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Cross-Border Alliance for Climate-Smart and Green Agriculture in the Black Sea
Basin (AGREEN)

Subsidy Contract No.BSB-1135

PROCEEDINGS

from the International Business
Conference "Internet Connectivity in
Agriculture in the BSB"

Joint Operational Programme Black Sea Basin 2014-2020

ANATOLIKI Foundation /PP6/

July 2022

Joint Operational Programme Black Sea Basin 2014-2020 is co-financed by the European Union through the European Neighbourhood Instrument and by the participating countries: Armenia, Bulgaria, Georgia, Greece, Republic of Moldova, Romania, Turkey and Ukraine.

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Introduction

The International Business Conference "Internet Connectivity in Agriculture in the BSB" was held on the 28th of June 2022, in Thessaloniki, Greece in the framework of the project "Cross-Border Alliance for Climate-Smart and Green Agriculture in the Black Sea Basin" (AGREEN, BSB-1135).

The event was organized and hosted by **Anatoliki S.A. - Organization for Local Development** in collaboration with the Agricultural Cooperative of Vassilika and took place in Makedonia Palace Hotel, on the imposing Thessaloniki New Waterfront.

The purpose of the International Conference was to display internet connectivity and networking tools for the support of agriculture in the Black Sea Basin presented by participants in the project and guest speakers. The main objective of the conference was to present the innovative networking tools for the support of climate-smart agriculture (CSA) and its products among which is the AGREEN Internet platform.

The AGREEN project partners from Armenia, Bulgaria, Georgia, Romania and Turkey attended the meeting, together with representatives from the municipality of Themi, the agricultural cooperative of Vassilika, ANETH Organization for Local Development, OECON Consultants Group, researchers, agronomists and other local and international agri-entrepreneurs took part in the conference.

Below are presented the agenda of the Conference, as well as synopsis of the presentations and conclusions.

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Table of contents

1. Agenda.....	4
2. Presentation of speakers.....	7
3. Synopsys of the presentations.....	9
4. Panel and discussions conclusions.....	121

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Cross-Border Alliance for Climate-Smart and Green Agriculture in the Black Sea Basin
(AGREEN), BSB-1135

International Business Conference "Internet Connectivity in Agriculture in the BSB"

AGENDA

27th of June

Thessaloniki, Greece

Arrival day for the international participants, accommodation in the hotels, technical preparation of the event

28th of June, Thessaloniki | Greece
Venue: Hotel Makedonia Palace

2. M. Alexandrou Av, 546 40, Thessaloniki, Greece
T: +30 231 089 7197, E: info@makedoniapalace.gr

Registration

10:00

Networking Session & Coffee Break

Welcome remarks

10:30

- ❖ *Iakovos Sarigiannis, General Director of ANATOLIKI SA Organisation for Local Development*
- ❖ *Violeta Dimitrova-Naydenova, AGREEN Project Coordinator, Dobrudzha Agrarian and Business School Association (DABS), Bulgaria, Project Coordinating Partner*

Project overview

11:00

- ❖ *Violeta Dimitrova-Naydenova, AGREEN Project Coordinator, Dobrudzha Agrarian and Business School Association (DABS), Bulgaria, Project Lead Partner*

Presentation of the AGREEN Internet Platform and Services

11:30

- ❖ *Violeta Dimitrova-Naydenova, AGREEN Project Coordinator (BG)*

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Digital Innovation Hub in the agrifood sector. The case of the rice value chain. The pilot action of the Region of Central Macedonia within the INTERREG EUROPE project RUMORE. 12:00

- ❖ *Dr. Notis Argyriou, Institute of Applied Biosciences/ CERTH/ THESSALONIKI*
- ❖ *Dr. Konstantinos Koukaras, Information technology Institute/ CERTH/ THESSALONIKI*

Questions & Answers 12:30

Lunch break & Networking 12:45

The digital technologies as a tool for the measurement of the environmental footprint in the agrifood sector. The INOFA case. 14:00

- ❖ *Dr. Vicky Krystallidou, American Farm School in Thessaloniki*

Questions & Answers 14:30

The digital technologies as a tool for the measurement of the environmental footprint in the agrifood sector. The INOFA case. 14:45
Αριστοτέλης Ταγαράκης, Ερευνητής Γ, IBO/EKETA

- ❖ *Dr Aristotelis Tagarakis, Institute of Bio-Economy/ CERTH*

Questions & Answers 15:15

Networking Session & Coffee Break 15:30

AGREEN COP and Alliance, Good examples from local farms (AGREEN Alliance members) introducing the modern technologies in the BSB 16:00

- ❖ *Violeta Dimitrova-Naydenova, AGREEN Project Coordinator (BG)*
- ❖ *AGREEN COP coordinators from PPs*

Networking Session & Feedback 16:30

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Closing of the event

17:30

29th of June

Thessaloniki, Greece

Technical meetings, preparation of the proceedings from the conference, preparation of dissemination materials

Departure of the international participants

GENERAL INFORMATION

- Aim of the conference:** Raising the awareness and practical knowledge of the farms and enterprises in agriculture as well as the other project stakeholders on the modernization opportunities provided by Internet and the benefits of the on-line connectivity for the securing the sustainability of the sector.
- Organizer:** ANATOLIKI - Organisation for Local Development (Project Partner 6)
- Location:** Thessaloniki, Greece
- Date:** 28th of June, 2022
- Participant groups:** Agricultural producers, cooperatives, associations, experts, regulatory bodies, business branch organisations, interest groups advocating sustainable development, IT companies and others.

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Presentation of speakers

<i>Violeta Dimitrova-Naydenova, DABS (BG)</i>	
<i>Short bio</i>	Background: Over 15 years of experience in project management of EU and nationally funded programs and initiatives. Curriculum developer and VET expert in educational and training institutions, developer of training materials for adult learners, VET accreditation expert. Expert trainer in courses in project management, civil society and NGO sector administration.
<i>Field of work</i>	International projects management, education and training, NGO activities
<i>Expertise</i>	EU Project Management, International Cooperation
<i>Position or role in the project</i>	AGREEN Project Coordinator (BG)
<i>Iakovos Sarianniis, General Director of ANATOLIKI SA Organisation for Local Development</i>	
<i>Short bio</i>	In the area of Eastern Thessaloniki, the Local Government has decided to implement a strategic plan with the aim of transforming it into a green zone, respectively with similar international initiatives. ANATOLIKI SA is a tool for a faster and more complete approach to this goal. A key policy in its operation is the combination of parallel interventions in all sectors of society and the combination of elements of integrated development in all its individual actions, utilizing its participation in projects co-financed by EU programs.
<i>Field of work</i>	General Director
<i>Expertise</i>	Mechanical Engineering
<i>Position or role in the project</i>	AGREEN Project coordinator (EL)
<i>Dr. Notis Argyriou, Institute of Applied Biosciences at CERTH - Thessaloniki</i>	
<i>Short bio</i>	The Institute of Applied Biosciences at the Centre for Research and Technology Hellas (INAB/CERTH) conducts research in the Life Sciences that extends from microbes to plants, animals and humans. The aim of INAB is to promote basic research, while providing solutions to important social needs related to health and well-being.
<i>Field of work</i>	Collaborating member of CERTH - Center for Research and Technology Hellas
<i>Expertise</i>	-
<i>Position or role in the project</i>	Guest speaker
<i>Dr. Konstantinos Koukaras, Information Technology Institute at CERTH - Thessaloniki</i>	
<i>Short bio</i>	ITI is one of the leading Institutions of Greece in the fields of Informatics, Telematics and Telecommunications. Since 1998 ITI has participated in a great number of Research and Development projects funded by European, Public investment funds and Services contracted by firms and other private legal entities.

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<i>Field of work</i>	-
<i>Expertise</i>	-
<i>Position or role in the project</i>	<i>Guest speaker</i>
<i>Dr. Vicky Krystallidou, American Farm School in Thessaloniki</i>	
<i>Short bio</i>	<i>Experienced Program Lead with a demonstrated history of working in the education management industry. Skilled in E-Learning, Data Analysis, Lecturing, Animal Nutrition, and Science. Strong professional with a PhD in Agriculture focused in Ruminant Nutrition from The University of Reading Reading, UK.</i>
<i>Field of work</i>	<i>Associate Director - Strategic Project Management Office at American Farm School</i>
<i>Expertise</i>	<i>PhD in Agronomy and animal specialist in the American Farm School</i>
<i>Position or role in the project</i>	<i>Guest speaker</i>
<i>Dr Aristotelis Tagarakis, Institute of Bio-Economy / CERTH</i>	
<i>Short bio</i>	<i>Dr. Aristotelis Tagarakis is Assistant Researcher at the Institute for Bio-economy and Agri- technology (iBO/CERTH) with expertise in precision agriculture. Dr Tagarakis received MSc degree in “Automation in Irrigation, Farm Structures and Farm Mechanization” and PhD degree in “precision agriculture” from the University of Thessaly, Greece. He has significant research experience working at various national, European, and other international projects.</i>
<i>Field of work</i>	<i>Precision agriculture, remote sensing</i>
<i>Expertise</i>	<i>Sensor networks in agriculture</i>
<i>Position or role in the project</i>	<i>Guest speaker</i>

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Synopsys of the Presentations

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Cross-Border Alliance for Climate-Smart and Green Agriculture in the Black Sea Basin

Grant Contract BSB1135

International Business Conference

"Internet Connectivity in Agriculture in the BSB"

28th of July 2022

Thessaloniki, Greece



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The project **Cross-Border Alliance for Climate-Smart and Green Agriculture in The Black Sea Basin (AGREEN)**, Ref. No. BSB 1135 is funded by the Joint Operational Program for Cross-Border Cooperation under the European Neighbourhood Instrument "Black Sea Basin 2014-2020", under Priority 1.2 "Increasing cross-border opportunities for trade and modernization of agriculture and related sectors".



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- Joint Operational Program for Cross-Border Cooperation under the European Neighbourhood Instrument "Black Sea Basin 2014-2020"
- Priority 1.2 "Increasing cross-border opportunities for trade and modernization of agriculture and related sectors"
- Duration: 30 months
- Period: 01.06.2020 - 30.11.2022





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Project **BACKGROUND**

- ✓ AGREEN project is based upon the concept of **Climate-smart agriculture** and unites multiple organizations from the region of Black Sea Basin.
- ✓ Agriculture is identified as major cooperation area for Black Sea countries, therefore we had the idea of linking the agents of the agricultural sector on transnational level.
- ✓ Our mission is to bring coherence within the actions taken against climate change and restore environmental stability, economic and food security for generations to come.



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The project “*Cross-Border Alliance for Climate-Smart and Green Agriculture in the Black Sea Basin*” /AGREEN/ aims to build capacities for networking and transnational knowledge-transfer base in order to escalate the drive for establishing climate-smart farming and maintaining higher rates of economical and social fulfilment as it is the evolution and future.



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SPECIFIC OBJECTIVES:

To design a common brand for agricultural products originating in the Black Sea Basin and produced in a climate-smart way.



To strengthen cooperation among the framers, entrepreneurs and professionals engaged in conservation and sustainable agriculture in the Black Sea region via improving the information exchange, peer learning and internet connectivity



To encourage the modernisation of agriculture in the Black Sea Basin by promotion of climate-adaptation models and by training young professionals to manage sustainable farms.



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CLIMATE-SMART AGRICULTURE

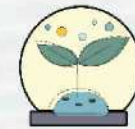
Climate-smart agriculture (CSA) is an approach that helps to guide integrated actions towards the transformation of agricultural systems and to effectively support the innovation and ensure food security in a changing climate.



Increase agricultural
productivity and incomes



Mitigate emissions



Enhance adaptation and resilience to
climate-change



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PROJECT CONSORTIUM

Project AGREEN is a joint initiative of 6 organizations from Bulgaria, Romania, Turkey, Georgia, Armenia and Greece among which education institutions who lead in applied research for agriculture and agri-business, a business support organization and a sectoral agency:

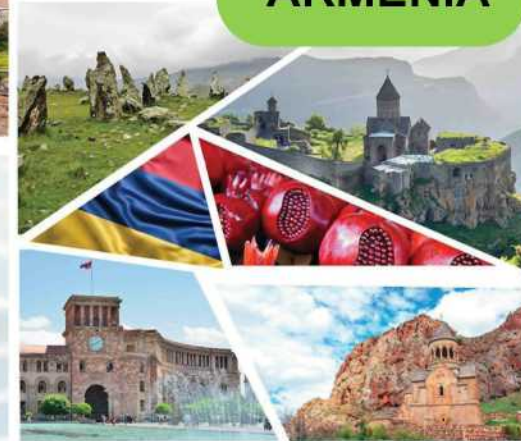
BULGARIA



TURKEY



ARMENIA



GEORGIA



ROMANIA



GREECE



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PROJECT PARTNERS:

6 countries from the Black Sea Basin

- Dobrudzha Agrarian and Business School (BG)
- "Ovidius" University of Constanta (RO)
- Tekirdağ Namık Kemal Üniversitesi (TR)
- Biological Farming Association Elkana (GE)
- International Center for Agribusiness Research and Education (AR)
- Development Agency of Eastern Thessaloniki Local Authorities (GR)



BULGARIA

ROMANIA

TURKEY

GEORGIA

ARMENIA

GREECE



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Local public authority

Local public authorities have great impact on the promotion of climate-smart entrepreneurship and their engagement with the CSA approach would have successful long-term effect over stakeholders' interest.



Interest groups, including NGOs

NGO and Interest groups influence public opinion and public policy regarding sustainable development therefore are one of the main target group of AGREEN. The added value of these organizations is really high because mainly the cooperation between NGOs and experts in this field is beneficial to the stakeholder network.



Higher education and research

This target group possess the expertise to create tools and innovations for modernizing the agricultural sector especially through their applied research. Moreover, the culture of future professionals and entrepreneurs who manage the agricultural and related sectors is deeply rooted in this stakeholder and their enormous impact over the knowledge in CSA field.



Business support organizations

Business branch organisations in agriculture mainly represent the small farms and enterprises. The AGREEN project considers the scope of business support organizations as developing business development organizations.



General public

Agriculture and food are universal grounds that presupposes the engagement of many people who do not belong to a specific target group. They can be qualified as representatives of the general public. All people with a conventional profile who are interested in the issue of climate-change and food security count here.



Small and Medium Size Enterprises

Small farmers are important of the local development of the agricultural regions, for sustainability of the communities and for the sustainability of the food chains. Sustainable and climate-smart agriculture depend on the sustainability culture of the farmers and on the way they manage the farms.

TARGET GROUPS:



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EXPECTED RESULTS:

1. Elaborated common brand for climate-smart agricultural produce originating in the BSB;
2. Better opportunities for CBC and trade in sustainable agricultural products in the BSB;
3. Cross-border network of like-minded professionals on climate-smart agriculture;
4. Enhanced capacity of young farmers and entrepreneurs to engage in sustainable farming;
5. Applied innovative climate adaptation models and shared good managerial practices for sustainable farming.



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GROUPS OF ACTIVITIES

M. Management

T1. Cross-border networking for the development of a regional brand for climate-smart agricultural production in the Black Sea Region

T2. Climate-smart Agricultural Practices in the Black Sea Basin

T3. Internet connectivity for information exchange and learning in climate-smart agriculture in the Black Sea Basin

T4. Entrepreneurial learning for climate-smart agriculture

C. Communication



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EXPECTED OUTCOMES:

T1. CROSS-BORDER NETWORKING FOR THE DEVELOPMENT OF A REGIONAL BRAND FOR CLIMATE-SMART AGRICULTURAL PRODUCTION IN THE BLACK SEA REGION

- A community of practice and alliance of organizations for climate-smart agriculture
- A regional brand and branding strategy for agricultural products originating in the Black Sea Basin and produced in a climate-smart way
- Interactive map of logistic centers for wholesale and retail trade in sustainably delivered agricultural produce
- International Business Conference on regional branding for climate-smart agriculture





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EXPECTED OUTCOMES:

T2. CLIMATE-SMART AGRICULTURAL PRACTICES IN THE BLACK SEA BASIN

- **Climate-smart crop models**, adapted to the environmental, social and economic conditions in the BSB region
- **Testing of the crop models on 3 experimental plots** in Bulgaria, Georgia and Turkey and providing the findings to the local farmers
- **International Business Conference** on models and best practices for climate-smart agriculture /BULGARIA/



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EXPECTED OUTCOMES:

T3. INTERNET CONNECTIVITY FOR INFORMATION EXCHANGE AND LEARNING IN CLIMATE-SMART AGRICULTURE IN THE BLACK SEA BASIN

- **An Internet Platform** for liaising sustainable producers and promotion of climate-smart agriculture in the BSB
- **Local business workshops** with the business representatives in the partner countries for presenting the platform and its services and benefits for the interested groups
- **International Business Conference** on Internet Connectivity in Agriculture /GREECE/



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EXPECTED OUTCOMES:

T4. ENTREPRENEURIAL LEARNING FOR CLIMATE-SMART AGRICULTURE

Integrative blended mobility training “Entrepreneurship for Climate-smart Agriculture in the BSB” AGREEN:

- Developed **training course** and organized **pilot training sessions** with international participation of young entrepreneurs who will further multiply the knowledge and the practices within their local communities /Bulgaria/
- Organized **local multiplier networking events** “Entrepreneurship for Climate-smart Agriculture in the Black Sea Basin” for multiplication of the results in the partner countries, where the piloting trainees will train local farmers in sustainable farms management



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Field trips (study visits) to the experiential plots for observation of the application of the climate-smart models

BULGARIA

30-31 May 2022

TURKEY

21-22 June 2022

GEORGIA

12-13 July 2022

TURKEY

25-27 July 2022

GEORGIA

9-10 August 2022

BULGARIA

6-7 September 2022



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Pilot training sessions “Entrepreneurship for Climate-smart Agriculture in the Black Sea Basin”

6-8 September 2022
3 days, Dobrich, Bulgaria



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International Business Conference on models and best practices for climate- smart agriculture in the BSB

