



Joint Research Centre - European Commission;
North East Romania Development Agency

ENTREPRENEURIAL DISCOVERY FOCUS-GROUP IN THE BIOTECHNOLOGY SECTOR IN NORTH EAST ROMANIA

Iasi, 6th June 2016

Event Report



Event Report – Entrepreneurial Discovery Focus-Group in the Biotechnology sector in North East Romania

1. EVENT SUMMARY

The Biotech EDP-Focus Group (Iasi, 6th of June 2016) gathered approximately 120 local stakeholders, thanks to the effort of the Regional Development Agency, which was in charge of mobilising local stakeholders.

The agenda and presentations are available on the [S3 Platform website](#).¹ The box below summarises the key elements of the day

Box 1 – Overview of the day

- Introduction to the day: the policy scene (plenary session)
- The international context: presentations from experts (plenary session)
- Entrepreneurial discovery exercises (two parallel sessions)
- Reporting from parallel session and closing remarks (plenary session)

During the first plenary sessions the project and the local RIS3 were introduced by JRC (Mark Boden) and the RDA and were commented by DG REGIO and national government representatives.

In line with previous EDP focus groups, the introduction was followed by a set of presentations from international experts, dealing with four different segments of the biotech industry and four associated societal challenges:

- **Biotech in agriculture** - societal challenge **Food Security**
- **Biotech in health/personalised medicine** - societal challenge **Healthy Ageing**
- **Industrial biotech** - societal challenge **Clean Energy**
- **Environmentally-oriented biotech** - societal challenge **Clean Safe Water**

The presentations were followed by a participatory exercise in two steps geared to identify entrepreneurial opportunities within the region. The methodology built upon the one previously adopted in Eastern Macedonia and Thrace, yet, following suggestions from the region, it had a stronger focus on the specific challenges faced by different actors. The exercise was conducted in four parallel tables, each addressing one of the four themes above. The moderators of the parallel sessions had been selected by the region among experts in each field.

¹ <http://s3platform.jrc.ec.europa.eu/-/entrepreneurial-discovery-focus-group-on-biotechnology-north-east-region-romania?inheritRedirect=true&redirect=%2Fris3-in-lagging-regions>

2. EVENT'S OUTCOMES

The ideas emerged from the exercise are listed below.

- Biotech in agriculture
 - Recycling of agricultural waste and improved use of wool
 - Exploiting horticultural by-products in various industries (pharmaceuticals, cosmetics, food, healthcare, etc.)
 - Improvement of the organic sector (including through certification);
- Biotech in health/personalised medicine:
 - Integrated public health management systems.
 - Probiotics and antibiotics, developing new pharmaceuticals
 - Regional information system for R&D and TT financing and know-how
- Industrial biotech:
 - Supporting the development of sustainable, cross-sectoral value chains in the NE region, with interregional connections at European level, from agricultural crops (e.g. acacia, spruce, hemp) to finished products
 - Recovery and exploitation of different types of waste
 - Exploitation of synergies between the agricultural sector and energy production
- Environmentally-oriented biotech:
 - Improve collaboration between actors.
 - Waste water treatment and treatment and use of treatment sludge
 - Provide safe water to rural areas

In what follows, we report the full template developed during the event, which outlines the key characteristics of the innovative idea proposed.

Biotech in agriculture: Recycling of agricultural waste and higher use of wool

Description of regional development opportunity offered by the challenge

Significant quantities of waste/residues are being produced in agricultural and livestock activities, the bulk of which are not subsequently exploited, thus causing environmental problems.

Sheep breeding in Romania generates large quantities of wool that remain unexploited, partly because the wool processing industry has virtually disappeared, but also due to customers' changing lifestyles.

Under such circumstances, alternative uses must be found for the significant quantities of vegetable and wool secondary materials generated in each and every production cycle, as compared to the traditional methods that are currently employed.

The research team aims to find new and efficient uses for these products in industries such as:

- Civil engineering (residential, industrial and agricultural, etc.);
Production of thermal-insulation boards/blocks from vegetable waste or wool;
Road construction;
- Manufacture of absorption and safety barriers for use in handling oil spills;
- Manufacture of water and air filtration systems for the milling and cement industries;
Use of wool as a raw material for tree protection against rodents, as well as for the thermal protection of frost-sensitive ornamental plants;
- As a support material for vertical gardens.

Regional strengths upon which the idea is built (identify clearly the research component

- Growing traditional industry;
- Large areas of agricultural crops generating large quantities of vegetable by-products and by-products that can be used as raw materials;
Large flocks of sheep in the north-eastern region;
- The absence of processing industries for these by-products;
- Making industrial use of these by-products has a positive impact on the environment;
- Knock-on effect on the local economy.

Regional weaknesses that need to be addressed

- Insufficient skilled staff to carry out this kind of research (training needed);
- Romanians' preference for imported products;
- High transport costs of raw materials.

