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Entrepreneurial Discovery Workshop Report III

Topic 1: AGRICULTURE AND FOOD PROCESSING

EDP workshop overview

On June 28, 2019, the Ministry of Education, Culture and Research, with the support of the Joint Research Center of the European Commission and in partnership with "Alec Russo" University from Balti, organized the first entrepreneurial discovery workshop (EDP) for the Agriculture and food processing sector.

The event was attended by 56 people, representatives of public authorities, universities, research institutes, private sector and NGOs, distributed per 4 preliminary sub-domains, as follows:

Working group Nr of representatives	<i>Agricultural and horticultural biotechnologies</i> Facilitator: Dr. Larisa Andronic	<i>Field crops</i> Facilitator: Prof. Boris Boincean	<i>Animal husbandry and veterinary medicine</i> Facilitator: Prof. Larisa Șavga	<i>Processing of agricultural raw material</i> Facilitator: Diana Russu
Business	4	6	4	4
Academia	4	6	4	4
Civil society	3	4	3	4
Public authorities	2	1	2	1
Total:	13	17	13	13

The objectives of the EDP workshop included carrying out SWOT analysis of identified preliminary sub-domains with potential for smart specialization in the agri-food sector and generating the common vision for the future and objectives for the development of the agri-food sector, as part of a future smart specialization strategy.

Following the mapping process were identified 4 sub-domains in the agri-food sector, considered to have potential for smart specialization. These were refined into 3 sub-domains during the EDP workshop:

<i>Agricultural biotechnologies and horticulture</i>	<i>Field crops</i>	<i>Animal husbandry and veterinary medicine</i>	<i>Processing of agricultural raw material</i>
<i>Advanced biotechnologies for agriculture</i>	<i>Sustainable agriculture (including ecological)</i>		<i>Value-added food products</i>

The EDP workshop agenda included an introductory plenary session, with contributions from representatives of relevant public authorities (dr. Olga Duhlicher from the Ministry of Education, Culture and Research, Vera Chilari from the Ministry of Agriculture, Regional Development and Environment). Workshop moderator, dr .Svetlana Codreanu briefly presented the agenda and the meeting methodology.

Several presentations were delivered by invited national experts (prof. Larisa Savga from the Trade Co-operative University, Diana Russu from the Chamber of Commerce and Industry of the Republic of Moldova), focusing on smart specialization as a new strategic approach for transformation and growth based on research and innovation.

The presentations were followed by two participatory exercises, organized in 4 parallel working groups, moderated by facilitators:

- performing SWOT analysis of the identified subdomains and the priority domain as a whole,
- developing of visions for identified subdomains and of common vision for the future of the agri-food domain as a whole.

Current status of the Agri-food sector

Agricultural sector in the Republic of Moldova is quite traditional, based on high soil fertility and favorable climate, it employs about one third of the national labor force. However, the sector holds a disproportionately low share of GDP (around 14% in 2018), due to low productivity and competitiveness of the sector. National agricultural sector is threatened by the danger of intensive soil degradation and of climate change, mostly droughts. By valorization of the existing genetic potential of crop plants varieties and animal breeds, as well as making use of the scientific and innovative capabilities in the field (8 research and scientific-practical institutions) it will be possible to increase the competitiveness of the agricultural sector and overcome the existing problems.

Despite the impressive growth in exports of agricultural and food products (e.g. sunflower seeds, wheat or fruit) during the recent years, the exports of products with a more advanced level of processing (sunflower oil, fruit juice, bakery and pastry) decreased. The structure of exports of agri-food products in terms of technology level is alarming, because they weren't accompanied by a proportional increase of their contribution to gross value added and economic growth, respectively.

According to the mapping report by H.Hollanders, there is significant scientific potential in the areas of Agricultural and biological sciences, economic and innovative potential in the agricultural and food processing sectors (food chemistry – international patents, winemaking, food, varieties (national patents), pharmaceuticals)¹. The report on characterization of preliminary priority domains by SIRIS Academic, has confirmed the preliminary priority domain of Agriculture and food processing, as being technological-innovation-oriented area, featuring an important contribution from patents but also significant publication records. It must be noted that the share of patents, witnessing technological innovation, is growing.²

The innovative activity of enterprises in the Republic of Moldova for 2015-2016 according to the National Bureau of Statistics shows an increasing number of enterprises in the agri-food sector participating in technology transfer projects. The agrifood sector is a priority for all the regions of Moldova and it also has been identified by the Investment Agency as one of the main economic sectors contributing to the economic development of Moldova.