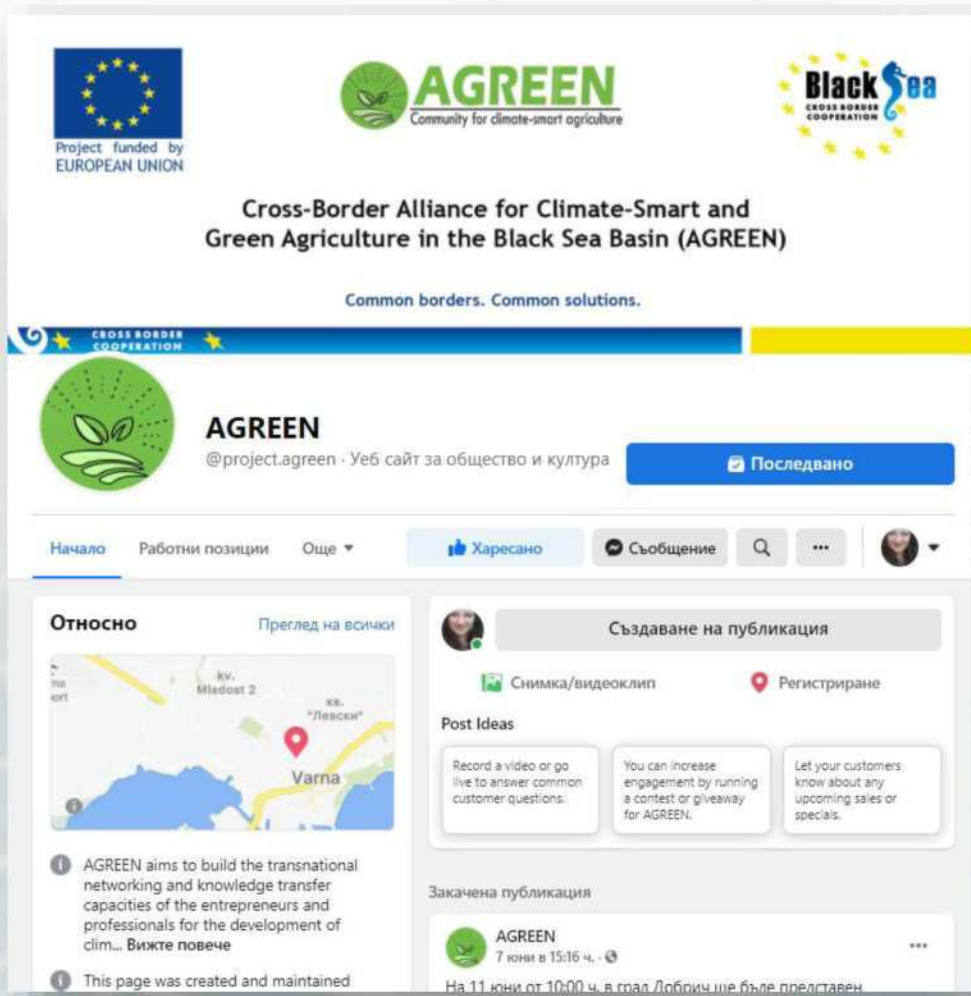
10-14 October 2022
2 days, Dobrich, Bulgaria



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Facebook page:

<https://www.facebook.com/project.agreen>



Group of activities T3:

Internet connectivity for information exchange and learning in climate-smart agriculture in the Black Sea Basin



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Cross-Border Alliance for Climate-Smart and Green
Agriculture in the Black Sea Basin
Grant Contract BSB1135



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Internet Platform for liaising sustainable producers and promotion of climate-smart agriculture in the BSB





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MAIN FUNCTIONALITIES

- AGREEN COP and AGREEN Alliance
- Climate-smart Agriculture in the BSB
- Best practices and Innovations for climate-smart agriculture
- AGREEN Climate-smart crop models
- Interactive map of logistic centres
- Cooperation for joint trading and export
- Agricultural Fairs and Farmers' Markets in the BSB
- Open education resources for sustainable agriculture (course "Entrepreneurship for Climate-smart Agriculture in the Black Sea Basin" training)
- Legislative support

AGREEN platform



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Web page:
www.agreen-project.eu



КЛИМАТОУСТОЙЧИВО
ЗЕМЕДЕЛИЕ





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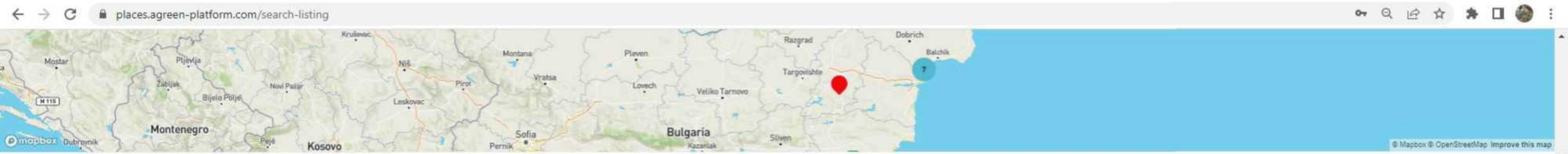


AGREEN
PLATFORM

Internet platform AGREEN: www.agreen-platform.com/

All Countries





Filter 70 results Maps

cities

- Istanbul
- Constanța
- Burgas
- Buzău

categories

- Local selling point
- Online sales platform
- Public markets
- Factory

Place Type

- Local selling point
- Online sales platform
- County neighborhood public markets

Tags

- Mother & Baby
- Baby Food
- Baby & Kids Cosmetics
- Gluten Free Products



Istanbul
"Biokent" Organic Market



Istanbul
"Ekolojikpazarlar.org" Buğday Association for Supporting Ecological Living & District Municipality



Istanbul
"City Farm" Organic Market



Istanbul
"Doga Evinizde" Organic Market



Istanbul
"Ekoorganik" Organic Market



Istanbul
"Eskitadinda" Organic Market



Istanbul
"Organigiller" Organic e-commerce platform



Denizi
"Sepeti Bostan" Organic e-commerce platform



Istanbul
Serente Organic

Interactive map AGREEN: <https://places.agreen-platform.com>



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AGREEN Climate-smart crop models

VS CONVENTIONAL GROWING

TRITICALE EXPERIMENT NO-TILL VS. CONVENTIONAL GROWING (BULGARIA)

Under constantly changing climate and locally specific meteorological conditions, the proper choice of a crop that would express resistant nature in a variety of locations is of key importance for optimal productivity and economic efficiency. At the same time, the ever-growing population increases the demand for high-quality food and forage resources.

In this respect, one way of achieving highly efficient production is to grow crops, which, on the one hand, have various applications as resources, and are, on the other hand, resistant to a wide range of stress factors and need comparatively low input of energy, plant protection products and fertilizers. One such plant that can completely meet these requirements is triticale.

Triticale is the first cereal crop that is entirely the product of human activity. Although the initial idea was to develop a hybrid between wheat and rye, at the contemporary stage of the crop development, triticale can be described as a separate biological species possessing traits entirely different from its initial parental forms. The modern hexaploid triticale cultivars are characterized by exceptionally high productivity of grain, which can reach over 1200 kg/ha. Such figures are significantly higher than the yield from common winter wheat and come close to the yields obtained from maize. Since these yields are obtained with considerably lower input than in wheat and maize, this is an indicator of the high production efficiency of triticale as a cultivated plant. However, triticale is of limited production in modern agriculture. This crop is not traditional neither for Bulgaria nor for Dobruzha region in spite of its good food and forage properties. Triticale remains a crop neglected by the farmers and the processors of raw materials since the consumer demands are low and its marketing as a grain resource is underdeveloped.

CROP MODEL
GROWING OF TRITICALE
BY THE NO-TILL METHOD VS. CONVENTIONAL GROWING

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[Download the Document](#)

WALNUT GROWING UNDER DIFFERENT IRRIGATION CONDITIONS

**WALNUT EXPERIMENT
GROWING UNDER
DIFFERENT IRRIGATION
WATER CONDITIONS
(TURKEY)**

Water, which covers a large part of the earth, has an indispensable importance for living things. However, only a small part of the water resources is usable. Unfortunately, the amount and quality of existing limited clean water resources are decreasing day by day due to population growth, rapid urbanization and rising living standards, agricultural practices based on heavy fertilizer and pesticide use, industrial activities and climate change.

In order to protect natural resources, the use of optimum soil and water resources has become mandatory. In the studies carried out, it is expected that the temperature will increase as a result of global warming, the precipitation will decrease, and therefore decrease in agricultural production. As a result of this situation, it is necessary to make optimal use of existing production facilities for a sustainable production.

World walnut production is spread over an area of 1.1 million hectares as of 2018. 3.6 million tons of walnuts are produced on this area. Turkey, which has a highly variable climate and a rich fruit growing culture, has a very important place in walnuts, as in most fruit species.

In this study, it is planned to carry out irrigation trials on walnut tree in order to protect water resources and maximize efficiency.

WALNUT GROWING UNDER DIFFERENT IRRIGATION WATER CONDITIONS

CROP MODEL

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<https://agreen-project.eu/goals-and-results-crop-models/>



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*Open education resources for sustainable agriculture:
Course “Entrepreneurship for Climate-smart Agriculture in
the Black Sea Basin” training*

1	CSA concept and approach / CSA in the BSB
2	Climate-resilient agro-food value chains
3	Managing sustainable farms
4	Financing CSA activities
5	Marketing for sustainable agricultural produce
6	International trade and cooperation

<https://agreen-platform.com/e-learning/>

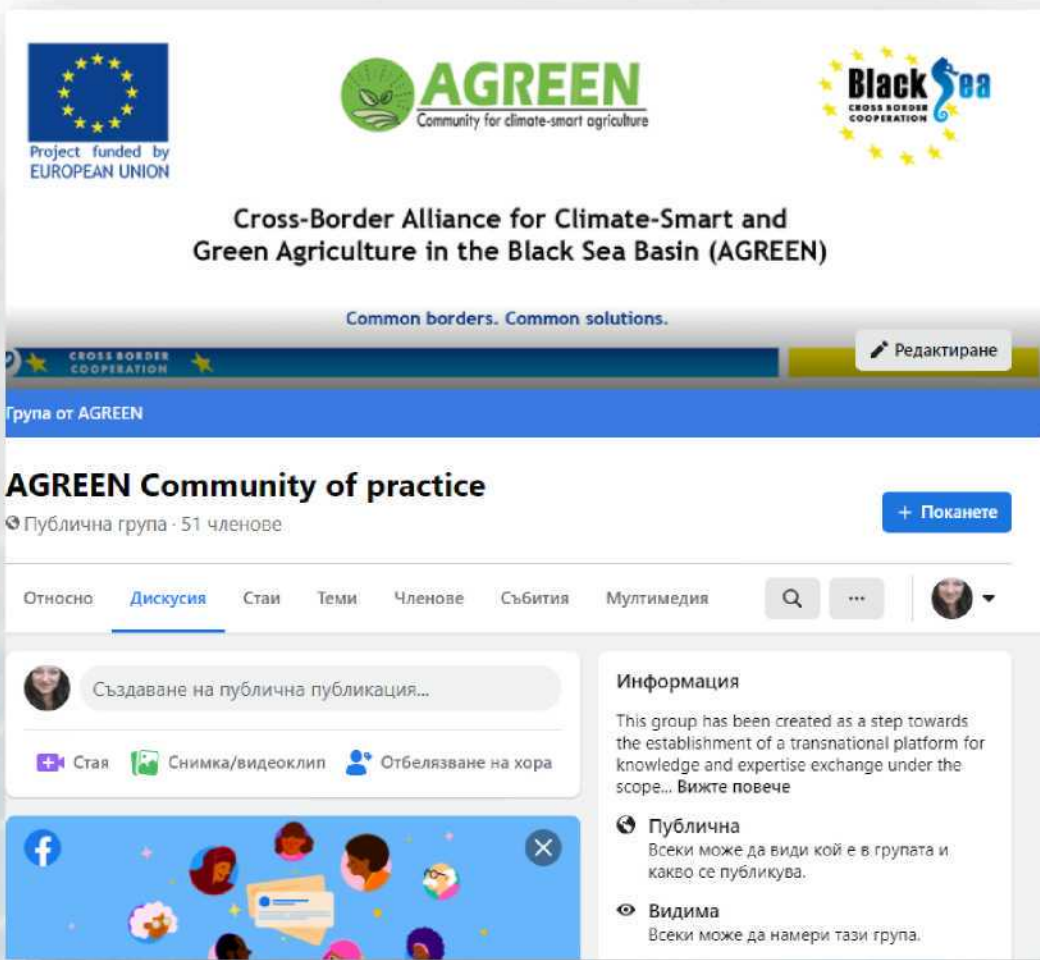


Training young farmers and students in climate-smart agriculture is a life-time investment that triggers the change in the management philosophy in the sector





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Facebook group:

AGREEN Community of practice



AGREEN
**COMMUNITY OF
PRACTICE**

HOME > COMMUNITY

Internet platform AGREEN: www.agreen-project.eu
Community of practice



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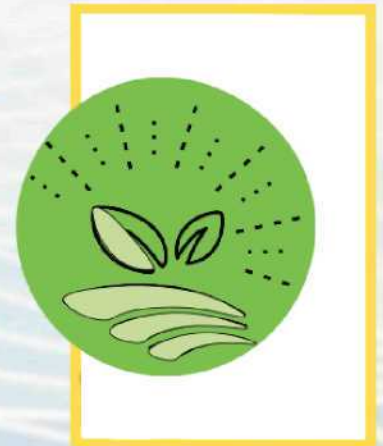
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„AGREEN COMMUNITY OF PRACTICE”

- AGREEN COP is a group of professionals who share common interests and expertise in the development of all aspects of climate-sustainable agriculture in the Black Sea basin.
- The community-of-practice (COP) approach is applied as one of the most efficient for building professional expertise and knowledge resulting in the establishment of an Alliance of organizations for regional branding, internet connectivity and learning in climate-smart agriculture.
- The Community and the Alliance unite researchers, practitioners, entrepreneurs, producers and their sectoral or umbrella organizations.
- The AGREEN COP has contact point in each partner country

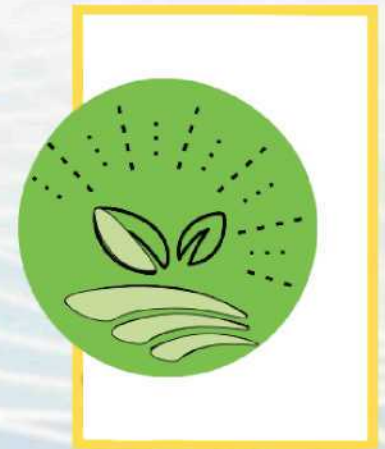




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Community of practice (COP)
is recognized tool for learning &
knowledge exchange.
Alliance of professionals and
practitioners is build in order to share
expertise and
experiece.





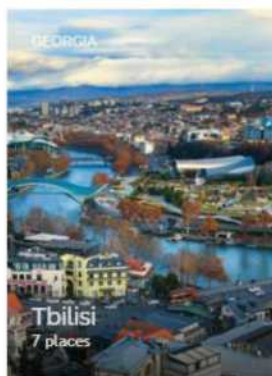
Agreen Interactive Map

Find Ex: Local selling point Where City

Popular: Larisa Denizli Darcheli

Popular cities

See all (34)



London

Interactive map AGREEN: <https://places.agreen-platform.com>



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EUROPEAN UNION



AGREEN

Community for climate-smart agriculture



Common borders. Common solutions.

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Web page: www.agreen-project.eu





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Community for climate-smart agriculture



Common borders. Common solutions.

**Thank you for your
attention!**

Joint Operational Programme Black Sea Basin 2014-2020 is co-financed by the European Union through the European Neighbourhood Instrument and by the participating countries: Armenia, Bulgaria, Georgia, Greece, Republic of Moldova, Romania, Turkey and Ukraine. This presentation was produced with the financial support of the European Union. Its contents are the sole responsibility of Association Dobrudzha Agrarian and Business School and do not necessarily reflect the views of the European Union.



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AGREEN
Community for climate-smart agriculture



Common borders. Common solutions.

AGREEN

**Cross-Border Alliance for Climate-Smart and Green Agriculture in
the Black Sea Basin**

Grant Contract BSB1135

**International Business Conference
"Internet Connectivity in Agriculture in the BSB"**

**28th of July 2022
Thessaloniki, Greece**

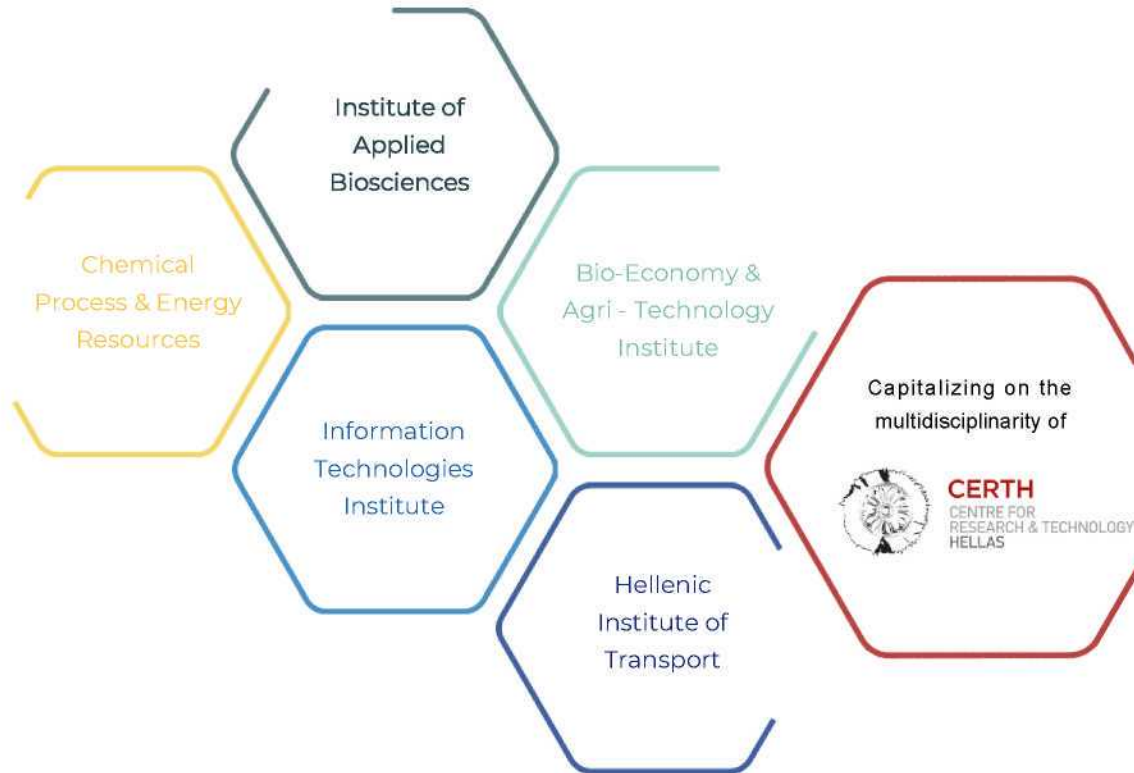
«Digital transformation of the rice sector or how to be resilient in periods of crisis»

«AGREEN, Cross-Border Alliance for Climate-Smart and Green Agriculture in the Black Sea Basin»

June 28 2022

Anagnostis Argiriou

Professor at the Department of Food Science and Nutrition, University of the Aegean
Deputy Director Institute of Applied Biosciences | CERTH





agri - food sector

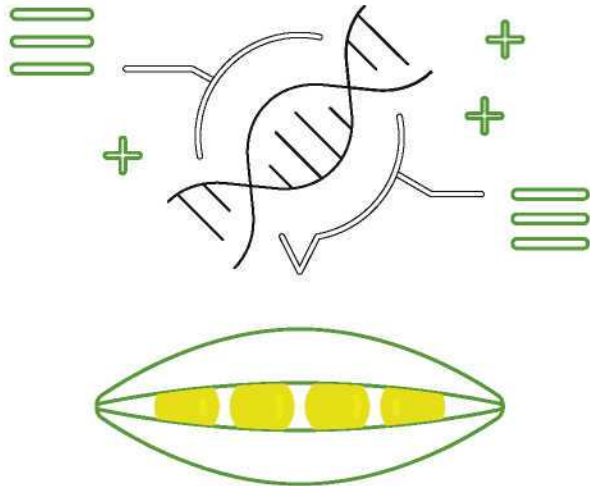
Promotion and utilization of Greek **biodiversity**