Role of each element of the 4-ple helix in pursuing this opportunity

- The role of universities is to research, assess and implement these new technologies.
- The role of public administration is to be a local coordinator and beneficiary of the research results.
- The private sector can be both a project partner and supplier of raw materials.
- NGOs are in a position to influence attitudes towards the environment and can have a positive impact on legislation.

Are there international experiences to learn from? Why are they relevant?

Yes, there are. There is international experience available in these areas as people return to a healthy lifestyle and sustainable use of local resources in the spirit of sustainable development.

For instance, Switzerland and Austria commonly use these thermal insulation technologies based on wool and compressed hay bales, which have begun to be used in Romania too, in various social projects.

Biotech in agriculture: Exploiting horticultural by-products in various industries (pharmaceuticals, cosmetics, food, healthcare, etc.)

Untapped potential in bio-compounds at regional level; increased interest on the part of research specialists: publications; resolving economic, socio-logistical/technological and environmental protection issues.

Description of regional development opportunity offered by the challenge

- Diversifying the local supply of pharmaceuticals (Antibiotice, Fiterman Pharma); cosmetics (encouraging new regional start-ups); foodstuff (Coseli); natural health products (Plantavorel, Zenyth Pharmaceutical, small existing business, such as Farmacia Verde);
- Attracting local farmers into the economic cycle in the context of sustainable development (training, financial support, attracting them into the value chain by integrating them into specialised networks, infrastructure, certification);
- Creating value chains by involving universities, institutes and research facilities, public administrations and the private sector (exploiting human resources in the field of research, exploiting existing facilities, improving infrastructure, optimising the technologies used to cultivate and obtain products);
- Strengthening regional brands (expanding the Made in Iasi project);
- Increasing the regional GDP;
- Regional leader in good practices (innovation cluster).

Regional strengths upon which the idea is built

Large areas of good quality agricultural land;
Potential farmers;
Training institutions;
Universities - research centres;
Market potential - emergent demand for relevant organic products

Regional weaknesses that need to be addressed

Lack of partnerships in the field (a culture of cooperation);
Lack of orientation towards innovation;
Poor research infrastructure;
Brain-drain;
Lack of civic education

Role of each element of the 4-ple helix in pursuing this opportunity

University - research, training, testing
Local government - access to research infrastructure, permits, control
Private sector - production, exploitation, job creation
NGOs - media coverage, lobbying, social responsibility projects

Are there international experiences to learn from? Why are they relevant?

Project ERMIS, innovation clusters in North-East and INTERREG projects.

Biotech in agriculture: Organic farming: a current and future challenge and the motor of a long and healthy life.

Description of regional development opportunity offered by the challenge

Processing farm-produced raw materials into compounds/extracts with therapeutic value (capsaicin, p-Coumaric acid, resveratrol, essential oils, etc.);

Creating companies specialised in the production of biopesticides (plant extracts, microorganisms, etc.), and their marketing;

Developing the organic product processing industry.

Regional strengths upon which the idea is built (identify clearly the research component)

- The research infrastructure and existing research teams;
- The tradition of organic farming;
- The high fertility and low pollution levels of the soil;
- The available, cheap workforce in rural areas;
- Local sources of germplasm that may be adapted to organic farming;
- Promoting cooperation between local stakeholders so as to provide an innovative ecosystem, support the funding of these special technologies and establish international clusters and networks;
- Entrepreneurial discovery as a business opportunity;
- Contributing to establishing infrastructure capable of supporting implementation of the project.

Regional weaknesses that need to be addressed

- No opportunities for farmers to associate (land fragmentation);
- Complicated extraction and processing technologies;
- Lack of a domestic market for organic products;
- Administrative obstacles (certification bureaucracy);
- Lack of independent analysis and certification laboratories.

Role of each element of the 4-ple helix in pursuing this opportunity

- University - analysis of active compounds;
- Business environment - demand for the innovations listed above;
- NGO - financial and implementation support. Facilitating role;
- Public administration - product approval and promotion.

Are there international experiences to learn from? Why are they relevant?

There are products of these technologies with recognised effects in the biomedical world (the bioactive products listed above).

Examples of successful companies - Robles Cellar (Spain) - production of organic wine.

<http://www.aiab.it/>

Biotech in health/personalised medicine: Integrated public health management systems

The north-east region has been identified as requiring efficient public health management systems to be implemented

- Creation of a medical statistical database for public healthcare professionals
- Creation of a platform for collecting, sorting and incinerating infectious medical waste
- Palliative/geriatric care system, given the marked tendency towards an ageing population

Description of regional development opportunity offered by the challenge

Creation of a medical statistical database for public healthcare professionals: a regional platform which should have access to the following information: which is the 'track record' of a hospital unit (reported hospital infections, authorisations and powers, level of equipment and facilities, available human resources by specialties, inspection reports, compliance plans, health programmes implemented, performance indicators), available to healthcare professionals, public health directors, epidemiological and sanitary inspection bodies, fire safety clearances, etc. Purposed: to remedy points of non-compliance in health facilities and improve the general state of public health; regional and national overview of the health system, accompanied by adequate legislative regulations

Creation of a platform for collecting, sorting and incinerating infectious medical waste: a regional physical platform for collecting, sorting and incinerating infectious medical waste by category (generated by operating theatres or contagious disease, pulmonology and phthisiology or oncology wards, etc.), that would receive the waste referred to above for the entire north-east region. Purpose: to create a single sustainable system for inactivating pathogenic microorganisms in the infectious waste produced by the regional network of hospitals.