¹Hugo Hollanders. Mapping for smart specialisation in transition countries: Moldova. The economic, innovative and scientific potential in Moldova. Summary of the report "Mapping of economic, innovative and scientific potential in the Republic of Moldova" prepared by, 2017. (https://s3platform.jrc.ec.europa.eu/documents/20182/234901/JRC_mapping-summary+leaflet-Moldova_Oct3.pdf/2f7c3eeb-3324-46db-a08b-e23a3ea87085)

²Characterisation of preliminary priority areas for smart specialisation in Moldova. Network analysis for the identification of key stakeholders for preliminary priority areas for smart specialisation in Moldova. SIRIS Academic, 2018. (<http://unics.cloud/wp-content/uploads/2019/01/Characterisation-of-preliminary-priority-areas-for-smart-specialisation-in-Moldova.pdf>)

SWOT analysis of the Agri-good sector

Strengths

- Scientific capabilities – specialised fundamental and applied research institutes;
- Rich soils and favorable weather conditions;
- Vast and diverse genetic pool of agricultural crops and breeding animals;
- Experience and traditions in growing crops and raising animals;
- Integrated plant and animal protection system;
- A significant private sector in the field;
- Innovative potential, indigenous raw materials and agricultural products processing infrastructure;

Weaknesses

- Weak connection between research, production and state authorities;
- Exaggerated dependence on non-renewable and imported energy sources;
- Dispersed activity of system elements, fragmentation between production and processing, poor orientation towards the technological process of high added value products in the value chain;
- Excessive fragmentation of agricultural land;
- Soil degradation due to incorrect management;
- Lack of motivation policies for highly qualified staff;
- Lack of internationally accredited laboratories for soil quality, seed and products certification;
- Low innovation absorption capacity of companies;
- Lack of testing units for functional products developed in industrial quantities;
- Developed functional products are not capitalized by the private sector;
- Poor funding (lack of state investment) and insufficiency of modern equipment.

Opportunities

- Opportunities brought by the Deep and Comprehensive Free Trade Agreement within the EU Association Agreement;
- Collaboration among countries / international collaborative partnerships, regional and international investment funds;
- Open access to international markets;
- Advanced degree of mobility and openness of science;
- High demand for organic products;
- Appropriate policies in the field of product processing and export.

Threats

- Brain drain and aging of the labor force
- Unfair competition, uncontrolled import, monopolization
- Social-economic instability, the danger of embargoes
- Limited and expensive energy sources
- Decrease of drinking water volume
- Natural hazards

The main development factors identified for the 4 preliminary subdomains, resulting from the participatory group exercise, are summarized in Table 1

Table 1. Main development factors per subdomain

Agricultural biotechnologies and horticulture	Field crops	Animal husbandry and veterinary medicine	Food processing
<ul style="list-style-type: none"> • Scientific capabilities – specialized fundamental research institutes • Diagnosis of harmful organisms (integrated plant protection) • Poor funding (lack of state investment) • Insufficiency of modern equipment • Collaborative relations among countries / international collaborative partnerships • Regional and international investment funds • Unfair competition, uncontrolled import, monopolization • Social-economic instability 	<ul style="list-style-type: none"> • Rich soils • Human scientific potential • Insufficient highly qualified staff (lack of motivation) • Promoting a sustainable and resilient organic agricultural system • Diminishing human scientific potential • Limited and expensive energy sources 	<ul style="list-style-type: none"> • Favorable conditions for animal breeding • Available genetic pool (breeding animals) • Innovative potential for animal breeding and production • Lack of internationally accredited laboratories for product certification • Deficient system / underdeveloped organisation of the zootechnical sector (lack of breeding segment, etc.) / System fragmentation • Insufficiency of qualified specialists (qualified staff) • Low innovations absorption capacity of companies • Opportunities brought by the Deep and Comprehensive Free Trade Agreement within the EU Association Agreement • Appropriate policies in the field of product processing and export • Migration of labor force / promoting the migration of labor force • Natural hazards • Internal and external unfair competition 	<ul style="list-style-type: none"> • Domestic raw materials • Migration of the labor force • Lack of testing units for products in industrial quantities • Developed functional products are not capitalised by the private sector • Scientific potential • Aging workforce • Open access to international markets • Poor orientation towards the technological process of high added value products in the value chain • State and international programs (donors) for funding and subsidizing producers • High demand for organic products • Application of IT for the processing of produce • Decrease of drinking water volume • Natural hazards