Genetic improvement of plants for **resistance**
to biotic and abiotic stresses

Genetic improvement of animal breeds

Biotechnological applications for the
production of substances of industrial,
nutritional and pharmaceutical interest

Application of high performance and **omics**
technologies in food science and nutrition



agri - food sector

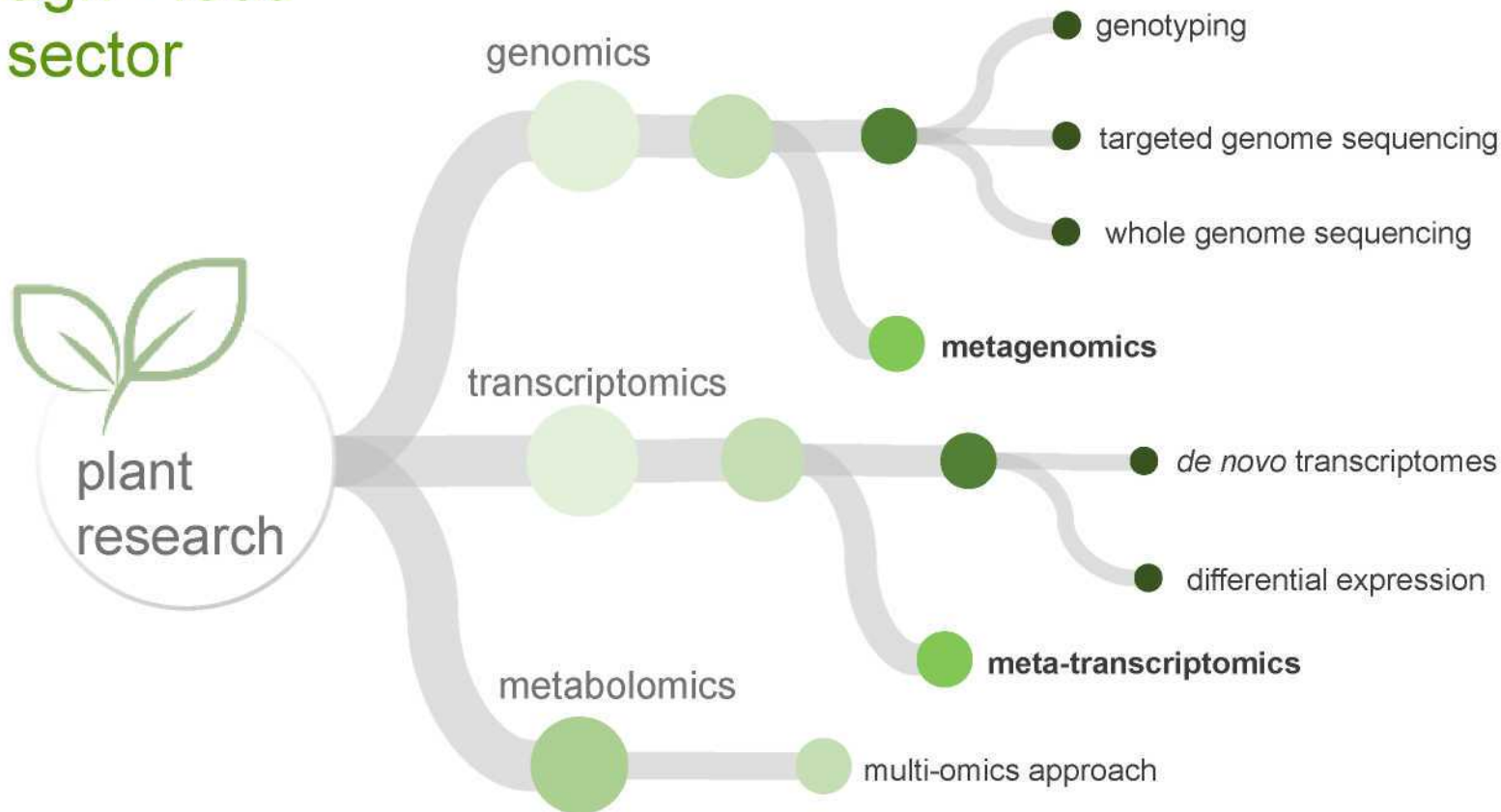
Basic research to understand biological and systemic mechanisms related to agricultural **production**, food and nutrition

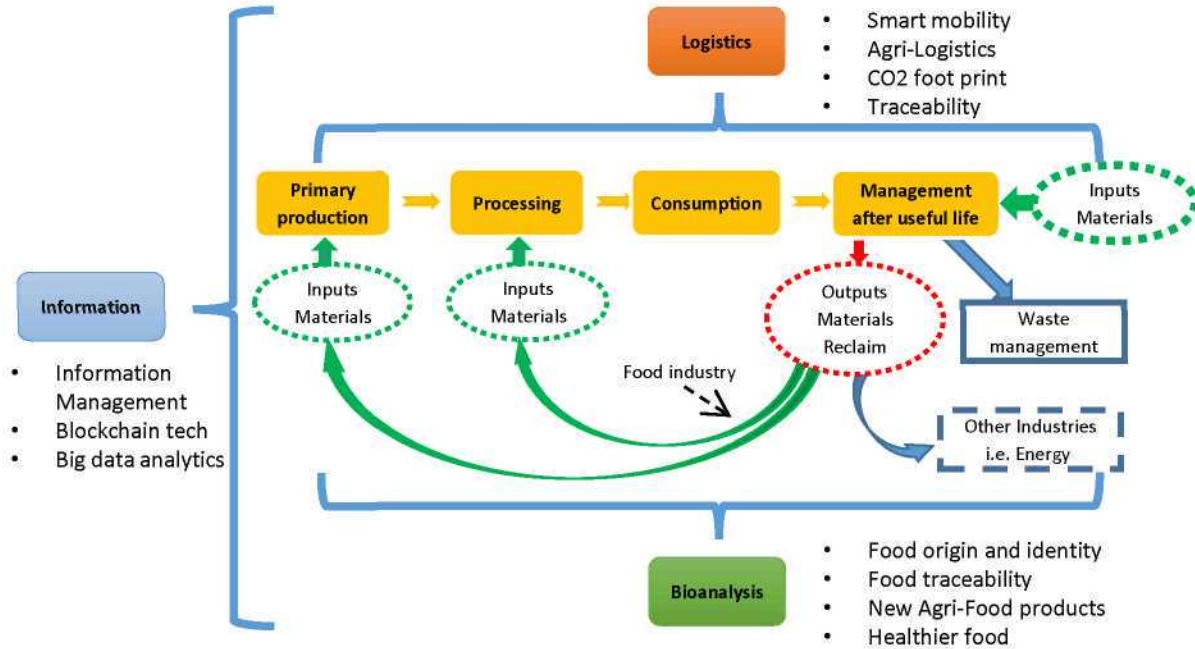
Biotechnological research and utilization of research results to solve problems and support the **sustainability** of agri - food systems


Promotion and management of **innovation** in value chains of the agri - food sector

Development and provision of specialized **services** for public, private and public bodies of the wider agri - food sector

agri - food sector





- **Digital Transformation**
 - Product traceability
 - Validation of blockchain technology as a business model in small actors
 - Precision farming
 - Supply chain
 - **Biotechnologies and analytical methodologies**
 - Molecular traceability (DNA of biochemical)
 - New varieties
 - Analytical methods to promote the nutrient value of selected MED products
- 

Create a digital repository where both pillars are connected and used to improve each value chain efficiency and sustainability

Objectives

- The creation of appropriate tools for **identification** and **tracking** of the produced products in connection with the supply chain in the production and processing of rice.
- Providing an **individual, inviolable** and therefore **unchanged cultivation and processing history**, based on blockchain technology.
- The key **characteristics** (information and processes regarding the field, the sowing, the use of medicines, etc.) and the relevant **certificates** from the analysis of the laboratories, will be recorded without the possibility of their falsification..
- The pilot implementation and the validation of the operation of the proposed solution in real conditions

Key Point Features

- Use of advanced tools through blockchain technology to ensure the required degree of trust both at user level and at institutional level
- Integration of digital calendars of producers for the recording at each stage of processing, storage and transportation of rice for the purpose of tracking by the final customer
- Creation of unique QR Code concerning the beginning of the cultivation of the good until its final standardization, for the automated tracking of the conditions that prevailed throughout the chain

- PS: The platform can be configured to receive and record data from any type of production (plant or animal) across the Agri-Food sector.

Key Users

1. Producers
2. Merchants
 - Cooperatives
 - Rice mills
 - Wholesalers
 - Retailers
3. Rice industry
 - Rice mills
 - Flower mills
4. Consumers
 - Household
 - Restaurant shops

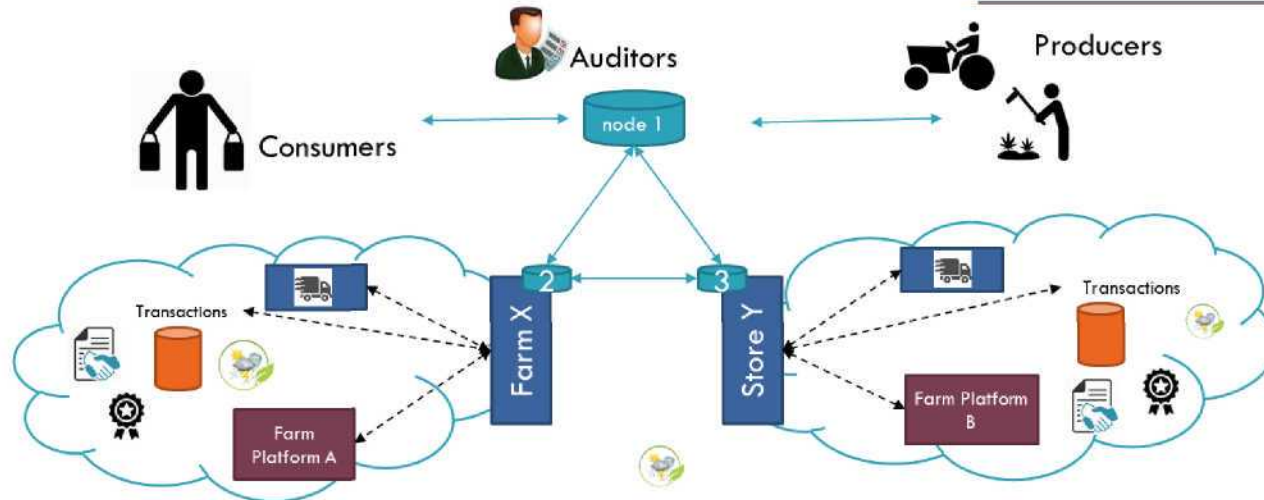
Development Methodology

- System users will be certified by relevant digital certificates (digital signatures)
- Each user of the system will have a personal wallet in which all the information entered in the system will be stored, regarding the processes of each field, as well as the production.
- By using smart contracts and provided that the conditions set by the system are met, the user, depending on the rights given to him, will be able to enter the information of each field, the production and transportation of the good, as well as the respective purchase and sale.

Blockchain Technology

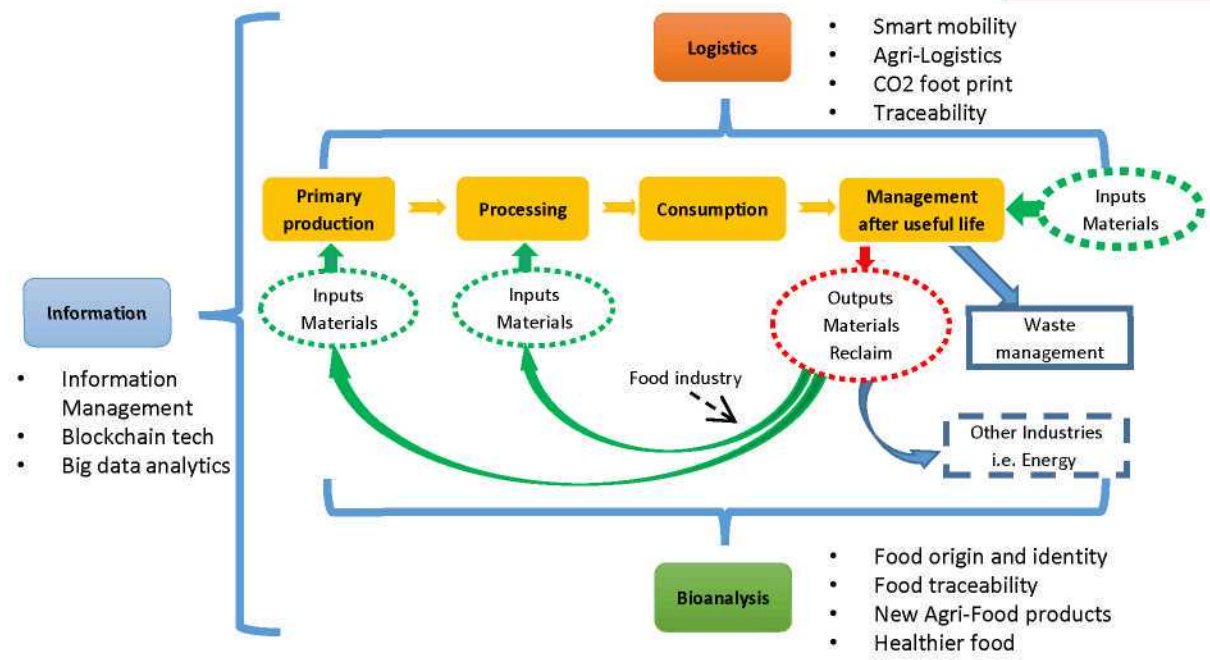
- The blockchain simulates a central computing service through a distributed protocol, which manages nodes connected over the Internet.
- In order to store data in the blockchain, it is necessary to have smart contracts, which codify the business logic and define a set of conditions / rules. These are essentially pre-defined agreements that evaluate information and are executed automatically when the conditions are met.

Product Assurance: Blockchain in Agri-Food

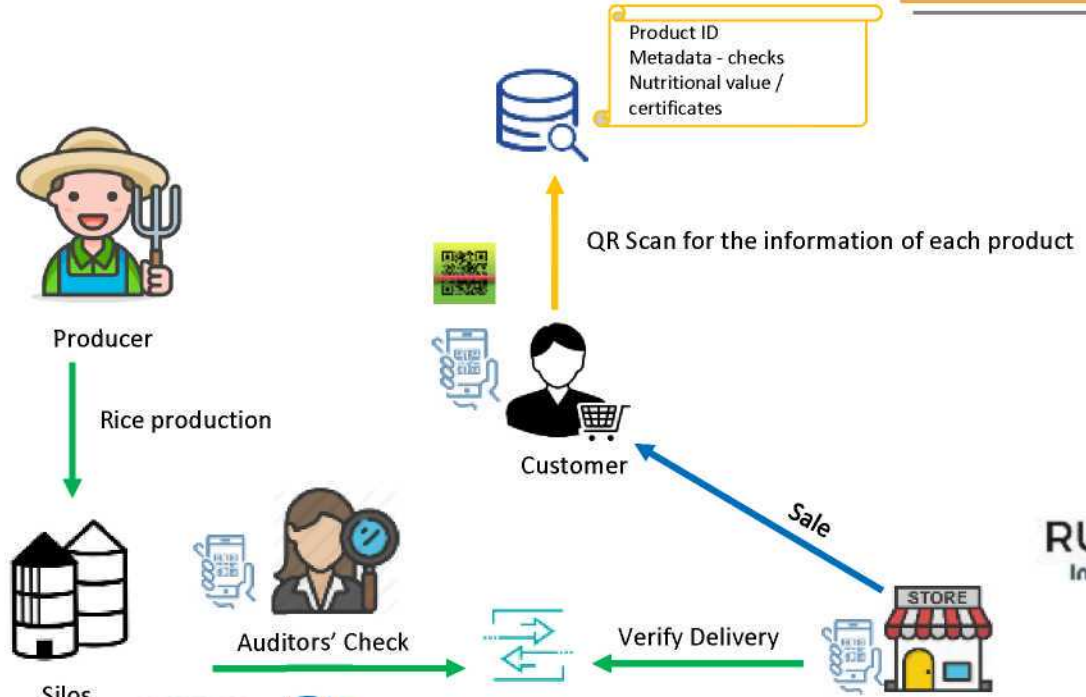


**Central Macedonia Blockchain infrastructure for Agri-Food stakeholders
ORION-CM project**

Blockchain-as-a-Service (BaaS)



Blockchain Technology in RUMORE

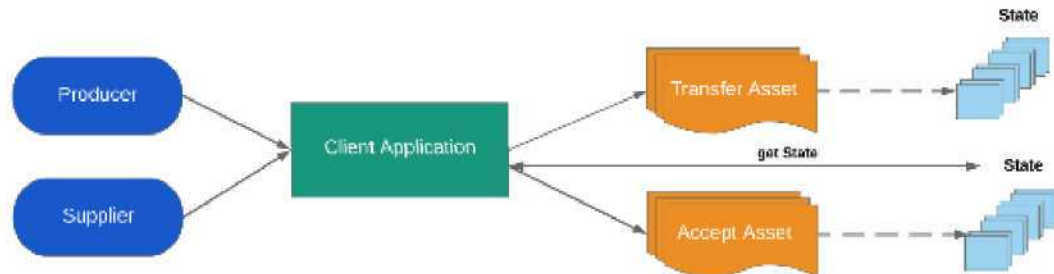


Related Information Flowcharts

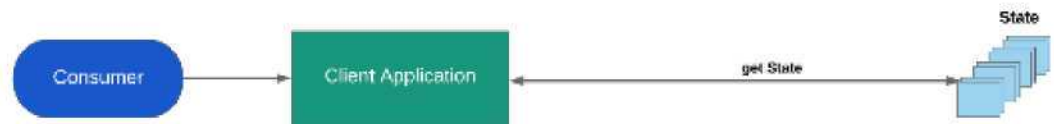
Step 1. Record all relevant information with the processes carried out in each field