Regional strengths upon which the idea is built (identify clearly the research component)

The medical database and statistical information for public healthcare professionals can be created using the existing IT systems in the health system and creating a pilot regional web-based application to collect all information relating to prevention and the approval, inspection and accreditation of a health unit, thus bypassing time-consuming and bureaucratic procedures when obtaining such information. Strengths: availability of IT resources and expertise in the region.

Creation of a platform for collecting, sorting and incinerating infectious medical waste: creating a reactor for the rapid treatment of infectious waste (plasma, microwave or combined) the synthesis products of which can be safely stored and made available with no environmental impact whatsoever. This can be designed in collaboration with the academic environment (faculties of physics, technological chemistry, IT, etc.).

Regional weaknesses that need to be addressed

There are no such platforms and the specialists in various counties hold no information about other units in other counties or regions. The collection of infectious waste has been outsourced to other specialist companies at high costs per kg of waste; there is no traceability in respect of how this waste is treated and stored.

Role of each element of the 4-ple helix in pursuing this opportunity

Resolving pressing common problems in the local public administration involving the academic environment in the field (research), benefits for people's health, and creating a value chain with the involvement of the private sector.

Are there international experiences to learn from? Why are they relevant?

Various technologies have already been developed in the EU and the USA for the same purposes, but developing bespoke own systems/platforms that are sensitive to specific local needs would directly help to resolve the aforementioned problems.

Biotech in health/personalised medicine: Probiotics and antibiotics, developing new pharmaceuticals

- Identifying and characterising probiotic strains with targeted effects or an overall probiotic effect;
- Developing mixed antibiotic/probiotic formulas, and characterising the mechanism of action
- Checking the effect of probiotics, in simple or mixed formulas (together with antibiotics) on antibiotic-resistant pathogenic microorganisms;
- Checking the probiotic strains in terms of their release of enzymes, amino acids, vitamins, etc., which are useful for maintaining the health of human and animal bodies;
- Checking the aiding/enhancing effect of probiotics in combination with synthesised pharmaceutical (antibiotics, antitumoral) and phytotherapeutical products;
- Developing products with probiotics for customised therapy;
- Developing rapid tests to be used for identifying bacterial and viral infections;
- Identifying applications for probiotic strains in the release and recovery of bioactive compounds from vegetable waste and waste from the food industry.

Description of regional development opportunity offered by the challenge

Production of probiotics as raw materials for various industries:

- Pharmaceuticals
- Food
- Cosmetics Livestock
- Environmental protection (exploitation of vegetable waste).

Establishment of a biotechnology research and innovation centre supports an interdisciplinary knowledge-based intelligent development of our society, cooperation between the business and academic environments, raising public awareness of the importance of functional nutrition in maintaining health.

Economically, we can speak about creation of new jobs, reducing workforce migration and cutting down on healthcare costs.

Regional strengths upon which the idea is built (identify clearly the research component)

The existence of a solid academic tradition, a research base and a number of research groups dealing with biotechnologies and pharmaceuticals, as well as a biotechnology and molecular imaging cluster.

The existence of an industrial platform with expertise in the production of active substances by biosynthesis and semisynthesis.

Regional weaknesses that need to be addressed

The lack of a platform to facilitate communication between the academic and economic environments and the funding sources.

Poor regional economic development mirrored in the poor health of the active population.

Lack of education regarding balanced nutrition.

Role of each element of the 4-ple helix in pursuing this opportunity

1. The academic environment trains future specialists, provides ongoing education and circulates information between stakeholders.
2. Researchers maintain research and innovation at high standards, and supply technologies with industrial applications.
3. The industrial sector turns the lab-developed ideas into commercial products.
4. The economic sector will provide financial support for research and technological transfer activities.

Are there international experiences to learn from? Why are they relevant?

The topic being addressed is of great relevance in the developed countries of the world.

Global sales of probiotics are expected to maintain a 7% growth rate until 2020. (Global Industry Analysis)

The probiotic consumption rate in Europe is at 15%, of which the UK and Germany account for 45%. (Global Industry Analysis)

Biotech in health/personalised medicine: Regional information system for R&D and TT financing and know-how

There is no culture of joint innovation in either the academic/research environment or the private sector. Private actors have not yet acquainted themselves with the financing opportunities and/or the specific tax regulations.