Vision for the Agri-food sector

The agri-food sector will be sustainable, precision-based, ecological, integrated into the circular economy, with a complex value chain based on modern technologies and the efficient use of natural resources.

The main objectives to achieve this vision

- Establishing an efficient communication platform between research and business, creating clusters of research - implementation – production stakeholders.
- Adopting the concept of intensive agriculture based on a fully closed circuit of energy and nutrients (rational crop rotations, conservative soil cultivation systems, rational soil fertilization systems, etc.).
- Increasing the share of lands where precision and ecological agriculture is implemented and increasing the share of organic production up to 5-10%.
- Incentivizing agricultural producers, based on the monitoring of ecosystem services provided by farmers.
- Use of virus-free / certified seeds and seedlings.
- Capitalizing on innovative potential and technological endowment.
- Improving the legislation in the field and the instruments for its implementation.
- Qualified staff training and development, implementing continuous education programs for sector professionals.
- Implementing advanced and / or intensive (complex flow) processing technologies of organic raw materials.
- Ensuring stable niches on international processed food markets.
- Implementing innovations in processing technological flow.
- Establishing testing units for new technologies and quality of products in industrial quantities.
- Certifying the conformity of agricultural production with national and European standards, establishing internationally accredited laboratories for certification of products;
- Funding and implementation of partnership projects.
- Supporting small and medium enterprises.

Conclusions

The discussions in the framework of the EDP workshop confirmed the importance of the agri-food sector as a priority area of the Smart Specialization Strategy of the Republic of Moldova.

The participants of the workshop emphasised the importance of such exercises not only for identification of the vision and objectives based on innovative potential in the field, but also for establishing a communication and cooperation platform between different stakeholders.

Recommendations

The planning of the EDP workshops in the agricultural sector should take into account the seasonal activity in the sector.

The next stages of the EDP should include intersectoral workshops (involving representatives of other priority areas identified during the mapping process).

The representatives of the Technological Transfer Network of the Republic of Moldova should be invited to the next iterations of EDPs, as they are involved in one relevant sectoral project: Danube S3 Cluster Transnational Cluster Cooperation active on Agro – food, based on Smart Specialization Approach in Danube region.

The following table lists the visions and objectives per subdomains, resulted from the participatory exercise.