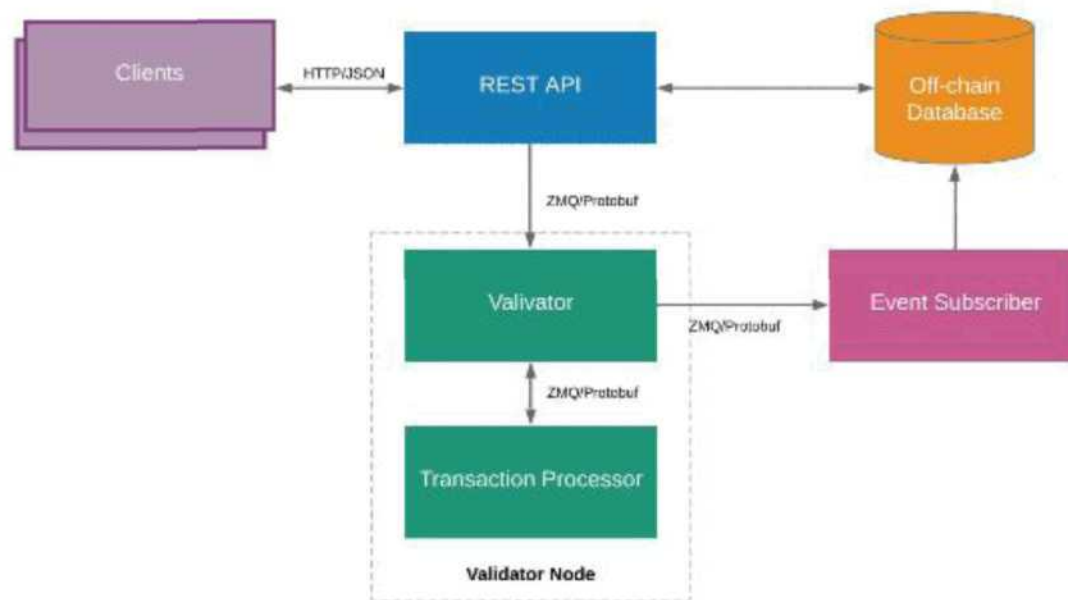
Step 2. Registration of all information related to the process of asset transport, by the producer and its acceptance by the trader



Step 3. Tracking of all relevant information with the asset, through the scanning of QR Code by the consumer

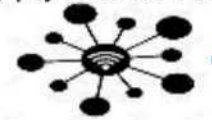


System Architecture



Tracking System

Supply-Chain Nodes



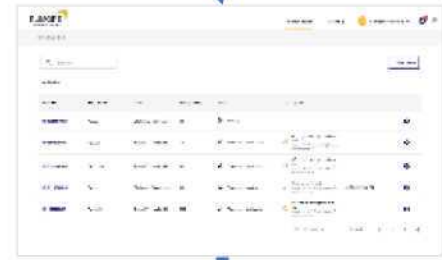
Certificates & Metadata



Users



RUMORE Web and Mobile Interfaces



Digital identity

Smart Contracts



Blockchain Product Tracking and Identification Toolkit

Blockchain Platform Interface

Registration and login forms



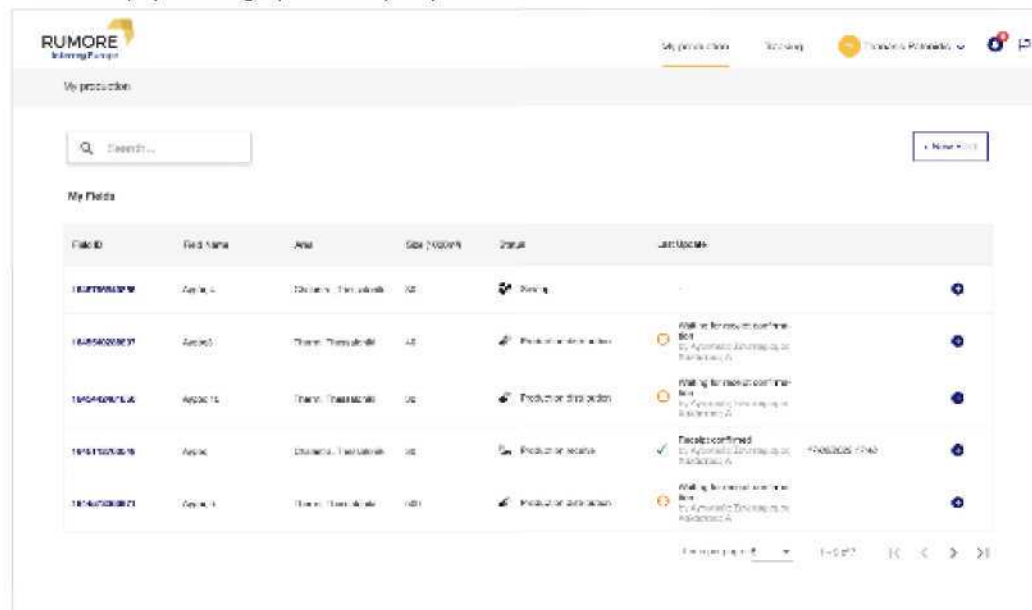
The registration form features the RUMORE logo at the top. Below the logo is a 'Sign up' button. The form contains several input fields: 'Organization' with a dropdown arrow, 'First name', 'Last name', 'Email', 'Password', and 'Confirm Password'. At the bottom, there is a purple 'Sign up' button and a link that says 'Already a member? Login'.



The login form features the RUMORE logo at the top. Below the logo is a 'Login' button. The form contains two input fields: 'Email' and 'Password'. At the bottom, there is a purple 'Log in' button and a link that says 'Don't have an account? Sign up'.

Blockchain Platform Interface

When logging in, as "producer" user they are taken to the "My Productions" tab, where they can see a summary of their production fields, some important information about each one field, as well as add a new field. Also, by selecting a production, they can retrieve all the recorded information that concerns the selected



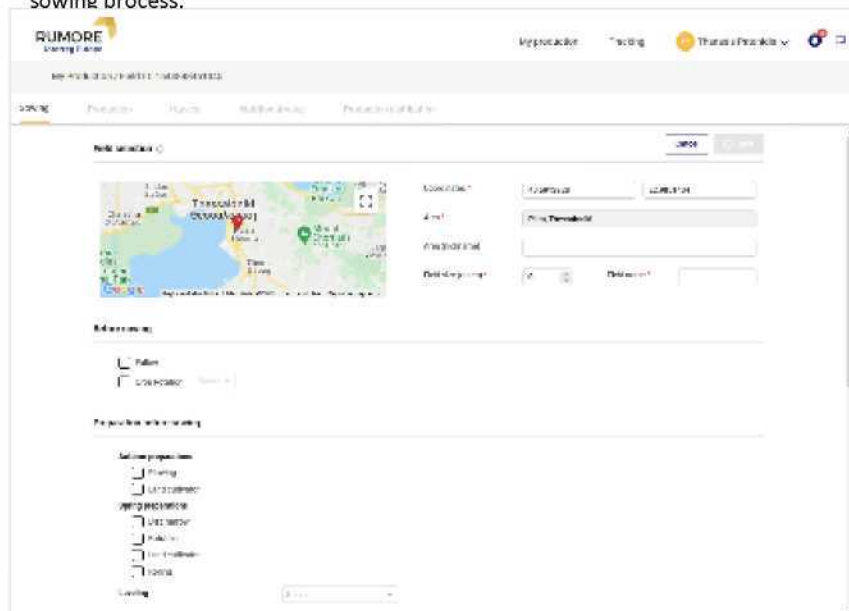
The screenshot displays the RUMORE Blockchain Platform interface. At the top, the RUMORE logo and navigation links for 'My productions', 'Recording', 'Production Records', and 'Help' are visible. The main section is titled 'My productions' and includes a search bar and a '+ New Field' button. Below this is a table with the following columns: Field ID, Field Name, Area, Size (sqm/ha), Status, and Actions.

Field ID	Field Name	Area	Size (sqm/ha)	Status	Actions
1612700000	Apple	Chania, Thessaloniki	50	Planting	[Action icons]
1616400000	Apple	Thessaloniki	40	Production in progress	<ul style="list-style-type: none"> Field is for production of the BOT by Agricultural Production of Thessaloniki
1616400000	Apple	Thessaloniki	50	Production in progress	<ul style="list-style-type: none"> Field is for production of the BOT by Agricultural Production of Thessaloniki
1616400000	Apple	Chania, Thessaloniki	50	Production records	<ul style="list-style-type: none"> Records confirmed by Agricultural Production of Thessaloniki
1616400000	Apple	Thessaloniki	50	Production in progress	<ul style="list-style-type: none"> Field is for production of the BOT by Agricultural Production of Thessaloniki

At the bottom of the table, there is a pagination control showing '1-5 of 5' records and navigation arrows.

Blockchain Platform Interface

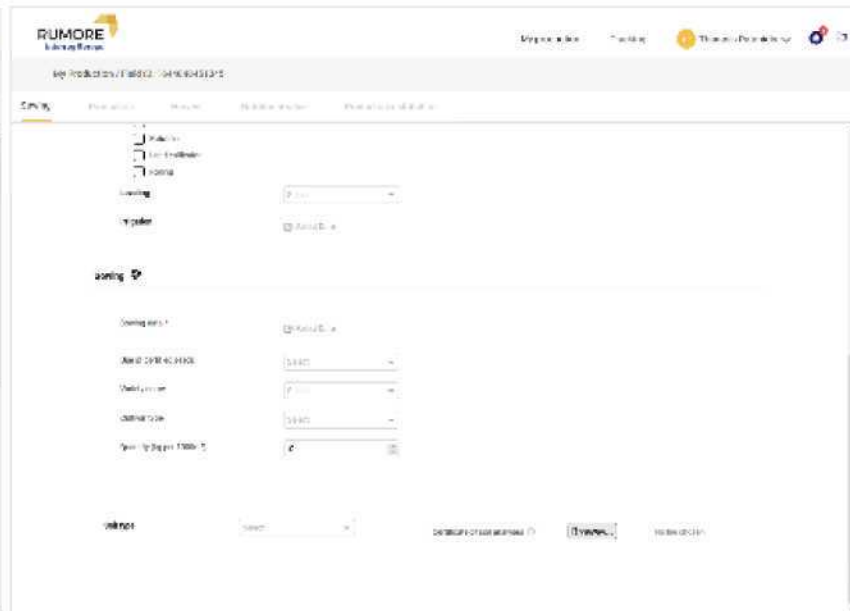
When adding "New field", they should fill in some necessary information such as its exact location, its size and the name of the field. They can also add information about the pre-sowing period, pre-sowing preparation and sowing process.



The screenshot shows the 'New location' form in the RUMORE Blockchain Platform. The form includes a map of Greece with a location marker, and several input fields for location and field details. The 'Preparation' section is expanded to show options for pre-sowing preparation and sowing process.

Form Fields:

- Location:**
 - Coordinates: 39.801234, 23.456789
 - Area: 100,000,000
 - Area Unit: Hektar
 - Field Name: New Field
 - Field Type: Field
- Preparation:**
 - Pre-sowing preparation:
 - Plowing
 - Fertilization
 - Sowing process:
 - Sowing
 - Fertilization
 - Irrigation



The screenshot shows the 'Sowing' form in the RUMORE Blockchain Platform. The form includes a tree view for location selection and several input fields for sowing details. The 'Sowing' section is expanded to show options for sowing process and sowing date.

Form Fields:

- Location:**
 - Field: Field
 - Area: Area
 - Area Unit: Hektar
 - Field Name: New Field
 - Field Type: Field
- Sowing:**
 - Sowing process: Sowing
 - Sowing date: 2023-01-01
 - Sowing time: 10:00
 - Sowing location: 100,000,000
 - Sowing area: 100,000,000
 - Sowing type: Sowing

Blockchain Platform Interface

Information on fertilization, herbicides, insect and disease control can be added to the "production" tab.

The screenshot shows the RUMORE Blockchain Platform Interface. The top navigation bar includes the RUMORE logo, the text 'Blockchain Platform', and a 'Production' tab highlighted in yellow. Below the navigation bar, there are tabs for 'Cultiv', 'PRODUCTION', 'Inputs', 'Production History', and 'Production Blockchain'. The main content area is titled 'herbicide' and contains several input fields for 'Name', 'Crop', 'Area', 'Quantity', 'Date', and 'Location'. Below this, there is a section for 'herbicide application' with a table and a 'New herbicide application' button.

The screenshot shows the RUMORE Blockchain Platform Interface. The top navigation bar includes the RUMORE logo, the text 'Blockchain Platform', and a 'Production' tab highlighted in yellow. Below the navigation bar, there are tabs for 'Cultiv', 'PRODUCTION', 'Inputs', 'Production History', and 'Production Blockchain'. The main content area is titled 'herbicide application' and contains a table with columns for 'ID', 'Crop', 'Quantity', 'Date', and 'Location'. Below this, there are sections for 'pest control' and 'disease control', each with a table and a 'New pest control' or 'New disease control' button.

Blockchain Platform Interface

In "Harvest" tab, the user can add information about the harvest of the production, its transport, as well as its storage before drying.

RUMORE Blockchain Platform Interface - Harvest Tab

Navigation: Dashboard, Production, **Harvest**, Blockchain, Blockchain Blockchain

Harvest Information:

- Eco?
- Production ID:
- Production Date:
- Production Quantity:

Transportation:

- Production Date
- Production Quantity

Storage before drying:

- Production Date

RUMORE Blockchain Platform Interface - Harvest Tab

Navigation: Dashboard, Production, **Harvest**, Blockchain, Blockchain Blockchain

Harvest Information:

- Eco?
- Production ID:
- Production Date:
- Production Quantity:

Transportation:

- Production Date
- Production Quantity

Storage before drying:

- Production Date
- Production Quantity
- Production Date

Blockchain Platform Interface

In "Nutritional value" tab, the user can add information about the quality characteristics of the grain, but also their nutritional value.

The screenshot displays the RUMORE Blockchain Platform Interface. At the top, there is a header with the RUMORE logo and navigation options. Below the header, there are several tabs: 'Grain', 'Production', 'Market', 'Blockchain', and 'Production characteristics'. The 'Blockchain' tab is currently selected. The main content area is divided into two sections: 'Grain quality characteristics' and 'Nutritional value'. Both sections contain various input fields for data entry, including dropdown menus and text boxes. The 'Grain quality characteristics' section includes fields for 'Type of grain (kg)', 'Moisture (%)', 'Number of grains', 'Grain size (mm)', 'Grain color (kg)', and 'Grain weight (kg)'. The 'Nutritional value' section includes fields for 'Protein (%)', 'Starch (%)', 'Fiber (%)', 'Lipids (%)', 'Ash (%)', 'Carbohydrates (%)', 'Minerals (%)', and 'Vitamins (%)'. The interface is clean and user-friendly, with a clear layout and easy-to-use input fields.

Blockchain Platform Interface

In "Production distribution" tab, the producer can add information about the date, the merchant or the cooperative to which they will sell the production and they could also produce a unique QRcode, through which they could track this specific production even from a mobile device.

The screenshot displays the RUMORE platform interface. At the top, there is a navigation bar with the RUMORE logo on the left and links for 'My production', 'Tracking', 'Thrasos Patenids', and social media icons. Below the navigation bar, the user's profile 'My Production / PaktID: 1649801651346' is visible. The main content area has a tabbed interface with 'Production distribution' selected. This tab contains a form with the following fields: 'Date of delivery' with a date picker, 'Coop/merchant' with a dropdown menu, and 'Brand name' with another dropdown menu. A 'QR code' button is located in the top right corner of the form area. At the bottom of the form, there is a 'Save changes' button.

Blockchain Platform Interface

When logging in, a "Cooperative" user can see a summary of the productions he has in his possession, as well as some important information about each one.

The screenshot displays the RUMORE Blockchain Platform Interface. At the top, there is a navigation bar with the RUMORE logo and several menu items: 'Productions', '983', 'Trading', and a dropdown menu for 'Appointments, Documents, Reports, Profile, Account Settings'. Below the navigation bar, there is a search bar labeled 'Search...'. The main content area is titled 'Productions' and contains a table with the following columns: Production ID, Producer, Producer Name, Contributor, Facility, Status, and Last Update. The table lists five production records, each with a status icon and a 'Last Update' timestamp.

Production ID	Producer	Producer Name	Contributor	Facility	Status	Last Update
134492700007	Thessaloniki	C 03	21-02-2022 10:57	...	Production contribution	Waiting for latest confirmation by user
134492700008	Thessaloniki	C 03	21-02-2022 10:54	...	Production contribution	Waiting for latest confirmation by user
134492700009	Thessaloniki	C 04	15-02-2022 12:48	15-02-2022 12:48	Final declaration	...
134492700010	Thessaloniki	C 03	11-02-2022 11:53	...	Production contribution	Waiting for latest confirmation by user
134492700011	Thessaloniki	C 4	04-02-2022 15:20	11-02-2022 11:27	Storage after storage	...

At the bottom of the table, there is a pagination control showing '1000 per page' and navigation arrows.

Blockchain Platform Interface

By choosing one of his productions, he can retrieve important information about the field, such as its exact location and size.

The screenshot displays the RUMORE Interreg Europe interface. At the top, there are navigation tabs for 'Productions', 'Silo', and 'Tracking'. A dropdown menu is open for 'Αγροτικός Συνεταιρισμός Χαλάστρας Α', showing a notification icon with '1' and a flag icon. Below this, the 'Production / Field ID: 1634732293581' is displayed. A horizontal menu contains 'Field details', 'Production receive', 'Processing', 'Nutritional value', and 'Quality'. The 'Field details' section is active, showing a map of the field location in Chalastra, Thessaloniki, with a red pin. To the right of the map, the following information is displayed:

- Coordinates:** 40.60495, 22.76357
- Area:** Chalastra, Thessaloniki
- Field size (acres):** 38

A 'QR code' button is located in the top right corner of the field details section. The map includes the Google logo and footer text: 'Keyboard shortcuts Map data ©2022 Terms of Use Report a map error'.

Blockchain Platform Interface

In the "Production Receipt" tab, it is possible to see information about the producer, the production quantity, to inform the system that he has received the specific production. He can also state dates for drying and storage after drying.

The screenshot displays the RUMORE Blockchain Platform Interface. At the top, there is a navigation bar with the RUMORE logo and several menu items: 'Production', 'Traces', 'Trucks', and 'Applications, Databases and WebServices'. Below this, the user is logged in as 'Application / User ID: 13475125890'. The main interface has a tabbed layout with 'Production Receipt' selected. The content area shows a form for recording production receipt details. It includes a 'Production receipt' section with a 'Done' button, a 'Production' section with fields for 'Production quantity' (value: 5), 'Production date' (value: 2023-01-01), and 'Production location' (value: 123456789). There is a 'Production status' dropdown set to 'Approved' and a 'Production type' dropdown set to 'Wine'. Below this is a 'Drying' section with a 'Drying date' field (value: 2023-01-01). Finally, there is a 'Storage after drying' section with a 'Storage date' field (value: 2023-01-01) and a 'Storage location' dropdown set to '123456789'.

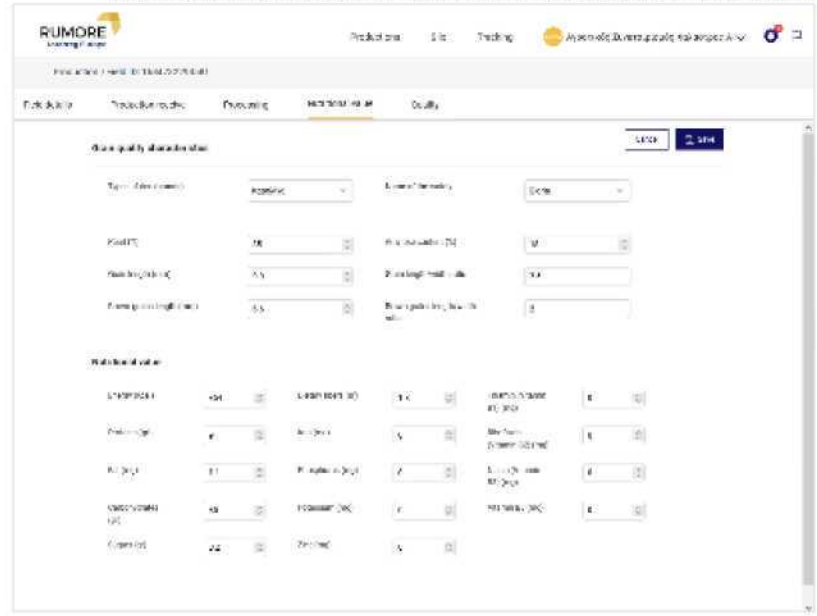
Blockchain Platform Interface

In "Process" tab, the user can inform the system about the date, the quantity of processing and the rice mill that will undertake the above process, as well as its distribution in the retail points of sale.