Description of regional development opportunity offered by the challenge

- Development of demand-oriented TT centres (Steinbeis model).
- Acquisition of TT know-how from other regions or similar European or international actors.
- Existence of a dedicated TT axis (Axis 1 of ROP) with amounts allocated regionally.
- Existence of a strategy that covers biotechnology and biomedical areas.

Regional strengths upon which the idea is built (identify clearly the research component)

- The main RDI actors are already active in the region with the two bio/medical clusters (bioROne and ImagoMol). (Academic and Public Research).
- Existence of advanced R&D infrastructure for synthesising new compounds, and preclinical studies.

Regional weaknesses that need to be addressed

- The existing R&D infrastructure fails to support certain EU priority areas (infectious diseases, viruses, probiotics, etc.).
- Migration of highly-skilled human resources towards more developed regions.
- The business environment is insufficiently informed of the tax incentives available for R&D and TT.
- Delayed dedicated financing for R&D and TT for the period 2014-2020.
- Lack of a joint database with the profiles of the R&D actors and major R&D results.

Role of each element of the 4-ple helix in pursuing this opportunity

- Academic/Research – performance of R&D activities
- Private sector - development of innovative products and processes
- Public sector - catalysts and champions of R&D and TT
- Consultants - facilitators and support in attracting financing and internationalising products

Are there international experiences to learn from? Why are they relevant?

- CIMIT – Harvard MIT Biotech Cluster.
- The Fraunhofer Institute and Steinbeis.
- Biotech entrepreneurship models.

Industrial biotech: Supporting the development of sustainable, cross-sectoral value chains in the NE region, with interregional connections at European level

Supporting the development of sustainable, cross-sectoral value chains in the NE region, with interregional connections at European level, from agricultural crops (e.g. acacia, spruce, hemp) to finished products, based on partnerships between administrative structures, research and innovation institutes, industrial producers and NGOs for social support.

Description of regional development opportunity offered by the challenge

Creating alternative profitable uses for acacia and spruce waste in finished products with high added value.

Reinstatement of the hemp value chain, from cultivation of the plant to using its long fibres in the production of fabrics, knitted fabrics and organic clothing, by-products (short fibres, chaff, etc.) in composites for construction, the car-building industry, biomass, medicine, food supplements, etc.

Reinstating these value chains will support sustainable regional development, job creation and the development of beneficial business models in terms of environmental protection and societal impact.

Regional strengths upon which the idea is built (identify clearly the research component)

1. The acacia, spruce and hemp cultivated are organic crops that help soil stabilisation and do not require large plots of land to be set aside, as there is sufficient fallow land available in the region that can be exploited for profit;
2. Available workforce with an average level of education, that can be attracted to the activities associated with these value chains;
3. A long tradition and experience in hemp cultivation and exploitation, at both domestic-handicraft and industrial level;
4. Availability of large areas regionally that are suitable for hemp cultivation;
5. The agricultural research facility in Secuieni (Roman) produces high-performance seed and fibre hemp varieties.

Regional weaknesses that need to be addressed

1. Lack of a consistent regional strategy to drive cross-sectoral cooperation and the development of financing programmes for crop development under a combined farming and forestry regime with areas of at least 50 ha, in the case of acacia and spruce cultivation or large-scale hemp cultivation.
2. Disappearance of hemp fibre primary processing units - retting pits, spinning mills.

Role of each element of the 4-ple helix in pursuing this opportunity

1. Research and development institutions can provide know-how based on new innovative technologies (e.g. wood biomass roasting techniques, bioenzyme retting of hemp stems, enzyme-based dyeing of textiles).
2. Regional administrative bodies can act as fund-raising facilitators.
3. SMEs become links in the new processing value chains.
4. NGOs can be involved in employing local labour.

Are there international experiences to learn from? Why are they relevant?

1. Nordic countries - Sweden and Norway have already implemented energy crops (e.g. energy acacia)
2. Other countries, such as the Netherlands, Germany and Poland mostly cultivate hemp for use in composites for construction, the automotive industry and biomass fuels.

Industrial biotech: Recovery and exploitation of various forms of waste

Recovery and exploitation of:

- **Solid wood waste** (evergreen branches, scrap wood from the furniture industry, etc., for the recovery of lignin anti-oxidants from falling black knots)
- **Food waste** (waste from apple juice production for pectin recovery, coffee grounds for energy uses, etc.)
- **Chemical waste** (recovery of alpha-cellulose used in brine purification)
- **Waste from construction materials** (rubble, wood, bricks, etc. to be reused in the construction and rehabilitation of social housing)

Recovering these types of waste means putting in place cooperative recovery schemes, building the specific equipment and creating schemes /identifying opportunities for funding the businesses active in this field.

Description of regional development opportunity offered by the challenge

Waste recovery meets the needs of sustainable development and stands for an opportunity to develop profitable businesses with a positive impact on the environment.

In regions with the highest unemployment rates, business development has a positive social impact by establishing microenterprises and creating jobs.