Table 2. Visions per subdomains in Agri-food sector

1. What is the present situation of the priority subdomain?			
<i>Agricultural biotechnologies and horticulture</i>	<i>Field crops</i>	<i>Animal husbandry and veterinary medicine</i>	<i>Food processing</i>
<ul style="list-style-type: none"> - Plant varieties with high production potential, which are not fully implemented, - Sub-domain branches (fruits farming, vegetables farming, winegrowing, berry farming, ornamental plants, nuts, genetics and melioration, agri-tech and protection technologies, organic farming) are not fully exploited due to lack of financial resources, - Lack of communication between producers and researchers, lack of interest in new technologies. 	<ul style="list-style-type: none"> - Stable situation, decreasing production levels; - Intensive degradation of soil fertility; - Decrease of the human scientific potential; - Lack of skilled labor; - Lack of organic products; - Fragmentation of phytotechnics and zootechnics; 	<ul style="list-style-type: none"> - Favorable weather conditions - Experience (tradition) in animal breeding - Processing infrastructure - Breeders' genetic pool available, but with low level of manifestation - Innovative potential 	<ul style="list-style-type: none"> - Scientific potential - Functional products developed - Domestic raw material - Poor orientation towards the technological process of high added value products in the value chain, - Lacking infrastructure for product quality testing - Developed functional products are not capitilised by the private sector.
2. What are the key challenges?			
<i>Agricultural biotechnologies and horticulture</i>	<i>Field crops</i>	<i>Animal husbandry and veterinary medicine</i>	<i>Food processing</i>
<ul style="list-style-type: none"> - Social-economic instability - Unfair competition, uncontrolled import, monopolization - Low quality of agricultural products (non-compliant to standards) - Low applicability of modern technologies - Embargoes 	<ul style="list-style-type: none"> - Degradation and pollution of natural resources; - Limited non-renewable energy resources, with increasing prices; - Climate change, with frequent occurrence of droughts; - The drastic reduction of biodiversity in the aquatic, terrestrial and underground environments; 	<ul style="list-style-type: none"> - Lack of qualified staff - Lack of internationally accredited laboratories for products certification - Fragmented system (lack of pastures, lack of reproduction centers for breeding animals, etc.) - Imperfect and obsolete legislation. - Insufficient infrastructure for the slaughter of animals 	<ul style="list-style-type: none"> - Increased consumer culture - Orientation towards the technological process of high added value products in the value chain - Establishing advanced infrastructure for new technologies and product quality testing - Integration of IT into processing flows

	- Insufficiency of qualified human potential; - Fragmentation of rural communities.	(slaughterhouses) and the conditions for their authorization	
3. What are the sectorial goals of the subdomain?			
<i>Agricultural biotechnologies and horticulture</i>	<i>Field crops</i>	<i>Animal husbandry and veterinary medicine</i>	<i>Food processing</i>
- Precision agriculture - Creation of research - implementation - production clusters based on modern technologies, - Increasing the share of lands where precision and ecological agriculture is implemented and increasing the share of organic production up to 5-10%. - Use of virus-free / certified seeds and seedlings	Sustainable agricultural systems, including ecological, low on non-renewable energy sources, in harmony with the environment and attractive to rural communities. Incentivizing agricultural producers, based on the monitoring of ecosystem services provided by farmers.	A sustainable system with a complex value chain integrated into the circular economy, based on modern technologies and the efficient use of natural resources.	Advanced and / or intensive (complex flow based) technologies for processing of organic raw material. Stable niches on international processed food markets.
4. What are the main objectives to achieve the sectorial goals?			
<i>Agricultural biotechnologies and horticulture</i>	<i>Field crops</i>	<i>Animal husbandry and veterinary medicine</i>	<i>Food processing</i>
- Funding and implementing partnership projects - Supporting small and medium enterprises - Changing the regulatory framework in the field - Investments in the field - Establishing intra / international partnerships in the field	- Supporting scientific programs and projects, staff training, collaboration between science and agricultural producers through extension services; - Adopting the concept of intensive agriculture based on a fully closed circuit of energy and nutrients (rational crop rotations, conservative soil cultivation systems, rational soil	- Capitalisation of innovative potential and technological endowment - Improving the relevant legislation and the mechanisms for its implementation - Initial and continuous education of qualified personnel in the field - Setting up and developing specialized regional centers for the provision of zootechnical and veterinary medicine services	- The implementation of continuous education programs for professionals, - Implementing processing innovations in the technological flow, - Establishing testing units for new technologies and quality of products in industrial quantities, - Setting up an effective communication platform for between research and business.

	<p>fertilization systems, etc.).</p> <ul style="list-style-type: none"> - Certification of agricultural products in compliance with national and European standards. 	<ul style="list-style-type: none"> - Incentivizing professional co-operation between business, academia and civil society - Creating internationally accredited laboratories for products certification - Cooperation with other related sectors at the regional level to generate and increase the added value of the finished output across the value chain / companies involved in commercialization of the sector products 	
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5. Which key stakeholders should be involved to achieve the sectorial goals?