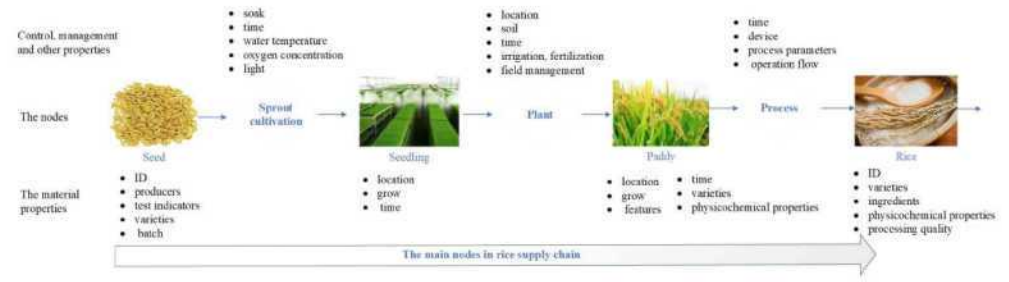
The screenshot displays the RUMORE Blockchain Platform Interface. At the top, there is a navigation bar with the RUMORE logo and several menu items: 'Production', 'Win', 'Trading', and a dropdown menu for 'Αγοράς Έκτακτης Χρήσης Μεταφορά & ...'. Below the navigation bar, the main content area is titled 'Production / Product ID: 1004/20220901'. There are four tabs: 'Field details', 'Production records', 'PROCESSING', 'Harvested data', and 'Quality'. The 'PROCESSING' tab is currently active. It contains two sections: 'Processing' and 'Retail distribution'. The 'Processing' section has a 'Date (date)' field with a calendar icon, a 'Date quantity (kg)' field with a numeric input and a calendar icon, a 'Rice mill (kg)' dropdown menu, a 'Rice mill (quantity)' dropdown menu, and a 'Quantity (kg)' field with a numeric input and a calendar icon. The 'Retail distribution' section has a 'Retail quantity (kg)' field with a numeric input and a calendar icon, a 'View of distribution in retail points of sale' field with a calendar icon, and a 'Retail date' field with a calendar icon.

Blockchain Platform Interface

In the "Nutritional value" similar to the producer, he can retrieve all the relevant information and in case it has not been added by the producer, he has the opportunity to add it himself.

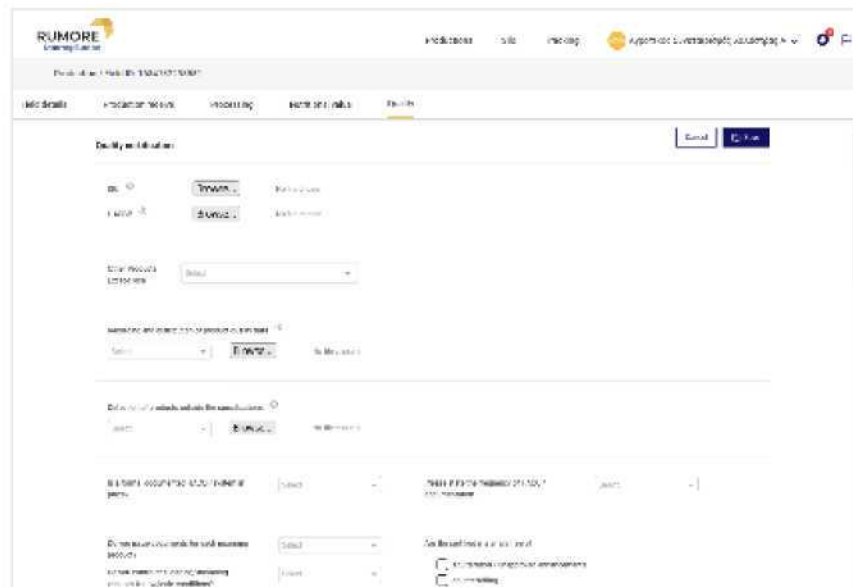


Nutritional value identity



Blockchain Platform Interface

In "Quality (A)" all the certificates and laboratory analysis, tests for impurities of foreign bodies (nuts, etc.), can be added.



RUMORE
Blockchain

Production history | Production log | Certificate details | **Quality**

Quality (A) details

ADD CERTIFICATE

ADD LABORATORY ANALYSIS

ADD CERTIFICATE

ADD LABORATORY ANALYSIS

ADD CERTIFICATE

ADD LABORATORY ANALYSIS

ADD CERTIFICATE

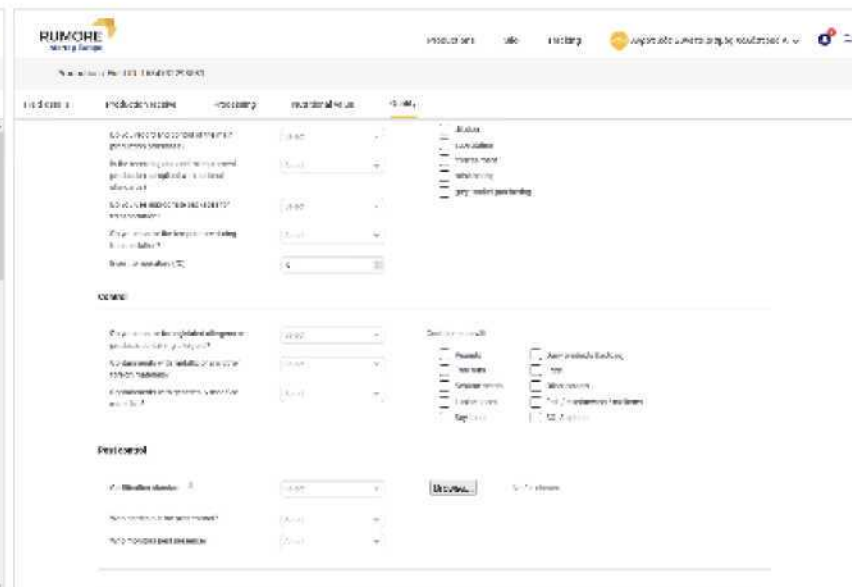
ADD LABORATORY ANALYSIS

ADD CERTIFICATE

ADD LABORATORY ANALYSIS

ADD CERTIFICATE

ADD LABORATORY ANALYSIS



RUMORE
Blockchain

Production history | Production log | Certificate details | **Quality**

Quality (A) details

Certificate ID	Production Date	Production Location	Production Line	Production Batch	Production Status	Production Type
1	2023-01-01	...	...	...	...	...
2	2023-01-02	...	...	...	...	...
3	2023-01-03	...	...	...	...	...
4	2023-01-04	...	...	...	...	...
5	2023-01-05	...	...	...	...	...

ADD CERTIFICATE

ADD LABORATORY ANALYSIS

ADD CERTIFICATE

ADD LABORATORY ANALYSIS

ADD CERTIFICATE

ADD LABORATORY ANALYSIS

ADD CERTIFICATE

ADD LABORATORY ANALYSIS

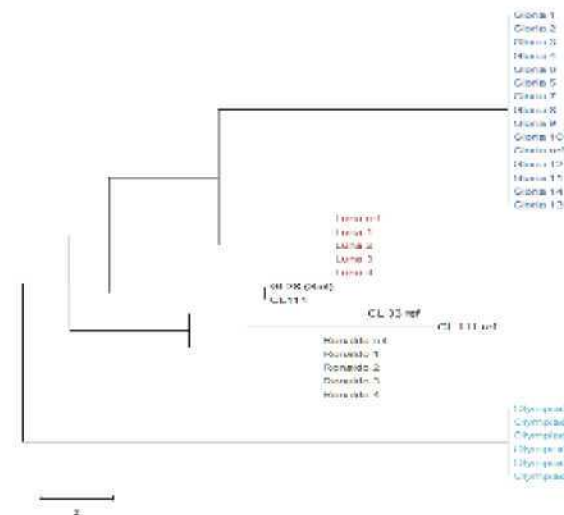
ADD CERTIFICATE

ADD LABORATORY ANALYSIS

Blockchain Platform Interface

In the "Quality (B)" tab, the disinfestation and cleaning programs concerning the workplaces can be added, if there are and are observed protection protocols regarding COVID-19, as well as DNA analysis of rice.

DNA identity



Blockchain Platform Interface

In "Notifications" tab, user can view a history of all notifications related to fields and mainly the stages of production transactions.

The screenshot shows the RUMORE Blockchain Platform Interface. At the top, there is a navigation bar with 'My production', 'Tracking', and a user profile 'Thanasis Patenidis'. Below this, the 'Notifications' tab is active. A search bar is present with the text 'Search...'. Below the search bar, there is a table titled 'My Notifications' with the following columns: Date, Field ID, Field name, Description, and ID. The table contains five rows of notifications. The first four rows have a warning icon (yellow circle with exclamation mark) and the fifth row has a checkmark icon (green checkmark).

Date	Field ID	Field name	Description	ID
28/12/2023 15:30	1645544288897	Apple 2	The point of distribution was notified about production transaction.	961
28/12/2023 12:34	164512732548	Apple 10	The point of distribution was notified about production transaction.	961
10/12/2023 10:36	164512732548	Apple	The receipt of the production was confirmed.	ASMA Agrotic Electronic Zu Surland S.
10/12/2023 10:46	164512732548	Apple	The point of distribution was notified about production transaction.	961
11/12/2023 1:30	1645544288897	Apple 2	The point of distribution was notified about production transaction.	961

At the bottom right of the table, there is a pagination control showing 'Items per page: 5', '1 / 4 of 7', and navigation arrows.

The screenshot shows a notification modal in the RUMORE Blockchain Platform Interface. The modal is titled 'Tracking' and shows the user profile 'Thanasis Patenidis'. It displays three notifications:

- A notice was sent to the point of distribution about 1645544288897 production by you (3 months ago)
- A notice was sent to the point of distribution about 1645442491850 production by you (2 months ago)
- The receipt of the 1645112732548 production was confirmed by ASMA Agrotic Electronic Zu Surland S. (7 months ago)

At the bottom of the modal, there is a button labeled 'SEE ALL NOTIFICATIONS'.

Blockchain Platform Interface

In the "Tracking" tab by pressing the drop-down, the list of all the productions in his possession is displayed. Selecting the desired ID, displays the entire "path" that the specific production has, from the moment of its sowing, until the moment the user chooses to see it.

The screenshot shows the RUMORE interface with the 'Tracking' tab selected. The main heading is 'Production history' with the subtitle 'select the production ID to see its history'. A dropdown menu is open, displaying a list of production IDs. The selected ID is '143472210101'. Below the dropdown, a vertical timeline shows the production path:

- Storage after drying** (143472210101)
 - 14/01/2018
 - 14/01/2018
- Drying** (143472210101)
- Production control** (143472210101)
 - 14/01/2018
 - 14/01/2018
- Production distribution** (143472210101)
 - 14/01/2018
 - 14/01/2018

The screenshot shows the RUMORE interface with the 'Tracking' tab selected. The main heading is 'Production Tracking' with the subtitle 'select the production ID to see its history'. A dropdown menu is open, displaying a list of production IDs. The selected ID is '143472210101'. Below the dropdown, a vertical timeline shows the production path:

- Storage after drying** (143472210101)
 - 14/01/2018
 - 14/01/2018
- Drying** (143472210101)
- Production control** (143472210101)
 - 14/01/2018
 - 14/01/2018
- Production distribution** (143472210101)
 - 14/01/2018
 - 14/01/2018
- Sowing** (143472210101)
 - 14/01/2018
 - 14/01/2018

QRcode

RUMORE
Interreg Europe



Sowing

Product: NOC 1502 NOV141216
Area: 1.000 m², 1000 m²
Quality status: 3000
Cultivar: SPS_402103
Seedling date: 14/03/23



Production

Fertilization:
1. Rate: 02.02.2023

Commercial name of fertilizer: 30-0-0
Quantity per 1000 m²: 100 kg
- Date: 11/03/2023
Commercial name of fertilizer: 40-0-0
Quantity per 1000 m²: 100 kg

Harvest

Harvest date: 11/05/23
Seed moisture content (%): 12
Storage before storage:
Date of storage: 11/05/23




Harvest date: 11/05/23
Seed moisture content (%): 12
Storage before storage:
Date of storage: 11/05/23



Nutritional value

Protein (%): 18
Ash content (%): 14.7
Grain length (mm): 10.27
Grain length index: 2.57
Keratin content (%): 0.27
Acid-detergent fibre (%): 1.39
Energy (MJ/kg): 15.4
Digestible fibre (g): 1.0
Phenolic (mg): 0.11
Phenolic (g): 0.8
Starch (mg): 11.2
Starch (%): 0.29
Fat (mg): 0.0
Manganese (mg): 0.17
Nickel (mg): 0.0 (mg): 0.1
Sulphur content (g): 0.1
Phenolic (mg): 1.08
Copper (mg): 0.14
Zinc (g): 0.14
Zinc (mg): 0.2



Benefits for the stakeholders

For the farmers:

- Full traceability of their products
- Certification of the quality
- Better price

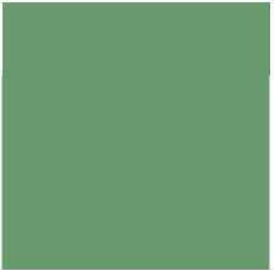
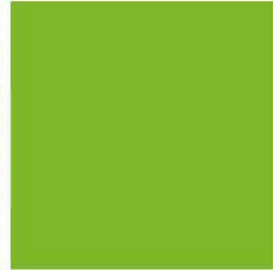
For the distributors and the Industry

- More efficient logistics
- Traceability
- Fair price based on the quality of product

For the Consumers

- Traceability
- Certification on what they buy and pay
- Trust for the rice value chain

The platform can be configured to receive and record data from any type of production (plant or animal) across the Agri-Food sector



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understanding and
harnessing biodiversity for
a competitive and resilient
food sector



Dr. K. Votis , ITI – CERTH
Dr. A. Patenidis, ITI-CERTH
Dr. K. Koukaras, INAB-CERTH
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ΕΛΛΗΝΙΚΗ ΓΕΩΡΓΙΚΟΤΕΧΝΙΚΗ
ΟΡΓΑΝΙΣΜΟΣ ΔΗΜΗΤΗΡ



Regional Development Fund
of Central Macedonia



Common borders. Common solutions.

Thank you for your attention!

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EUROPEAN UNION



AGREEN

Community for climate-smart agriculture



Common borders. Common solutions.

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Cross-Border Alliance for Climate-Smart and Green Agriculture in the Black Sea Basin

Grant Contract BSB1135

International Business Conference

"Internet Connectivity in Agriculture in the BSB"

28th of July 2022

Thessaloniki, Greece



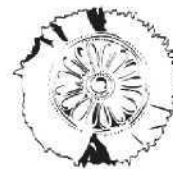
Digital Agriculture and Climate Change

Aristotelis C. Tagarakis

Researcher

Institute for Bio-Economy and Agri-Technology - iBO

Centre for Research and Technology Hellas - CERTH



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Digital Agriculture and Climate Change

The agri-food sector contributes significantly to the greenhouse effect

Greenhouse gas emissions from:

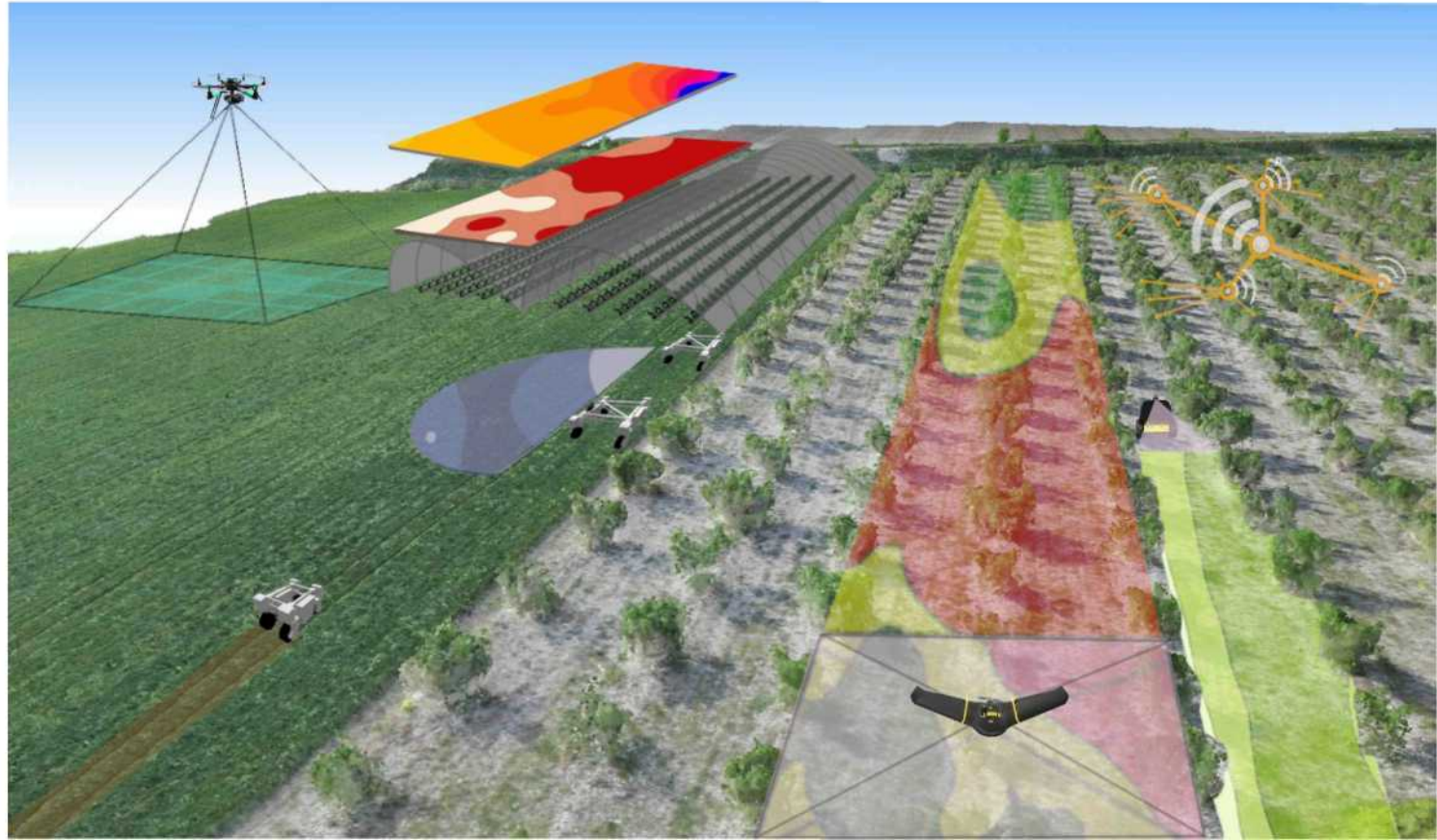
- use of fossil fuels along the supply chain (production - pumping water for irrigation - operation of agricultural machinery, transportation)
- Use of chemical fertilizers and other chemical applications
- Livestock (methane release)