Additionally, this type of development supports the reintroduction into the economic cycle of certain materials which would otherwise imply decommissioning, storage and conservation costs. The appearance of new companies and innovative products will have a positive impact on the region's economy.

Regional strengths upon which the idea is built (identify clearly the research component)

1. Biomass is one of the energy development priorities in the regional development strategy
2. Mitigating environmental impact is a priority for the national and European environmental and research strategies
3. The excess skilled workforce (with higher education), young people in particular, will thus be easily able to access the new jobs created by the projects
4. Abundance of the raw materials needed for these developments
5. International demand for the products resulting from these developments
6. High potential for research, innovation, development and technological transfer in the region's academic environment
7. Effective, patented know-how ready for technological transfer in most of the development directions

Regional weaknesses that need to be addressed

1. Lack of support from the local authorities
2. Lack of private funds to support development in new directions
3. Poor transport infrastructure
4. Shortage of workforce with intermediate qualifications (skilled workers, foremen, technicians, etc.)

Role of each element of the 4-ple helix in pursuing this opportunity

1. The academic environment provides technological know-how, technology, prototypes and support for the implementation of projects
2. The private environment provides the need (problems to be solved by researchers), participates in the development of the necessary technologies (feedback), takes over the prototype and uses it to build the business, and participates in the supply-management-transport-waste recovery value chain
3. The public sector facilitates the access of business undertakings to public resources, can offer tax incentives for businesses with low environmental impacts, can offer specialist legislative consultancy, can propose local projects for funding or subsidies at national level, can get involved in addressing environmental issues, can promote projects in local communities and can facilitate participative democracy.
4. The NGOs can promote the project at the level of end beneficiaries (population, entrepreneurs), can act as a communication interface between the relevant stakeholders, can facilitate the establishment of partnerships, can run awareness and citizen involvement campaigns, and can support the dissemination of project results.

Are there international experiences to learn from? Why are they relevant?

There is European experience available in projects tackling the recovery and recycling of all types of waste. This type of waste is not specifically covered in western Europe, and there is a demand for waste-based products that is not fully covered by the available supply.

Industrial biotech: Synergies between the agricultural sector and energy production

There are significant quantities of waste being generated by agriculture that are not being exploited economically. Moreover, they are a risk factor for the environment, being inadequately disposed of between business undertakings/small producers (on unauthorised sites, in furrows, etc.). There is a prevailing underlying financial reason for this.

Description of regional development opportunity offered by the challenge

Using waste for:

- The production of pellets and briquettes for burning;
- The production of electric power and heat from biomass (efficient and reduced pollution co-generation) - with a direct impact on communities/institutions (e.g. for a hospital, a school, etc.) or integrated into the National Grid (SEN);
- The production of biofuels (e.g. biogas, biodiesel, bioethanol) that can be exported from the region;
- The production of animal feed pellets;

Regional strengths upon which the idea is built (identify clearly the research component)

- a. there is a high number of companies active in wood processing and agriculture in the NE region, generating large quantities of raw materials;
- b. raw materials from agriculture, for which there is no alternative economic use, may be used;
- c. exploitation of raw materials and labour at a regional level (already available at local level) - for operational purposes;
- d. exploitation of the regional workforce and resources to produce/manufacture equipment - with an impact on diversification of the economic activities in the area;
- d. use of the region's research, innovation and development capacities (in partnership with universities, agricultural schools, research institutes, etc.);
- e. collection of pruning waste from trees, vineyards, parks and private gardens, etc.;
- f. newly-created value;

Regional weaknesses that need to be addressed

- a. Materials stored in substandard spaces - require drying (for pellets and briquettes);
- b. Need for additional energy consumption (approx. 30% of the resulting energy potential);
- c. Lack of a waste collection system;
- d. Poor compliance with waste storage legislation (few penalties);

Role of each element of the 4-ple helix in pursuing this opportunity

Private sector

- investing in the production of equipment and operations employing it;
- establishing waste collection systems (potentially as public-private partnerships);
- developing an offer of integrated cleaning services for agricultural land/parks/gardens, with subsequent collection of the resulting waste;

Public sector (local administration)

- educating business people and the public regarding the adverse impact of waste and the applicable legislation;
- intensifying inspections and sanctioning non-compliance with waste legislation;
- financing lines for local or regional environmental protection (e.g. waste collection campaigns, 'green' business, waste map, etc.)

NGOs

- information campaigns regarding the adverse consequences of waste;
- education campaigns for children regarding waste;
- organisation of promotion events/awarding prizes to companies for environmentally responsible behaviour - potentially in partnership with the public and private sectors;
- monitoring and quick reporting of any violation of waste legislation;

Academic/research environment

- partnerships with the private environment to attract funding, perform impact studies, economic studies and technical projects and implement theoretical projects/innovative applications;
- independent studies regarding the impact/current situation of waste disposal, waste use, etc.

Are there international experiences to learn from? Why are they relevant?

Existing experiences at international level (in European countries) can serve as examples of good practices for the implementation of such projects across the NE region.

