL" has 2 (two) specific characteristics:

**1. Product innovation**–the cultivation of field vegetables in an ecological system, unique from a nutritional and therapeutic point of view as living food (*any agricultural or natural product, consumed instinctively by humans and/or animals and plants, raw or (semi) processed by biological, mechanical and physical methods that maintain its vital qualities*) (Toncea et al., 2011) ,with high added value and commensurate with consumer demand and purchasing power, as well as the marketing of organically certified fresh vegetables packaged and unpackaged (bulk) according to the Global GAP standard

**2. Preservation of rural sustainability**based on functional biodiversity following long-term rotation (4 - 6 years, depending on market requirements) of crops (alfalfa, mix of ornamental plants and flowers, pumpkins, peppers, aubergines, strawberries, sweet potato, mix of oats and peas ), of the diversified ecological technologies of their cultivation and friendly to the environment and of the employment of local labor force (Table 3).

**Table 3. Dynamics of the number of employed workers, their domicile and structure at "Beleza Store SRL"**

The year	Permanent			Seasonal			
	Barbie	Ladies	domicile	Barbie	Ladies	domicile	Employment Period
2020	2		Vâlcelele, Călărași County	5	2	Vâlcelele and Ciocănești, Călărași County	May to November
2021	2			1	6	the hills, Calarasi County	May to November
2022	2	1			9	Vâlcelele and Dragoș Vodă, Călărași County	May to November

**ACTIVITIES** carried out by "Beleza Store" SRL are:

**1. Research – Development – Testing – Implementation**at the farm level, all focused on the consumer and materialized in reports and scientific reports developed by the company administrator in the framework of the doctoral thesis "The economic, social and environmental impact of the integrated protection of vegetable plants grown in an ecological system", as well as in the dissemination , on the occasion of the field day, of knowledge regarding the technology of cultivating field vegetables in an ecological system and the modern techniques of marketing fresh vegetables, ecologically certified.

**2.Co-creation**,together with employees, customers and partners, of agroecological technologies and techniques for selling organic field vegetables corresponding to seasonal, or/and (multi)annual environmental disturbances (eg climate change and soil fertility decrease), economic (eg high input costs) and social (eg labor shortage) and the increasingly frequent demand for agricultural products and ecological food of the living food type.

**THE RESOURCES** of "Beleza Store SRL" are important in creating, delivering and capturing value, penetrating markets, maintaining customer relationships and generating revenue (Toncea and Iordache 2020) and in several ways: Agro-pedoclimatic – flat land, continental climate with cold winters and hot summers, chernozemous soil and water for deep irrigation (60 m), favorable for vegetable crops, economic – own ecological technologies for cultivating field vegetables and human – ressource of young, local and job-trained labour.

**Table 4. Agroecological Living Laboratory "Beleza Store SRL"**

<b>components</b>	<b>Distinctive features</b>
<b>MISSION</b>	<b>Product innovation</b> <i>organically unique certified field vegetables such as live food</i>
	<b>Restoring and preserving rural sustainability</b> <i>based on functional biodiversity and the employment of local labor</i>
<b>ACTIVITY</b>	<b>Research – Development – Testing – Implementation</b> <i>for solving environmental, technological and social problems</i>
	<b>Co-creation</b> <i>of agroecological technologies and techniques for selling organic field vegetables</i>
<b>RESOURCES</b>	<b>Agro-climatic</b> <i>Agricultural land, continental climate, black soil and deep water</i>
	<b>Economic</b> <i>Technologies for cultivating field vegetables in an ecological system</i>
	<b>Social</b> <i>Local workforce trained on the job</i>
<b>PARTICIPANTS</b>	<b>Customers</b> <i>CARREFOUR Romania, FRESHFUL, Groceries and the "Young Mums" Social Group</i>
	<b>Farmer</b> <i>and its employees, permanent and seasonal</i>
	<b>Partner</b> <i>Academic Public Actors and Non-Profit Civil Actors (NGOs)</i>
<b>CONTEXT</b> <i>(from real life)</i>	<b>Legislative</b> <i>International and national agro-ecological normatives and regulations</i>
	<b>The Associative Environment</b> <i>Part of a network (associations)</i>

**Participants** to the activities of "SC Beleza Store SRL" are, in the order of their importance:

**1. Customers**, the heart of any business model (Osterwalder and Pigneur, 2017) , including ALLs, are in this case: CARREFOUR Romania, FRESHFUL, CORA, Groceries and direct consumers: Social group "Young mothers" (tab. 4). Among them, the most important and constant customer is CARREFOUR Romania, with the largest volume (67 - 81%) of goods purchased each year, followed by Groceries (9.71 - 18.82%), FRESHFUL (17 .85% in 2022) and the Social Group "YOUNG MOTHERS" (2.57 - 6.10%), with constant and growing interest in the vegetables produced by "SC Beleza Store SRL".