Digital Agriculture

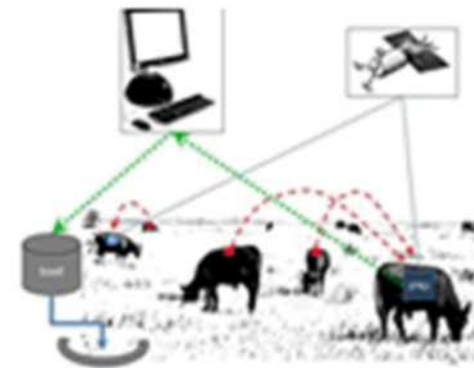
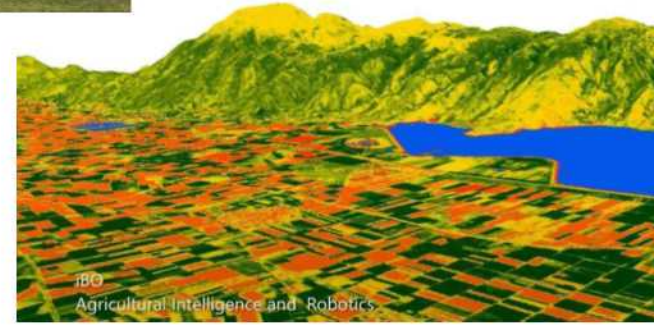
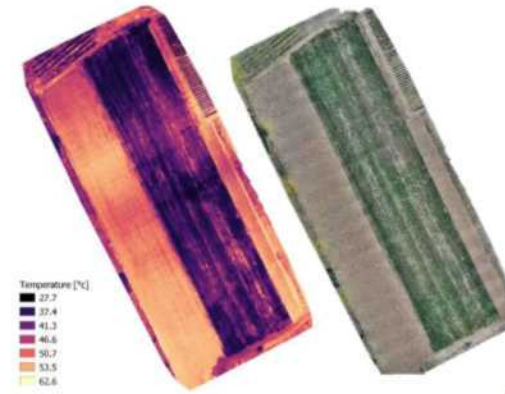
Modern digital systems for agricultural applications

management optimization

- Crops
- Water
- Food processing
- Transportation and logistics



Sensors in agriculture - management

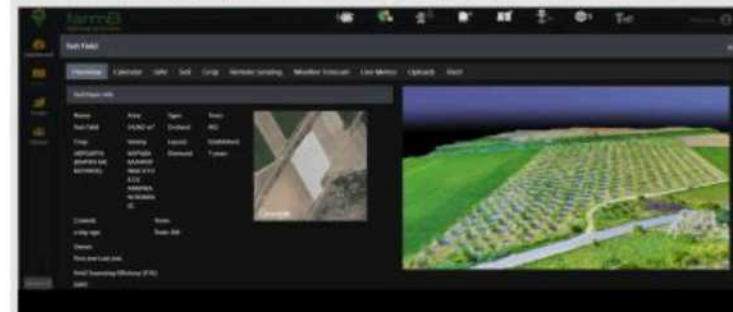
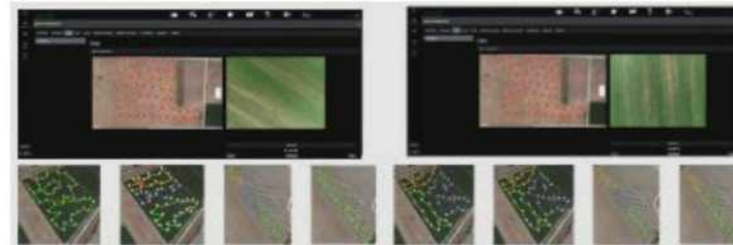
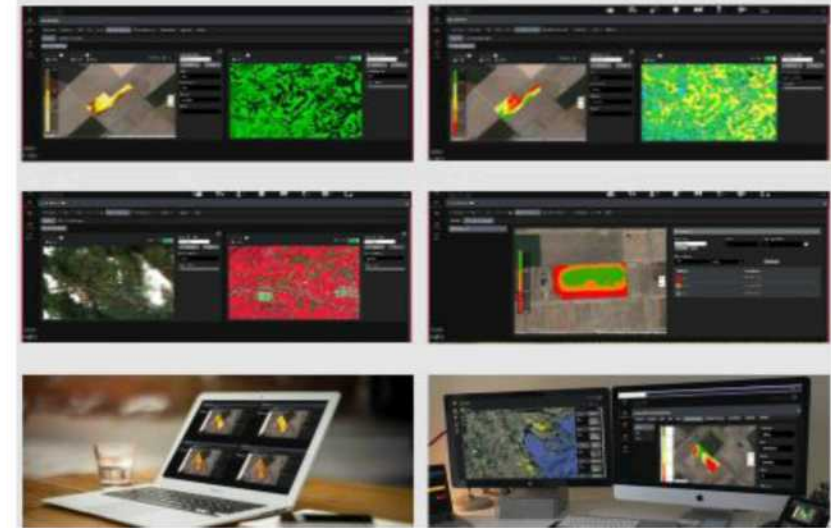
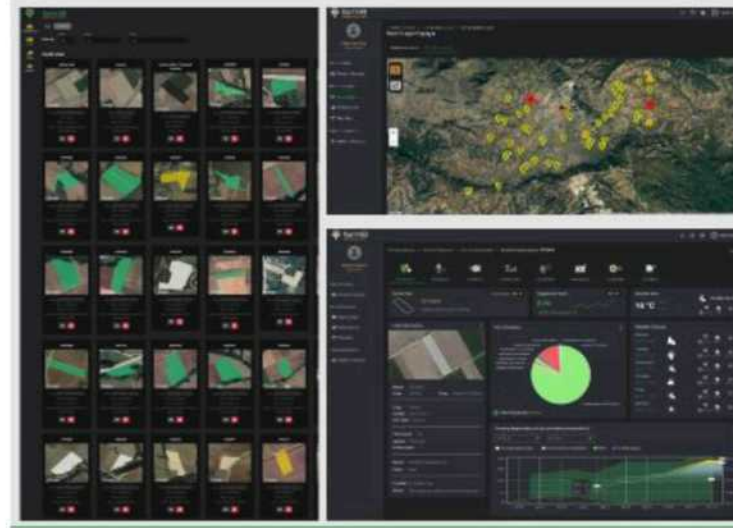


Information Systems

Modern digital systems for agricultural applications

Sensors data

- Acquisition
- Storage
- Management
- Analysis
- Decisions



Information systems – Crop management

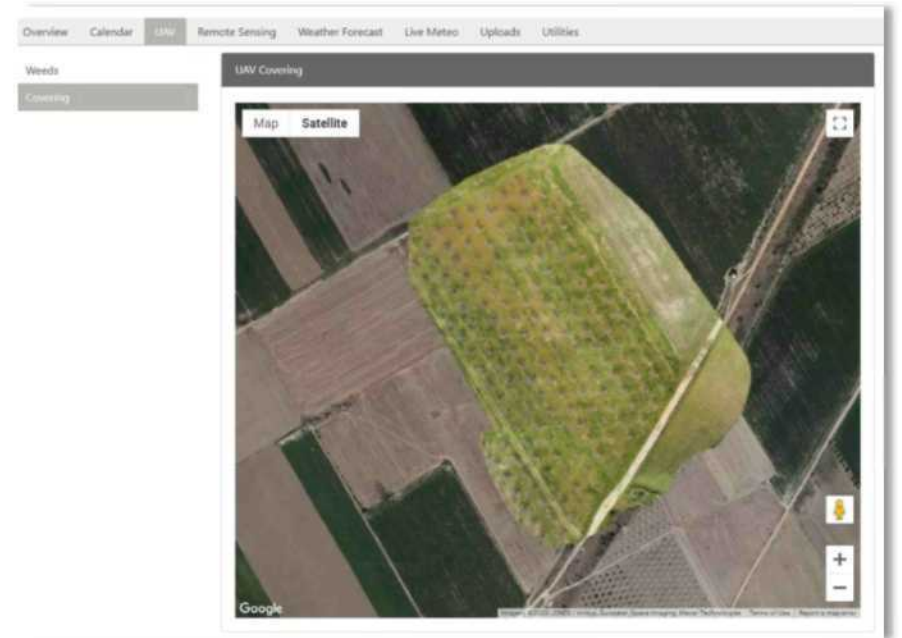
This screenshot shows a dashboard with a dark sidebar on the left containing icons for 'Dashboard', 'Fields', and 'Crops'. The main content area is titled 'Map Overview' and includes a 'Filter by:' dropdown menu set to 'All'. Below the filter is a grid of field overview cards. Each card features a satellite image from Google, a field ID, and key data points: Client, Soil type, Area, and Crop type. An 'Open' button is located at the bottom of each card.

Field ID	Client	Soil	Area (m ²)	Crop
K2	Client	Light	45,136	Free
K1	Client	Medium	55,193	Free
A1	Client	Light	30,677	Free
A2	Client	Difficult	64,452	Chickpea
A3	Client	Light	27,192	Wheat
A4	Client	Light	31,892	Peanut

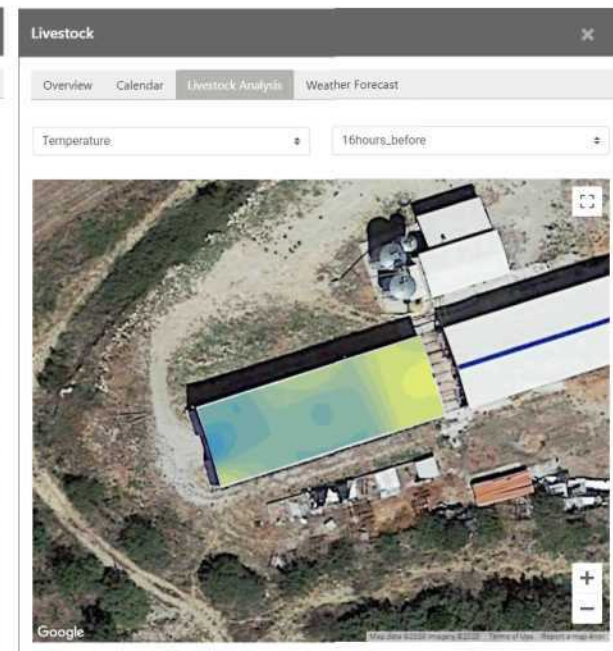
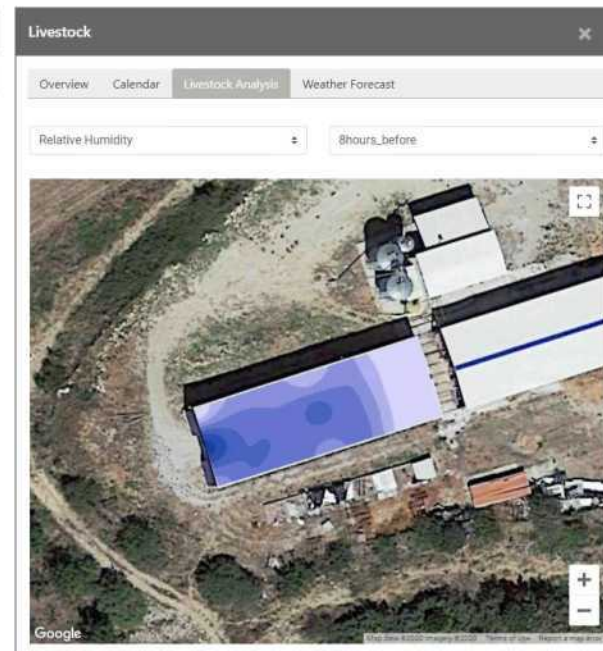
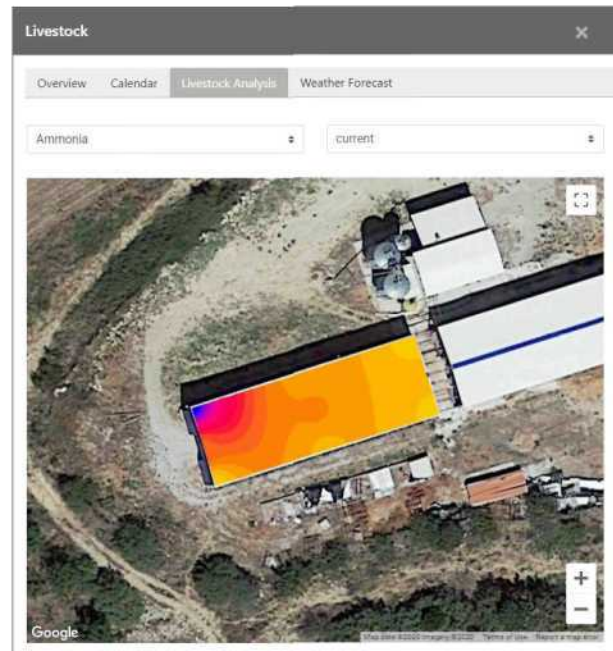
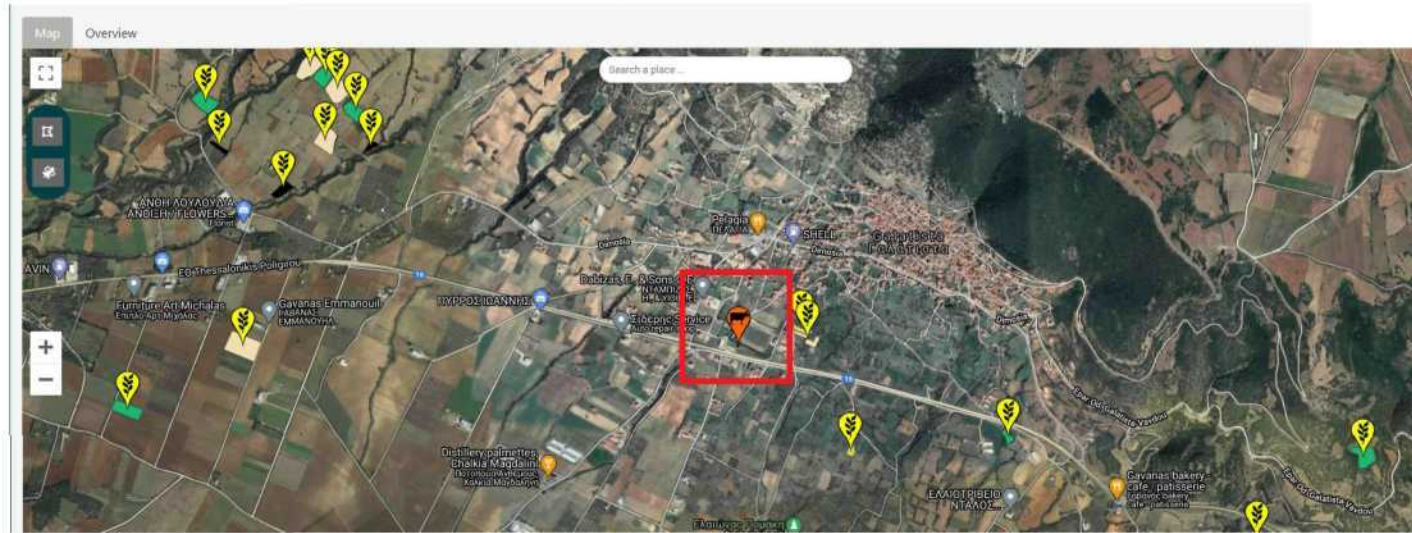
This screenshot shows a dashboard with a dark sidebar on the left containing icons for 'Dashboard', 'Fields', and 'Crops'. The main content area is divided into two summary cards: 'Fields' (39 currently active) and 'Crops' (9 currently active). Below these is a 'Crops Allocation' pie chart showing the distribution of crop types across the active fields.

Crop Type	Area (ha)
Free	28.92
Chickpea	17.66
Wheat	22.03
Peanut	17.67
Cotton	19.59
Walnut	16.06
Cloverleaf	14.62
Tomato	10.75
Corn	2.12
Carrot	26.86

Information systems – Crop management

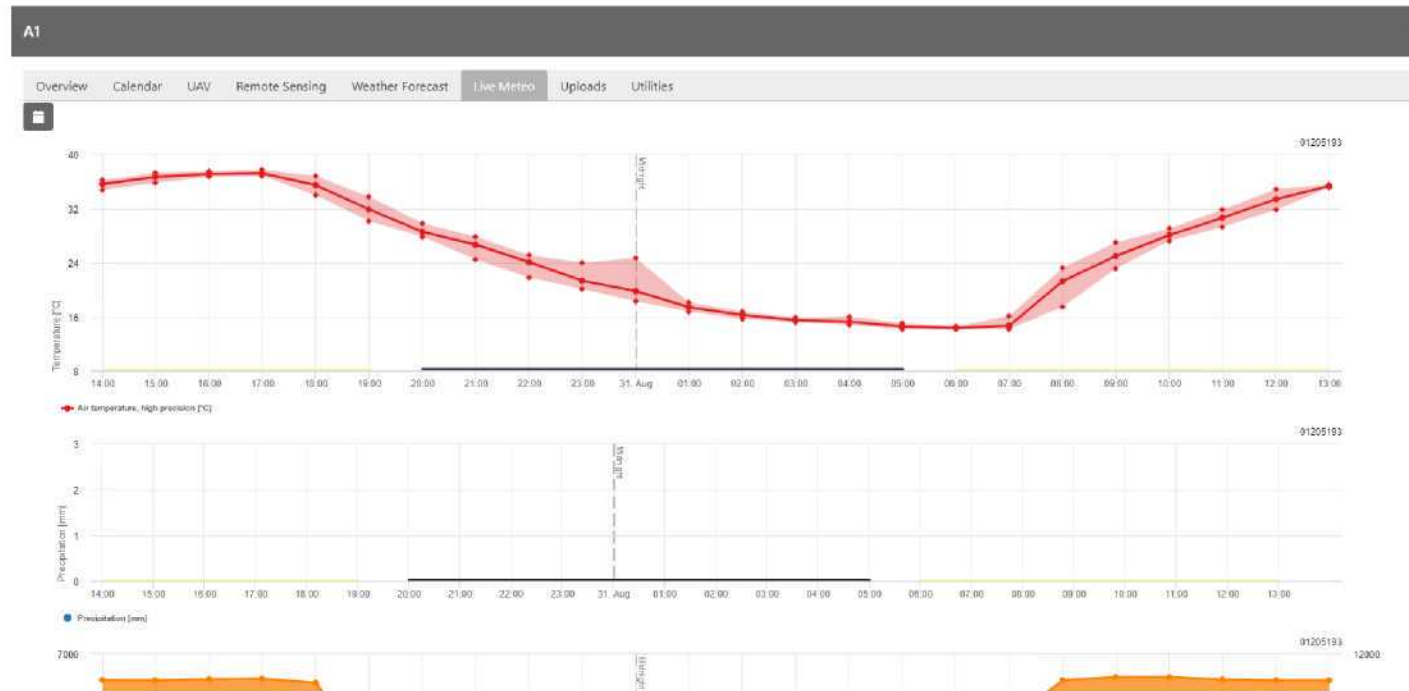


Information systems – Management of animal production



Information systems – Meteorological data – Weather forecast

- From commercial weather stations
- From private weather stations installed in the field



Benefits of using digital farming systems

- Monitor processes throughout all the production stages
- Facilitate the procedures for the production of certified products
- Traceability (field to fork)

- Optimal management decisions
- Increase the efficiency of the use of inputs
- Reduction of system inputs
- Financial benefit for the producer
- Minimization of losses of nutrients and agrochemicals
- Minimization of greenhouse gas emissions
- Reduction of the environmental footprint
- Minimization of agriculture's contribution to climate change

BACCHUS



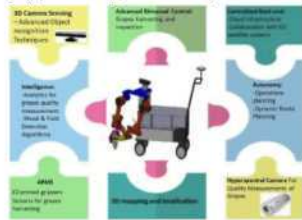
Mobile Robotic Platforms For Active Inspection And Harvesting In Agricultural Areas

Objectives

BACCHUS intelligent robotic platform promises to fully reproduce grapes hand harvesting operation, while at the same time take the manual legwork out by autonomously operating in three different levels: i) collecting timed and geo-referenced data (precision viticulture) through embedded sensorial system, ii) advanced decision making based on ripeness (sugars of grapes and acids level), iii) harvesting operation with the finesse needed and robot navigation with of quality performance guarantee

Concept

The BACCHUS project aims to develop a modular, bi-manual, multi-sensor robotic inspection and harvesting system with cloud-based information-processing and decision-making capabilities. As a proof-of-concept use case, it will be tailored for use in the context of knowledge-based agriculture production systems, designed especially for open-air high-value crops, grapes in our case – although applications in other domains will be also possible. The core of BACCHUS concept will be a light-weight dual manual modular mobile ground unit which will carry a prototype multi-sensor fusion sensing system, installed on the one arm of the robot along with a scissor, which will play the role of the end-effector and a gripper installed on the other arm able to collect the grape, after cutting (with the scissor) it from the stem.