Environmentally-oriented biotech: Improve collaboration between actors.

- Insufficient cooperation with western EU organisations;
- Insufficient cooperation in Romania (university, R&I, technology company, public administration);

Project theme for ADR:

- evaluation of the current situation, and development/ongoing adaptation of S3;
- provision of specific S3 services (platform, stakeholders, setting up consortia, etc.).

Description of regional development opportunity offered by the challenge

- There are premises and (pilot) projects to support entering a new stage of cooperation;
- Sharing experience with regional partners (Moldova);
- Setting the target for development of sectoral strategies/action plans;
- The virtually empty technology market provides good conditions for intelligently incorporating technologies/methods.

Regional strengths upon which the idea is built (identify clearly the research component)

- Natural resources
- Good people to be trained
- Pilot projects and demo sites to be shown to others.
- Willingness to enter consortia.

Regional weaknesses that need to be addressed

- Lack of interest of local SMSs
- Lack of legislation to implement projects
- Lack of research budgets.
- Mobility to Italy/ Spain will leave region without specialists
- Education system not adapted to future requests.

Role of each element of the 4-ple helix in pursuing this opportunity

- Public administration –Catalyst
- Univ and R&I develop demonstration sites
- Tech companies- beneficiary and partners
- NGO_ disseminator and local partner/ catalyst/developer

Are there international experiences to learn from? Why are they relevant?

- Drawing contest/prize on water in colleges in NE region
- Science cafe (group of interested people discuss water).
- Group visit to Wetsus Leeuwarden
- Application for European strategic cluster partnership (10 regions/ NE region part of it)
- Romanian regional funds

Environmentally-oriented biotech: Waste water treatment and treatment and use of treatment sludge

- Waste water treatment is not prevalingly provided in rural areas, or where WWTPs have been built, they have not been put into service yet;
- The amount of waste water recirculation for industrial, farming or other purposes remains very low (below 5%);
- Insufficient waste water sludge treatment;
- Inconsistent and insufficient legislation to regulate sludge reuse in farming.

Description of regional development opportunity offered by the challenge

- Drawing up demonstration projects to foster the exchange of information and experience between the representatives of universities and research institutions, business undertakings, industry representatives, potential beneficiaries (farmers), local and regional governmental agencies about sludge treatment and its use in farming;
- Development of treated water recirculation applications (with additional advanced treatment steps) for industrial undertakings to reduce their consumption of fresh water.

Regional strengths upon which the idea is built (identify clearly the research component

- Availability of expertise in education, research, development, innovation (universities, environmental research institutes in Iasi, Bacau and Suceava);
- Existence of business undertakings (including regional water operators) interested in water recirculation and sludge treatment;
- Existence of SMEs involved in environmental services and waste water treatment;
- Relevant financing opportunities under national, international, and regional development programmes;
- Existence of national/international stakeholder cooperation networks for developing projects.

Regional weaknesses that need to be addressed

- Absence of a smart environmental specialisation sector as a specialised action line in the NE regional development strategy;
- No information available about sludge composition or how sludge can be used in farming (including reticence from some business undertakings);
- Lack of clusters and business incubators in the region.

Role of each element of the 4-ple helix in pursuing this opportunity

Industry

- Producers of waste water and sludge who are interested in subsequently exploiting these commodities in the interests of efficiency and economic viability
- Producers of relevant equipment and technologies

Universities

- Generators of environmental research, development, innovation and knowledge transfer
- Providers of higher education (Bachelor's degree, Master's degree, PhD, post-graduate courses) on specific topics such as: waste water treatment, waste management, water recirculation in industry, etc.

Public authorities

- Identification of issues with an environmental impact
- Compliance with applicable legislation
- Legislative proposals to supplement the current legal framework

NGO

- Running awareness-raising campaigns

Are there international experiences to learn from? Why are they relevant?

Yes, there are: in particular, in countries such as Spain, the Netherlands, Portugal, Italy and Germany.

Environmentally-oriented biotech: Provide safe water to rural areas

Supply of drinking and domestic water, use in households, discharge of the waste water into a centralised sewerage system, thence via treatment plants or, locally, using septic tanks.

Description of regional development opportunity offered by the challenge

Residents and small businesses in the rural environment are currently using water from unauthorized and unmonitored sources. Tests show that the potability quality indicators of these sources are being exceeded. Similarly, water is discharged into leaking basins with soil infiltration, or simply into the environment, thus contaminating the groundwater and soil.

The water supply and sewage systems made available by local administrative authorities failed to provide possibilities for connection (to the water supply and to waste water treatment sewerage systems). The main problem in some rural areas is poverty and the impossibility of paying for these services.

Regional strengths upon which the idea is built (identify clearly the research component)

- availability of surface and underground water sources in the area.
- possibility of the relevant companies creating adequate infrastructure.
- strong regional operator.
- willingness of the local community to act as an interface for inhabitants and regulators.
- willingness of regulators to become training providers.