**Table 5. "Beleza Store SRL" customers and sales volume in the period 2020 - 2022**

<b>CUSTOMERS</b>	<b>SALES VOLUME (%)</b>		
	<b>2020</b>	<b>2021</b>	<b>2022</b>
CARREFOUR Romania	81.00	74.23	66.90
CORA	5.06	2.75	0.44
FRESHFUL	-	-	17.85
Grocery	11.35	18.82	9.71
Social group "YOUNG MOTHERS"	2.57	4.20	6.10

"SC Beleza Store SRL" is also permanently concerned with relations with customers, listening to their wishes and identifying their needs. Maintaining customers is done through seriousness and professionalism - diversified production and constant deliveries, minimum 3 deliveries/week in the long term "May-December", compliance with the delivery schedule, confirmation of product quality by performing analyzes (nitrates and pesticide residues). The farmer maintains a close relationship with customers by phone calls, promotions and prompt and positive response to requests. Even if it is not openly acknowledged, the influence of customers on "SC Beleza



SRL" is felt on the entire value chain (from fork to fork), but most visible through the adaptation of crop rotation to market requirements.

**2. The farmer and farm employees**, permanent (2) and seasonal (7 – 9), dedicated to the ecological management of the cultivation and marketing of field vegetables in accordance with international and national organic farming regulations and customer requirements (standards).

**3. Key partners** from the Academic environment, such as the Faculty of Horticulture of USAMV Bucharest and the Research Station - Development for Plant Culture on Sandy soils, from Dăbuleni and from the Association environment, such as the Romanian Association for Sustainable Agriculture (ARAD);

**CONTEXT** or favorable relevant circumstances that precede, accompany, succeed or mitigate a fact, an action or a phenomenon related to Beleza Store SRL, are of two types:

**1. Legislative Context** -International agro-ecological normative acts (regulations and other legislative acts) (Regulation 848/2018 and other 34 specific Regulations) and national (OG 34/2000 and nine other orders, ordinances and decisions);

**2. The Associative Environment**– Networks (Associations) of farms, such as the Romanian Association for Sustainable Agriculture.

## CONCLUSIONS

1. In real life there are 4 types of Living Labs – living labs (LL), urban living labs (LLU), agroecosystem living labs (LLA) and agroecological living labs (ALL-Organic).

2. The Agroecological Living Laboratory (ALL) is a real-life system, open to new ideas, oriented towards and supported by users - customers, including those from the associative and information technology (IT) environment, co-creative and/or co-innovative of products, such as living food and services for common use and for the benefit of the environment, economy and society.

3. Any ALL has 5 components, of which 3 are methodological: Mission, Activities and Resources and two are infrastructural – Participants and Context, and each component has two or three distinctive characteristics.

4. The distinctive characteristics of ALL "Beleza Store SRL" are: product innovation, restoration and preservation of rural sustainability, research-development-testing-implementation, co-creation, favorable natural, economic and human resources, customers, staff, partners, legislation and the associative framework.

5. ALL can be any farm or ecological peasant household, in conversion or certified, as well as any sustainable conventional or traditional agricultural unit and their structural and functional components producing goods and services that satisfy the needs of food, clothing and of the consumer and were produced and are in harmony with the environment.

6. Every ALL is a business model/case , but not every agroecologic business models/cases is a LL.

7. ALL standard does not exist, because there are no standard users either.

## ACKNOWLEDGEMENT

This paper received funding from the project "*Agroecological Living Laboratories for the promotion of resilient organic production systems - ALL-Organic*", code ERANET-COREORGANIC - ALL-Organic, pursuant to contract no. 251/2021.

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