BACCHUS Concept

Project Partners



Vision



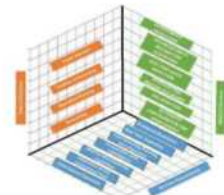
BACCHUS Vision



BACCHUS Methodology

Use Cases

The BACCHUS solution will be demonstrated and validated under real operating conditions in 2 pilot sites (through 6 use cases) in 2 European countries as described in the paragraphs below. Prior to these demonstrations the project technologies will be tested in controlled environments in 4 countries that will function as test beds.



Autonomous robotic harvesting system

- Use of small size electric autonomous robotic vehicles
- Digitization and automation of the harvesting process
- Zero emissions
- Reduced soil compaction



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STARGATE



Resilient farming by adaptive microclimate management

Problem

Agriculture is perhaps the most weather /climate dependent sector of the economy, and changes in the weather/climatic patterns are strongly affecting it, in terms of the productivity, risk assessment /management, and environmental preservation. From the other, the current farm practices are producing the 1/4th of the global greenhouse gas emissions annually, contributing and further enhancing the climate change, retaining a continuous cycle of altering the climate and impacting the food production system.

Project aims

STARGATE aspires to develop a breakthrough, multiscale and holistic climate smart agriculture methodology, capitalizing innovations in the field of microclimate and weather risk management, as well as in the field of landscape design. It is based on Earth Observation, weather/climate intelligence and IoT technologies to support a more effective farm/parcel management and related options for adaptation on climatic changes, local and regional policy formulation leading to better landscape management, protection against climatic risks and implementation related to mitigation on microclimate changes.

Objectives

- To develop a state of affairs and a detailed requirement analysis for CSA.
- To shape a stakeholder community and establish Living Labs.
- To develop observational data infrastructure and data management framework.
- To develop and provide climate services and agro-climatic indicators.
- To evaluate the STARGATE, methodology and DSS in real condition pilots.
- To develop an outreach plan to maximize the society impact of STARGATE.
- To develop an exploitation plan to maximize the business potential of STARGATE.

STARGATE aims at developing, testing, implementing and showcasing a framework that will improve the resilience of farming systems, to variable climatic conditions and extreme weather events, while will deliver scientific sound results to guide policymakers in landscape planning and long-term adaptation of the modern agriculture to climate change.



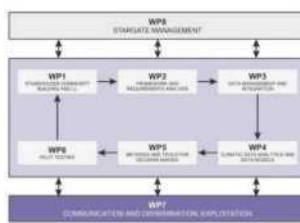
Technical Activities of STARGATE

To achieve this, STARGATE will:

1. Build its knowledge foundation, both theoretical and practical, through the following mechanisms: Existing programmes and initiatives from the European Union / European Commission
2. Participate actively in the networks to which partners of the project's consortium belong to and
3. Establish synergies with ongoing CSA projects.

Implementation

The STARGATE is organised into eight Work Packages (WPs) designed to address the STARGATE's technical objectives, plus WP8 (STARGATE Management) and WP7 (Dissemination and Communications, Exploitation). A Living Lab bases 'collaborative networking' approach is taken in order to quickly produce demonstrable results and innovations, utilising the rich knowledge base and network of the consortium as outlined previously but also local stakeholders group. Development and experimentation run in 2 cycles to guarantee user community feedback to research and development. This cycle include Framework and Requirements Analysis.



STARGATE Work Packages connection

Impact

STARGATE meets the impacts expected as follows:

- Deliver effective solutions for ensuring the highest level of implementation on the farm and landscape scale regarding climate-smart and resilient systems and provide decision support systems adapted to mixed farming and agroforestry systems in heterogeneous landscapes
- Unlock and improve viability and replicability of efficient and resilient farming systems and propose different transition scenarios leading to the development of modern land use systems, value chains and infrastructures
- Reduce the environmental impact of farming and contribute towards mitigation and adaptation to climate change
- Provide ecosystem services through integrated and small-scale land management
- In the longer term funded activities will help to foster the synergies between agricultural production, climate change mitigation and adaptation. They will allow the farming sector to continue fulfilling its multiple functions under predicted, more challenging abiotic conditions.

Integrated smart farming methodology for adapting crops to climate change

Decision support system



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ATLAS

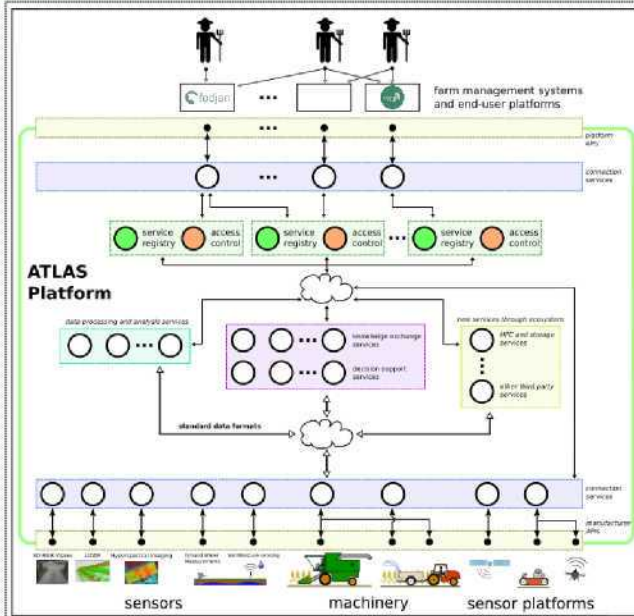
Agricultural Interoperability and Analysis System



Introduction and Objective

The overall objective of ATLAS is the development of an open digital service platform for agricultural applications and to build up a sustainable ecosystem for innovative data-driven agriculture using the platform. The platform will allow the flexible combination of agricultural machinery, sensor systems and data analysis tools to overcome the problem of lacking interoperability and to enable farmers to increase their productivity in a sustainable way by making use of the most advanced digital technology and data. The platform will define a service architecture providing hardware- and software-interoperability layers which enable the acquisition and sharing of data from a multitude of sensors and the analysis of this data using a multitude of dedicated analysis approaches. The benefits of data driven agriculture will be demonstrated using the ATLAS platform within a multitude of pilot studies. Around these pilot studies, so called "Innovation Hubs", a network of end-users, service providers, researchers and policy makers along the agricultural value chain, will be established to exploit the benefits of digital agriculture to a larger audience. ATLAS will put significant effort into the definition of the next generation standards for data driven agriculture.

Consortium



Overall Concept

To improve the interoperability of technology in the agricultural sector and to enable a more sustainable and productive agriculture based on four main aspects:

- Building a platform based on open standards, protocols and data formats to interconnect sensors, machines and services.
- Demonstrating the platform's benefits in pilot studies.
- Building-up business incubators around the pilots through Innovation Hubs.
- Extending the proven and established ISOBUS standard to match the requirements of the data driven agriculture of the future.

The ATLAS Platform

ATLAS connects different sensors, machines and actors locally and on demand delivers data to cloud services, where data storage, processing and evaluation services are run to then share the data with the users granted access to it. In the cloud will be frameworks for knowledge exchange and decision support as well as the infrastructure to store and process all data, granting access to single users, user communities, SMEs, NGOs and other stakeholders. ATLAS follows a flexible microservice architecture. Microservices can be run locally and independent for a specific task.

Digital platform for agricultural applications

- Combination of heterogeneous systems
- Interoperability of digital systems
- Crop management based on real field data
- Making up-to-date and optimal decisions



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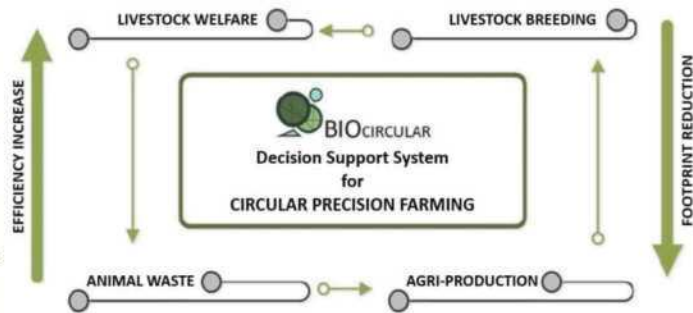


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Bioproduction System for Circular Precision Farming

BIOCIRCULAR aims to tackle major issues in inefficient and unsustainable farming practices leading to inappropriate application of resources such as artificial fertilisers, non-optimised value chains in the production system, and insufficient data handling and processing. This will be aimed through the incorporation of smart farming and smart processing processes into an integrated system for the optimal management of a middle-sized farm and the minimization of its carbon footprint.



BIOCIRCULAR will bring together novel ICT and cross-border multidisciplinary expertise in precision farming and aims to develop economically viable advanced smart technologies and software integrating multiple levels of farm decision making, considering and integrating business intelligence, Systems Engineering, Future Internet and Data Informatics disciplines, within a whole systems framework.



The benefits of the BIOCIRCULAR project are summarized in the following sections:

- Production of innovative software and tools based on modern ICT to help farmers and dairy farmers in strategic, tactical and operational decision making,
- Vertical integration of businesses and production of attractive dairy products with low environmental impact ("green" products)
- Improving the efficiency of agricultural production in relation to quantity, quality, environmental performance and corporate social responsibility,
- Promoting synergies between the stages and the actors involved in the agricultural economy,
- Creating high-skilled human resources for precision agriculture,
- Analyzing consumer requirements to better satisfy them, mapping the milk market with emphasis on environmental certified products, providing their market sustainability assessment data.

Project Partners



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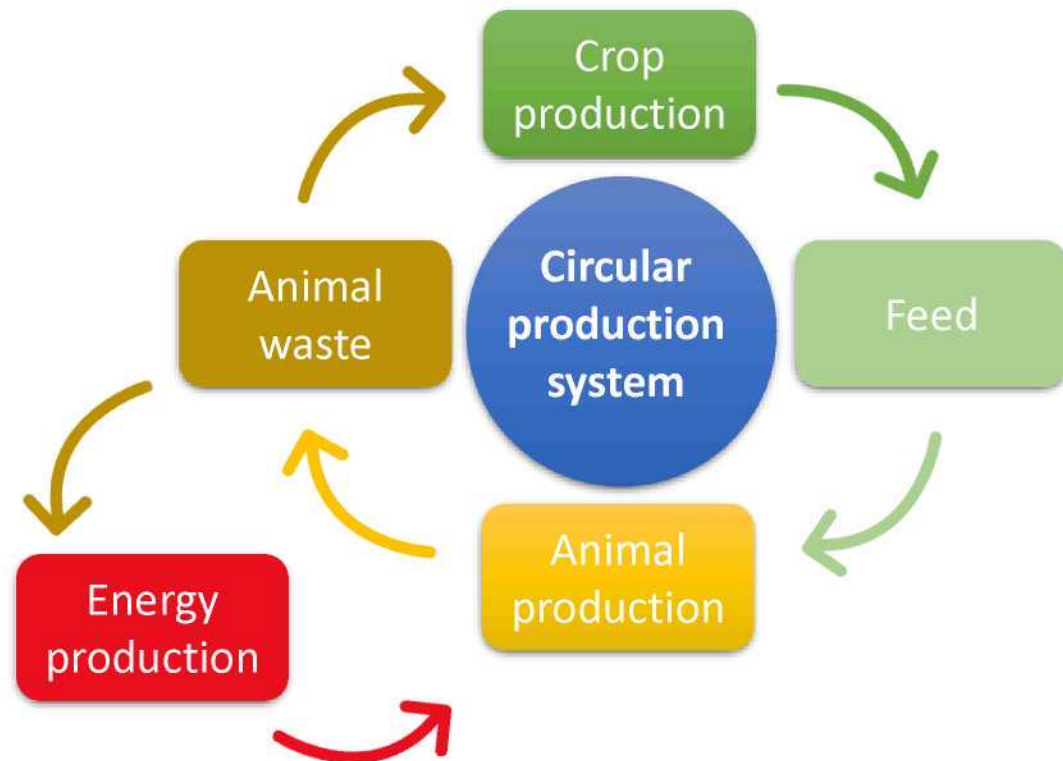
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Development of a bioproduative system for precision circular agriculture

circular agriculture: reuse of all resources that can be used by the system itself





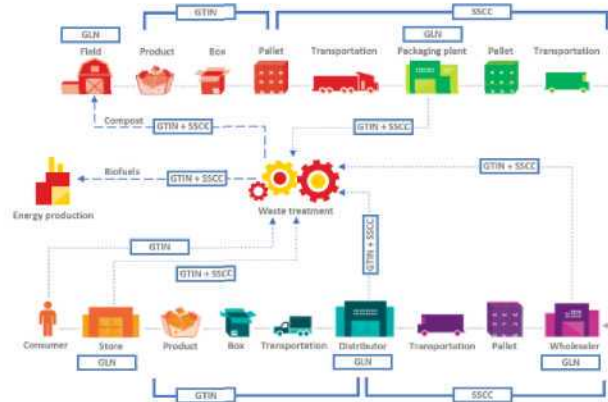
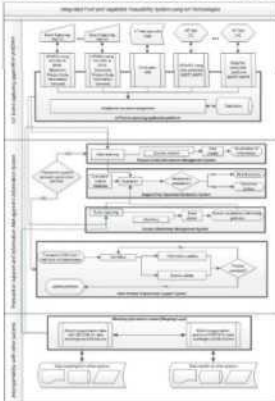
Co-financed by Greece and the European Union

Integrated Agrologistics System For Tracing And Supporting The Sale Of Fresh Fruits And Vegetables

The AGROTRACE project aims to achieve end-to-end traceability of a fresh product supply chain through the deployment system, which will combine internal and external tracking processes, so that each operator is able to identify the immediate source and immediate recipient of the products. The system will apply the "one step up, one step down" principle to provide effective tracking in the supply chain. In particular, each distinct product will be recognized globally and in a unique way so that it can be located upstream and downstream of the

The main objective of the system is to effectively support this implementation through a 4-step process:

1. Recognition: Following the GS1 standards, the system will (at unit level) discriminate all fresh products (commercial items), infrastructures, sites and so on, from the cultivator to the consumer. These numbers will provide links between the fresh product and the product-specific information.
2. Recording: GS1 system data carriers will be used for data management to meet different supply chain process needs for different products. The EAN / UPC barcodes are to be used for scanning at retail outlets. The GS1-128 barcodes will be used to identify product units in packaging and pallets to help inform product information and monitor their movement. GS1 DataBar barcodes that carry the same – and in some cases larger volumes – information in less space than the UPC barcodes will also be used. The data encoded in GS1 system carriers will not only identify the products (and product units) but will allow the trading partners to share large volumes of data (batch number, date of production, packaging information, etc.).



3. Evaluation: The information gathered will be evaluated against the objectives expressed in the form of Performance Indicators (KPIs) set by the supply chain partners. In addition, the system will enable KPIs from the SCOR (Supply Chain Operations Reference) model to enable "anonymous" benchmarking of chain partners' performance.
4. Sharing: The interoperability of our system will facilitate the smooth exchange of information in trade transactions. The following GS1 interface templates are to be used: GDSN (Global Data Synchronization Network): GDSN connects trading partners to the GS1 Global Registry® via GS1 Certified Data, allowing the immediate electronic exchange of standardized, up-to-date and verified information.

All participants in the distribution network will be able to use the system to implement internal and external traceability practices, and in addition, internal traceability will be implemented in such a way as to ensure the necessary connections between inputs and outputs.