Regional weaknesses that need to be addressed

- Poor standard of living and reluctance to change
- Lack of information from, and involvement of, the local authorities.
- Domestic environmental legislation weak compared to the European legislation
- Lack of involvement on the part of local authorities and regulators
- Unavailability of subsidies for deprived people to access water/sewerage services.

Role of each element of the 4-ple helix in pursuing this opportunity

Private sector:

domestic or business beneficiary - understanding the national/local service regulatory measures. action: closing down locally drilled wells, connection to public systems

Public sector:

investor, local administrative unit, intercommunity development association, following-up on the legal measures established at local/national level

Academic sector:

research and development, designing/redesigning the systems using community-specific solutions; application of biotechnology-based good practice policies (for both drinking water treatment and waste water treatment - plant-based or adequate treatment) in line with models/partnerships with municipalities in other EU states

Ngo:

monitoring/training/communication - advancing existing practices at European level, involvement in amending domestic legislation and compliance with the measures by population, business undertakings and service operators

Regulation:

supplementing/amending the legal framework and implementing the abovementioned measures determined by stakeholders

Operator:

implementing, verifying and ensuring that the design requirements match the actual operational requirements/communications with stakeholders

Are there international experiences to learn from? Why are they relevant?

- Plant-based treatment - similar experience in north-eastern Europe
- Collection of discharged waste water - national standards
- Use of waste water in farming further to filtering - leach fields
- Use of treatment sludge in rural farming

ANNEX 1: METHODOLOGICAL APPROACH

This annex describes in more detail the dynamics of the two participatory-exercise sessions

Participatory Exercise – Step 1

Aim of the session: Identification of challenges to be addressed in Exercise 2 and their related working sub-group.

Dynamics: The session will include individual thinking time, individual presentations as well as a process of consensus building. It is comprised of the following steps which are described in more detail below:

- Split into thematic working groups
- Individual identification of challenges
- Presentation of challenges
- Formation of sub-groups

Support: each thematic working group will be supported by a **moderator** (who will also report back to the final plenary) as well as a **secretary** who will record and collect the relevant output of the session.

IT and Stationary Equipment: Each thematic working-group will have a beamer connected to a computer for the secretary to conduct its tasks, as well as the usual flipcharts, post-its and writing pads to support the moderator and the participants.

1) Split into 4 thematic working groups

Attendees will split in four working groups addressing the four challenges and related industrial segments. As 70 people are expected, we estimate **between 17 and 18 people per table**. Each thematic working group should have participants from the whole triple helix. It might also be interesting to have graduates and post-graduates students from different disciplines taking part. Each working group will start with a tour de table

Role of the moderator: facilitate participants splitting in the working group and start the tour de table.

Role of the secretary: facilitate participants splitting in the working group.

Role of the participant: locate the working table of interest

2) Individual reflection and identification of challenges (10 minutes – 11:30-11:40)

Each individual participant will be given some minutes to think about a challenge faced by their organisation which could be met with a technological solution. Please notice that the **focus should be on the challenge**, not on the technological solution.

Each participant will have a color-coded “**Challenge fiche**” (see below) and and (potentially) a post-it it to write the challenge down. The colour reflects the element of the quadruple helix to which the participant belongs. I.e: **Public sector** **Private sector** **NGOs** **Universities**

Example of “Challenge fiche”

Challenge Title: Pollution of a given local natural area

Challenge description and impacts

The river xxx is polluted due to the problems with given industrial discharges and this is impacting the community in the following ways:

- Agricultural...
- Economics...
- Social...

Role of the moderator: Explain the task, keep the time and ensure each participant understands the process.

Role of the secretary: Ensure that each participant has a fiche and a post-it and to collect the fiches at the end of the task.

Role of the participant: Fill in the “Challenge fiche”

3) Presentation of the challenges – (25 minutes – 11:40-12:05)

Each participant will present their challenge to the rest of the working table, **using** between 1 and 2 minutes per speaker. If we use post-its, the speakers will also stick them to a flipchart.

Role of the moderator: explain the task, ensure time keeping, ensure that speakers do not deviate from their task

Role of the secretary: write the challenges-titles in using an excel file (visible through the beamer), following the same colour code.

Role of the participant: explain the challenge, keeping the time, post the post-it to the flipchart.

4) Formation of subgroups to address the challenge in the plenary exercise 2 – (55 minutes – 12:05- 13:00)

The **objective** of step 4 is to have a maximum of 4 subgroups, each comprising at least a representative from business and one from research, around 4 selected challenges. These sub-groups will then work together in session 2. The role of the **moderator** is critical in this step, as she/he will need to manage the discussion, reducing the number of challenges from step 3 by “collapsing” similar/complementary ones, identify common interests from

participants and building consensus on the grouping process. The **secretary** will record this step in the so called “Preference Table” and the “**Final challenges and subgroups**” table, drafted below.