<i>Agricultural biotechnologies and horticulture</i>	<i>Field crops</i>	<i>Animal husbandry and veterinary medicine</i>	<i>Food processing</i>
<ul style="list-style-type: none"> - Institute of Genetics, Physiology and Plant Protection - Institute of Microbiology and Biotechnology - Institute of Horticulture and Food Technology - Research Institute for Field Crops "Selecția" - "Alec Russo" State University, Bălți - Institute of Phytotechny "Porumbeni" - Institute of Animal Husbandry and Veterinary Science - „Moldsuinhibrid" - Agrarian State University of Moldova - Institute of Zoology - Technical University of Moldova - Ministry of Education, Culture and Research - Ministry of Economy and Infrastructure - Ministry of Agriculture, Regional Development and Environment - Chamber of Commerce and Industry of RM - EBRD, USAID - ENI - AgroBioNis LTD, Molsalvia SRL, Agro Bio Management SRL, ElitAgrotehnologie SRL, PROGRAM ORGANIC" SRL, "AGROSELECT-VADENI" SRL, "UNICAPS" SRL, Vita-Biofarm" SRL, PF "Tomaș Oleg", „BasNicCom-Impex" SRL, Apinatur SRL, "CODRU-NORD" SA, "CARMEZ" SA, "ORHEI-VIT" SA, "OLOI PAK" SRL, JLC S.A. - Association of potato producers „SOLANA-M" - Association of berries producers „Bacifera" - Association of lavender producers of Moldova - "UniAgroProtect" Association - Moldovan Farmer Federation - Federation of Sheep and Goat Breeders of the Republic of Moldova - National Association of Beekeepers - Association of Farmers-Producers of Milk - Dairy products Association of Molodva 			

VISION for the priority domain AGRICULTURE AND FOOD PROCESSING

1. What is the present situation of the priority domain?

Agri-food sector - a traditional sector, based on high soil fertility and favorable climate. The existing gene pool of crop plants and animal breeds is not fully exploited, the same being true for the existing scientific and innovative potential due to the low innovation absorption capacity of economic agents. Infrastructure for agricultural production processing opens the possibility for the private sector to capitalize on new value-added functional products.

2. What are the key challenges?

- Danger of intensive soil degradation and climate change, with major drought impact;
- Limited non-renewable energy resources, with increasing prices;
- Low applicability of modern technologies;
- Lack of efficient infrastructure for testing of new technologies, soil quality, seed material and products;
- Migration and aging of the workforce;
- Unfair competition, uncontrolled import, monopolization.

3. What should the priority domain be like in 2029 in order to stay competitive, innovative and answer the societal challenges (VISION)?

The agri-food sector will be sustainable, precision-based, ecological, integrated into the circular economy, with a complex value chain, based on modern technologies and the efficient use of natural resources.

4. What are the main objectives to achieve this vision?

- Establishing an efficient communication platform between research and business, creating clusters of research - implementation – production stakeholders.
- Adopting the concept of intensive agriculture based on a fully closed circuit of energy and nutrients (rational crop rotations, conservative soil cultivation systems, rational soil fertilization systems, etc.).
- Increasing the share of lands where precision and ecological agriculture is implemented and increasing the share of organic production up to 5-10%.
- Incentivizing agricultural producers, based on the monitoring of ecosystem services provided by farmers.
- Use of virus-free / certified seeds and seedlings.
- Capitalizing on innovative potential and technological endowment.
- Improving the legislation in the field and the instruments for its implementation.
- Qualified staff training and development, implementing continuous education programs for sector professionals.
- Implementing advanced and / or intensive (complex flow) processing technologies of organic raw materials.
- Ensuring stable niches on international processed food markets.
- Implementing innovations in processing technological flow.
- Establishing testing units for new technologies and quality of products in industrial quantities.

- Certifying the conformity of agricultural production with national and European standards, establishing internationally accredited laboratories for certification of products;.
- Funding and implementation of partnership projects.
- Supporting small and medium enterprises.

5. Which key stakeholders should be involved to achieve this vision?

Private sector (economic agents);
Academia (educational institutions, research and scientific-practical institutions, technology transfer units, accredited laboratories);
Civil society (professional associations of producers, processors and consumers);
Public sector (central and local public authorities);
Development partners.