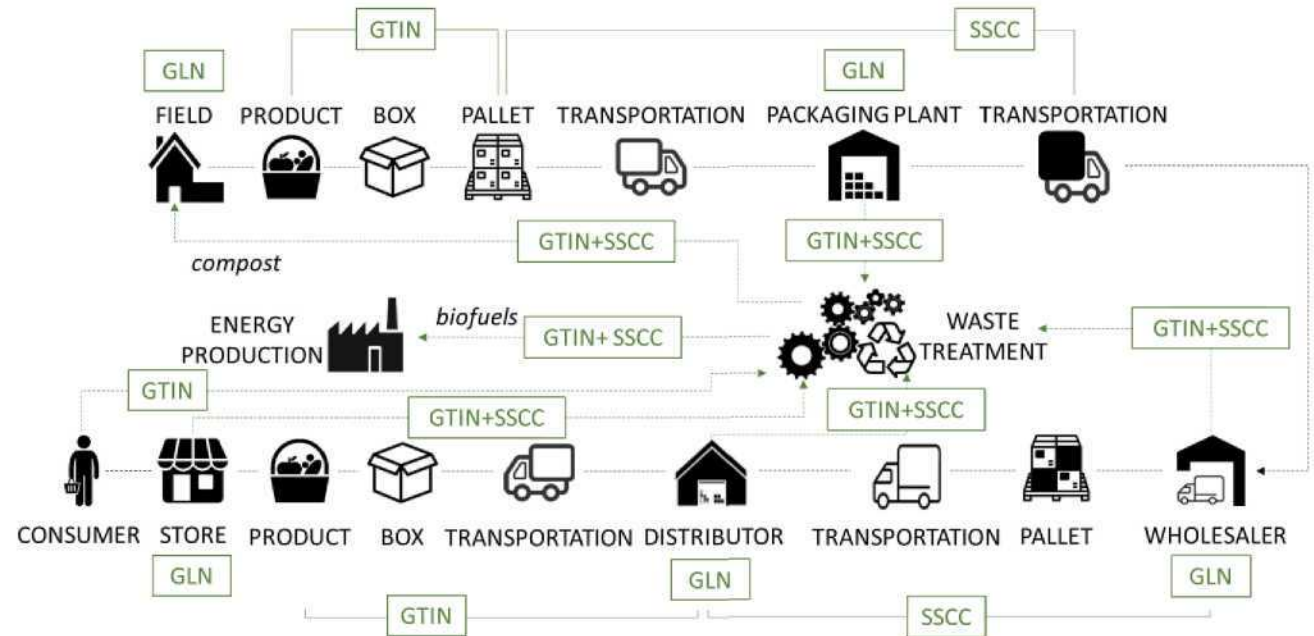
Project Partners



Integrated traceability system for fresh fruits and vegetables

- Use of autonomous sensor systems
- Internet of Things (IoT)
- Systems interconnection

Integrated agro-supply chain management information system



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Problem

Access to good quality water is essential for people, nature and economic activities. But freshwater sources are increasingly at risk from a variety of natural and human-induced stressors, including population growth, climate change land-use changes and pollution.

Objectives

NIAIADES Ecosystem envisions transforming urban water management through automated and smarter water resource management and environmental monitoring, achieving a high level of water services for both residential and commercial consumers, exploiting the efficient use of physical and digital components of water ecosystem. NIAIADES aims to:

- Address the increased need for sustainable and eco-friendly water methodologies defining a new ICT framework.
- Provide multidimensional intelligence on the water ecosystem through the introduction of Artificial Intelligence technologies:



NIAIADES framework

NIAIADES relies and builds upon on various types of big data collected from different water monitoring and control systems in Europe, in order to:

- Establish more efficient water consumption
- Generate increased confidence of water consumers
- Measure the water quality
- Assure the safety and reliability
- Enhance public awareness on water consumption

NIAIADES Overall Architecture

NIAIADES will perform all needed research, integration and awareness raising activities to yield a holistic system. The innovative technological building blocks of NIAIADES integrated system are:



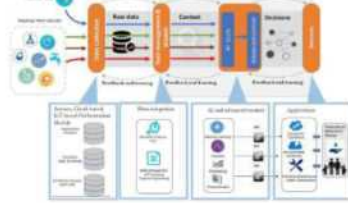
NIAIADES Overall Architecture

- Data Collection, Integration and Fusion Middleware
- Advanced Data Mining Engine
- Decision Support tool-Mitigation and Counteraction Platform
- AI-driven Services
- Blockchain auditing mechanism
- NIAIADES AI Marketplace
- NIAIADES Communication Platform
- NIAIADES IoT Platform
- Anonymization/Privacy Module
- Personalized behavioural change support tool
- Sensor Network For Water and Weather Monitoring

NIAIADES Intelligence Framework

The Intelligence Framework of the proposed integrated solution comprises a number of interconnected technological components:

- Data Collection, Integration and Fusion Middleware
- Advanced Data Mining Engine
- The core Machine Learning and control Development Environment
- The NIAIADES Decision Support tool-Mitigation and Counteraction Platform
- AI-driven services
- Communication platform
- Blockchain Auditing mechanism
- NIAIADES AI Marketplace



Intelligence Framework

Overall approach and methodology



From idea into market realization

1. Framework Design & Preparation includes the identification of technologies relevant to the project objectives.
2. Technical Development & Innovation where the identification of technology specifications and tools from user requirement specifications is included.
3. Integration & Validation.
4. Demonstration & Evaluation. This phase will focus on fine-tuning and validation of the whole framework assessment of the demonstration phase of the project.

Impact

- Gives the floor to technology partners to introduce novel optimized and integrated approaches to potential end users.
- Facilitates an opportunity to innovative European companies to join forces with incumbent European industries for the delivery of advanced technology solutions in a niche domain.

Integrated ecosystem for the digitization of water bodies

- Use of autonomous sensor systems
- Internet of Things (IoT)
- Artificial intelligence

Integrated management information system



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Research projects



<p>AGROTRACE</p> <p>28/09/2019 - 18/09/2022</p> <p>2014-2020 (GSRT)</p>	<p>BACCHUS</p> <p>01/01/2020 - 31/12/2022</p> <p>H2020-ICT-2018-2020</p>	<p>CAREWASTE</p> <p>09/11/2018 - 09/05/2019</p> <p>SERVICE</p>	<p>KYKLOS 4.0</p> <p>01/01/2020 - 31/12/2023</p> <p>H2020-DT-2018-2020</p>	<p>RES4LIVE</p> <p>01/10/2020 - 30/09/2024</p> <p>H2020-FNR-2020-1</p>	<p>AGROFOSSILFREE</p> <p>01/10/2020 - 30/09/2023</p> <p>H2020-FNR-2020-1</p>	<p>UPREVENT</p> <p>18/06/2020 - 15/10/2022</p> <p>2014-2020 (GSRT)</p>	<p>CAVE3</p> <p>28/02/2020 - 27/02/2023</p> <p>2014-2020 (GSRT)</p>
<p>STARGATE</p> <p>01/10/2019 - 30/09/2023</p> <p>H2020-SFS-2018-2020</p>	<p>ATLAS</p> <p>01/10/2019 - 30/09/2022</p> <p>H2020-DF-2018-2020</p>	<p>NAIADES</p> <p>01/06/2019 - 31/05/2022</p> <p>H2020-SC5-2019-2019-2020</p>	<p>OPTIMA</p> <p>01/09/2018 - 31/01/2023</p> <p>H2020-SFS-17-2017</p>	<p>FARMET</p> <p>01/07/2020 - 30/06/2021</p> <p>Natural Environment & Innovative Actions 2020</p>	<p>FIELDS</p> <p>01/01/2020 - 31/12/2023</p> <p>ERASMUS+ KA2 - Sector Skills Alliances</p>	<p>CPIGFEED</p> <p>28/07/2020 - 27/01/2023</p> <p>2014-2020 (GSRT)</p>	<p>MED FOOD TTHUBS</p> <p>01/03/2020 - 28/02/2023</p> <p>PRIMA Call-2019</p>
<p>SMART-AKIS</p> <p>01/01/2016 - 31/08/2018</p> <p>HORIZON 2020 - ISIB-2015-1</p>	<p>SYNERGIE</p> <p>22/08/2018 - 21/08/2021</p> <p>HFRJ</p>	<p>TASTESTEVIA</p> <p>31/07/2018 - 30/07/2021</p> <p>2014-2020 (GSRT)</p>	<p>SAFEACL</p> <p>25/07/2018 - 24/07/2021</p> <p>2014-2020 (GSRT)</p>	<p>BRIDGES</p> <p>01/04/2016 - 31/12/2020</p> <p>INTERREG EUROPE 2014-2020</p>	<p>EUXDAT</p> <p>01/11/2017 - 31/10/2020</p> <p>H2020-EINFRA-2016-2017</p>	<p>OACTIVE</p> <p>01/11/2017 - 31/10/2020</p> <p>H2020-SC1-2016-2017</p>	<p>Z-FACTOR</p> <p>01/10/2016 - 31/03/2020</p> <p>H2020-FOF-2016</p>
<p>GREENPOULTRY MEAT ANTIFREE</p> <p>09/07/2018 - 08/07/2021</p> <p>2014-2020 (GSRT)</p>	<p>NANOFUM</p> <p>29/05/2018 - 28/05/2021</p> <p>Greece-Germany; Call for Proposals on Bilateral Research and Innovation Cooperation</p>	<p>BIO CIRCULAR</p> <p>06/09/2018 - 05/09/2021</p> <p>2014-2020 (GSRT)</p>	<p>INNOSETA</p> <p>01/05/2018 - 30/04/2021</p> <p>H2020-RJUR-30-2016-2017</p>	<p>DESIGN IT</p> <p>01/09/2017 - 31/08/2019</p> <p>ERASMUS+</p>	<p>NEXUS</p> <p>01/01/2017 - 31/12/2019</p> <p>2014-2020 (GSRT)</p>	<p>FINESOL</p> <p>01/11/2015 - 30/04/2019</p> <p>H2020-FOF-2015</p>	<p>PROCETS</p> <p>01/01/2016 - 30/06/2019</p> <p>H2020-NMP-PILOTS-2015</p>





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International Business Conference "Internet Connectivity in Agriculture in the BSB"

Closed cycle in agriculture. Good practice from the region of Dobrich, Bulgaria

Thessaloniki, Greece

28 June, 2022



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„Nedko Nedkov – Ovcharovo“ Company“

The company was founded in 1993 by Nedko Nedkov, who is an agronomist by education.

Initially, the main sector he established his farm was in the crop production, but later dairy products and meat production were also introduced into the business.

Currently the main focus of the company is the production of milk and dairy products - yogurt, cheese, cream and butter.

Cereals are produced solely to provide farm animals with quality food that is clean and unmodified. Meat is produced mainly from male calves.



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Plant/crops growing

The company manages 10,000 ha, in which it grows wheat, corn, alfalfa, sunflower.

Only part of the sunflower is sold, the other crops are used to feed the livestock animals.



The main goal in the cultivation of cereals and fodder is to be as clean as possible. No genetically modified crops are grown. The use of chemical fertilizers is minimized, mainly organic fertilizer is used.



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Plant/crops growing

Modern powerful machines, mainly “John Deere” tractors and “Case” harvesters, are used in tillage and harvesting, but the company has a variety of equipment and inventory.

The whole process - from sowing to harvesting is closely monitored by the agronomists of the company.

The quantities produced cover the needs of animal husbandry and there is no need to purchase additional fodder.





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Livestock breeding

10,000 cows of highly productive breeds are bred, mainly of the Dutch Holstein breed.

About 3,000 of them produce milk continuously, with a daily milk yield of 100 tonnes. This breed of cow is also an excellent source of quality meat.

Excellent conditions for animals breeding have been created, most of the processes are automated and computer controlled.

The company also raises sheep for milk and meat.





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Livestock breeding

Milking of cows is automated and individual computerized control of their health status, quantity and quality of milk is performed.

About 80 tons of milk of excellent quality is available daily on the market and transported by company tankers.

The remaining amount is processed into dairy products.





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Processing

The company is an established and popular producer of yogurt, cheese, cream and other dairy products. The authentic taste of these traditional Bulgarian foods is preserved.

The production is carried out with modern technological lines with continuous and strict control of the processes.

A separate factory for meat processing has been built, which works only with meat produced by the company and also according to traditional Bulgarian recipes.





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Products and sales

The company produces 12 dairy and 86 meat products using traditional Bulgarian technologies. No preservatives, dyes or enhancers are used, the products are free of additives.

The production is transported by own transport and is sold among more than 800 customers (shops, stores, etc.) in the country.

The company does not work with large supermarket chains, but has created its own retail network of about 50 stores in Bulgaria.





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Biogas

In 2018, the company built an installation for processing organic waste into electricity and organic fertilizers.

The installation is supplied by pipelines with waste from farms and processing lines and is automated as much as possible.

1.5 MWh of electricity is produced, which turns the waste problems into additional significant revenues.

Specialized machines are used for fertilization, which introduce the obtained organic fertilizer deep into the soil.





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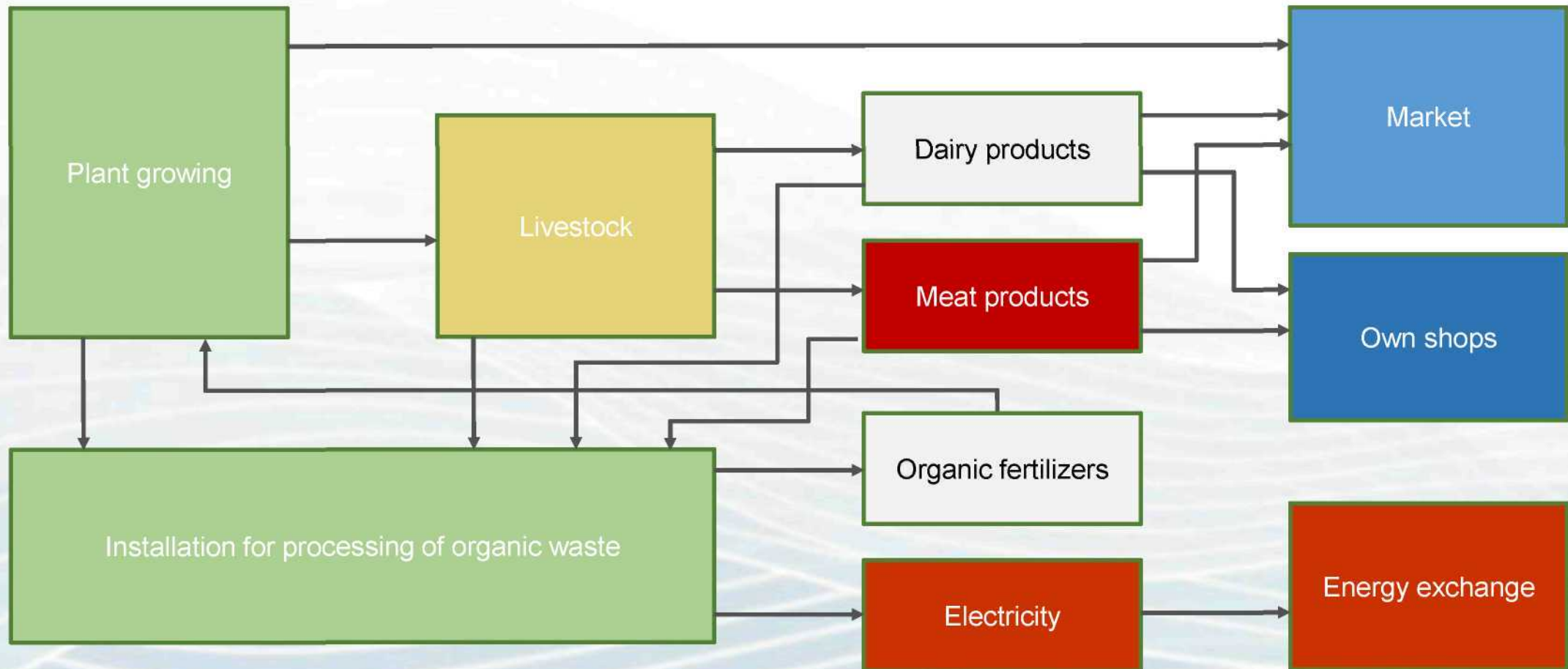


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Environmental protection

- Minimal use of chemical fertilizers in crop production, organic fertilizers are used;
- No genetically modified crops are produced, the animals are fed with natural foods of their own production;
- Organic waste from animal husbandry and processing of milk and meat is utilized, no waste is disposed of;
- Food is produced according to traditional recipes, without preservatives and other additives, the health of customers is of a great concern;
- The electricity produced from the waste is more than the needs of the company as a consumer.



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Panel and discussions conclusions

During the International Business Conference "Internet Connectivity in Agriculture in the BSB" that was held on the 28th of June 2022, in Thessaloniki, Greece in the framework of the project "Cross-Border Alliance for Climate-Smart and Green Agriculture in the Black Sea Basin" (AGREEN, BSB-1135) the focus was placed at the presentations and discussions of innovative web-based networking tools for the support of climate-smart agriculture and its products.

One of these tools claims to be the developed within the project AGREEN Internet platform offering different instruments for knowledge sharing, networking and discussion of pressing issues and new trends in the climate-smart agriculture (CSA). The platform is designed to serve as a specially dedicated virtual environment accommodating the collected resources as well as promoting and giving floor to the latest achievements and progress of the key actors involved in the CSA.

In order to broaden the scope and vision of other possible solutions for the producers in the Black Sea Basin to keep up with the times in the field of CSA, other successful initiatives were also presented and discussed. Among those were the Digital Innovation Hub in agriculture-food sector and the rice value chain - a pilot project of the Region of Central Macedonia in the frame of INTERREG EUROPE RUMORE Programme, the activities of the American Farm School in Thessaloniki using IT technology as a tool for calculating the footprint in agri-food sector, the potential and the strategies used to reduce the carbon footprint of food products, and a good practice from a farm in Northeast Bulgaria applying vertically integrated solutions to close the production cycle.

As the topics of discussion were closely related to the area of climate-smart and green agriculture, the audience and participants were highly interested and satisfied with the conference.

Following the presentation of the AGREEN Internet platform the participants united around the vast potential of the virtual environment to connecting producers, experts and other parties interested in Climate-Smart and Green Agriculture and recognized its benefits in allowing easy and fruitful exchange of information and practices.

The second presentation was by Notis Argiriou, PhD - collaborating member of CERTH-Center for Research and Technology Hellas. During the presentation the participants were introduced to a pilot project of the Region of Central Macedonia in the frame of INTERREG EUROPE RUMORE Programme developing a rice production tracking platform through the block chain technology. Key achievement of the initiative is that the final

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consumer of the product can use of a single QR code to track the full production cycle and to retrieve information for each package bought, such as: area of production, storage, packaging, trading path, etc. The participants discussed the potential effect such technology can have on the customers' behaviour, especially when it comes to those consumers who have positive attitude towards the environment protection, sustainability and healthy lifestyle and want to be aware of the footprint they leave on the environment by consuming particular foods or goods. The possibility to "read the story" of the product they buy increases the trust and the satisfaction of their choice and may answers the need of responsible consumption.

Another interesting approach was presented by Vicky Crystalidou, PhD in Agronomy and animal specialist in the American Farm School in Greece, who demonstrated the possibilities of using IT technology as a tool for calculating the footprint in agri-food sector. The organization has established an innovative cluster INOFA - Internet of Food Alliance with the main purpose to help the consumers get oriented and make their informed choice when selecting the products they buy. Carbon footprint is also a topic that is of growing interest in the agri-food sector as it is in many others and it became of a great interest to the audience engaged in the development and promotion of the climate-smart agriculture. The carbon footprint tracking system presented was highly appreciated since it allows farmers and producers who actively partake in practicing climate-smart agriculture to measure the progress and results achieved in effort to minimize the negative impact of their activity on the environment.

In general, the participants welcomed the idea of constant internet connectivity of the parties involved in the agri-food sector as an opportunity for utilizing the potential of the new technologies in a traditional sector as the agriculture. The main challenges that were mentioned were the difficulties in providing good (internet) connection to the remote areas that will allow their inclusion in the global market and educational environment, but the advancement in the development of the IT infrastructure in the last decades is believed to rapidly compensate for these shortages and make it accessible to all interested parties.

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