Preference table					
Challenge title	Participant name (initials)				
Challenge 1	EM	LC	KH		
Challenge 2	GM	LB	LC	MB	
Challenge 3	KH	MB			
Challenge 4	KH	GM			

Final challenges and subgroups	
Challenges	Composition of the subgroup
Challenge 1	1 research, 2 business, 1 NGO
Challenge 2	1 research, 1 business, 1 NGO, 1 Publich
Etc.	

Role of the moderator: The moderator is critical in this step. She/he should;

1. Explain the task and ensure all participants are clear about it
2. Lead a discussion on whether there are **challenges** which are similar or complementary and hence **cluster** them into one.
3. Invite **participants to express up to three preferences** (depending on the number of participants in the working table). This can be done in an excel sheet, with the help of the secretary. If the group is small, this process can also be managed orally.
4. Lead a **consensus-building** interaction forming “sub-groups” which comprise at least 1 member of business and 1 of research. During this process the titles and definition of the challenges can be further modified and adapted to the evolution of the conversation.

Role of the secretary: The secretary should record the process by:

1. Filling the “**preference table**” in an excel file visible through the beamer to facilitate the moderators task
2. Filling in **the final challenges and composition** template, which describe the sub-group composition in terms of triple helix.

Role of the participant:

1. Be active in the discussion and facilitate the creation of groups.

Participatory Exercise - Step 2

Aim of the session: The sub-groups defined in exercise 1 will develop “regional development idea” fiches. Through these, they will identify and reflect on ways to address the challenges formerly identified, in such a way that is aligned with RIS3 (through such fiches we can then infer on the potential of the region and the perception of stakeholders).

Dynamics: Following two brief presentations by business-intermediaries and research-representatives, the sub-groups will discuss and fill in the “regional development idea” fiche. The following steps are included:

- **Split into thematic working groups**
- **Brief presentation by local universities and business intermediaries**
- **Split into subgroups for the completion of the “regional-development idea” fiche**
- **Internal reporting to the thematic working group**

Support: each thematic working group will be supported by the same **moderator** (who will also report back to the final plenary) as well as a **secretary** who will record and collect the relevant output of the session.

IT and Stationary Equipment: Each thematic working-group will have a beamer connected to a computer for the secretary to conduct its tasks, as well as the usual flipcharts, post-its and writing pads to support the moderator and the participants.

Each sub-group will also **have a computer**, connected to the internet, which they should use to fill the “business potential” fiche.

1) Split into thematic working groups

Participants will split into the same thematic working groups as the morning.

Role of the moderator: Ensure that the working group resumes

Role of the secretary: Ensure that the working group resumes

Role of participants: Re-join the working table

2) Brief presentation by local universities and business intermediaries – (20 minutes – 14:00-14:20).

Universities and business intermediaries will give a short presentation (5-8 minutes each) on the future opportunities, from their perspective, offered by the research/business sector, highlighting the local capabilities and making links to the challenges mentioned during the morning. If there is time, one or two questions from the audience can be addressed.

This short discussion will serve to further set the scene for the subsequent steps.

Role of the moderator: to introduce the session and ensure time-keeping from the presenters.

Role of the secretary: support speakers if they need IT help.

Role of participant: attend the session

3) Split into subgroups for the completion of the “regional-development idea” fiche – (1h 30 minutes – 14:20-15:50)

The subgroups will discuss on how to address each challenge and fill-in a “Regional-development potential fiche” summarising the discussion. At the end of the session, each subgroup will present to the working table. Each sub-group will need to identify a “writer” and a “rapporteur”.

Preliminary example of “regional development idea” fiche

1. Title and brief description of the challenge (potentially illustrated through an image)
2. Description of regional development opportunity (in terms of creation of specific businesses, participation to given international value chains, development of a new industrial etc.) offered by the challenge (potentially illustrated through an image)
3. Regional strengths upon which the idea is built (identify clearly the research component)
4. Regional weaknesses that need to be addressed (related to capacities, human resources, research and business infrastructure or other)
5. Role of each element of the 4-ple helix in pursuing this opportunity

Role of the moderator:

- to explain the task to the subgroups
- to move within subgroups and facilitate their discussion, ensuring they don't get “stuck”
- to ensure that each subgroups nominates a “writer” to fill-in the fiche in the computer and a rapporteur for the internal reporting (task 4)

Role of the secretary:

- Ensure each subgroup can access the computer with the “regional development idea” fiche.

Role of participants:

- Join the sub-group identified in the morning
- Identify a rapporteur and writer within the sub-group
- Participate actively to the discussion

4) Internal reporting to the thematic working group – (10 minutes – 15:50-16:00)

Each sub group will summarise to the working group the discussion by appointing a speaker.

Role of the moderator:

- to facilitate the process and ensure time-keeping

Role of the secretary:

- to collect the fiches from the computers and email them to Elisabetta.Marinelli@ec.europa.eu

Role of participants (rapporteur or writer):

- to provide the information required by the task and keep the timing

