

Critical Mass Evaluation of the Region of Murcia RM in the water technology sector. IWATERMAP project

1. CRITICAL MASS OF THE REGION OF MURCIA IN THE WATER TECHNOLOGY SECTOR

1.1. Public administration bodies

The articulation of water policy in environmental, economic and social issues in products of high added value with scientific and technological competence is one of the smart specialization strategies for the RM RIS3Mur. Therefore, there is support from the Public Administration to generate innovative products and services that contribute to the creation of growth and employment in the region.

The government of the RM, for the management and decision making in the field of water has distributed its work areas in a transversal way in different Councils and General Directorates.

The Government of RM is currently formed by 10 executive bodies, among which are: Ministry of Water, Agriculture, Livestock, Fisheries and Environment; Ministry of Employment, Research and Universities and Ministry of Enterprise and Industry. These three executive bodies stand out because in their organization they include the following autonomous bodies and public entities that are closely linked to innovation in water technology:

- Murcia Institute of Agri-food Research and Development (IMIDA).
- Entity of sanitation and depuration of residuals waters of the RM (ESAMUR).
- Development and Innovation Agency of the RM (INFO).
- Regional Employment and Training Service (SEF).

General Directorate for Water assumes competences and functions in the field of hydraulic works, sanitation and purification, water resources, modernization and improvement of irrigation and hydraulic infrastructures. General Directorate of Food Industry and Agricultural Cooperatives includes a Service of Industries and Agrifood Promotion that supports the agri-food companies. General Directorate of Agricultural, Livestock and Marine Environment Production, through the Training and Technology Transfer Service, which is responsible for carrying out training in the agrifood, agro-environmental, environmental, and rural development areas, as well as homologation and certification of training actions, counting for it of the Integrated Training Centers and Agricultural Experiences CIFEAs. And the General Directorate of Research and Scientific Innovation is in charge of scientific innovation and the promotion of transfer of knowledge, generation of value from science to society, encouraging connection of research results from public and private organizations of R&D with society and market through technological scientific R&D.

1.2. Research groups, technological centers and other research and development entities

RM has 16 research groups specialized in the efficiency of water resources management, located in the 3 universities of the Region: University of Murcia (UMU), Polytechnic University of Cartagena (UPCT) and Catholic University San Antonio (UCAM); as well as in the IMIDA and the Center of Edaphology and Applied Biology of Segura belonging to the Spanish National Research Council (CEBAS-CSIC).

Water research lines, publications and participation in regional, national and European projects are notable. Universities can train students with the most innovative techniques to guarantee the presence of specialists in the water sector that provide solutions over the years. On the other hand, Chairs in the different universities are relevant, which aim to develop collaborative activities in the fields of training, and practices of students in water management, and with the main objective of promoting research and development of technologies related to the integral water cycle.

RM has a network of private and not-profit Technological Centers, which actively contributes to economic and social development, supporting and promoting the processes of innovation and technological development as strategies for Competitiveness of the business environment. National Technological Center for the Food and Canning Industry CTC and Technological Center for Energy and the Environment CETENMA are two centers that develop their work to provide solutions to their associated companies in the field of water innovation. In addition, they give support to improve the processes and access financing to the associated companies.

Mediterranean Water Institute Foundation (IEA) has among its objectives the promotion and development of technological innovation, activities aimed at contributing to the search for solutions to problems related to water and its uses.

1.3. Companies and innovative cluster

RM has many companies dedicated to the water sector. According to data from the Regional Statistics Center of Murcia, updated on June 18, 2019, companies dedicated to the industrial sector of water supply, sanitation, waste management and decontamination are 406 in RM, generating a turnover of around 900 M€. To these companies should be added those that are grouped in other business sectors such as the Manufacturing Industry and Professional, Scientific and Technical Activities. Therefore, it is necessary to deepen in each of the companies to know their lines of work, such as: hydraulic lines, irrigation systems, automation systems, membrane filtration systems, pumping systems, design and assembly of integral plants for companies and pilot plants for R&D projects, domestic or industrial wastewater treatment, etc.

The Food and Agriculture Cluster Foundation of the RM AGROFOOD, an Innovative Business Association recognized by the Spanish Ministry of Industry, is an innovative cluster, meeting point for entities and companies, with the objective of creating value for the agri-food system, with special interest in water resources due to their high dependence on the agri-food industry of the RM.

All of them work to address the challenges related to water resources management: water scarcity; efficiency; use in the industrial sectors and link to a circular economy; recovery of wastewater resources and wastewater treatment for reuse; promotion of training and employment in the water sector, etc.

2. EVALUATION OF STRENGTHS AND WEAKNESSES OF THE REGION OF MURCIA IN THE WATER TECHNOLOGY SECTOR

The critical mass of the water sector in the RM works on the development of more sustainable technologies for Wastewater treatment, Reuse of Purified Water and Optimization of the use

of water resources, mainly focused on water scarcity and the high demand of the agri-food industry, pillar of the regional economy.

The strengths and weaknesses of the self-assessment in the water technology sector are presented below.

STRENGTHS	WEAKNESSES
Water Cycle is included in RIS3 Mur. Its activity, coordinated, oriented, and transformed through the intensive use of advanced technologies, will allow obtaining competitive advantages for the Region.	There is an excess of institutions in the area of the water cycle and the agri-food network. As a result, there is confusion about which organization is leading, for example, in relation to the issue of water technology.
Educational institutions, ranging from Training centers to universities, are actively involved in providing education related to water technology to students, in such a way that there is no shortage of students, or technicians in the future that guarantee water sustainability in the Murcia region.	There is uncertainty among farmers in the RM about the availability of water resources. It is necessary to guarantee them with projects in modernization of irrigation and infrastructures that help in the water management in all the regions.
Research centers involved in the development of the water sector are known and collaborate according to their lines of work to achieve a sustainable economy.	Water price is high for agricultural use, despite the advantages of using recycled water. Work must be done to improve the profitability of companies.
Murcia has extensive experience in the creation of water research and demonstration projects. Many companies work to provide solutions to the problems caused by the scarcity of water resources.	Murcia has the right technological centers, however, the forecast of jobs and skills needs can be improved with an interlocutor between all research groups and public administration.

3. CONCLUSION FOR THE REGION OF MURCIA

There is a critical mass in the water sector which includes education-training centers, research and technological centers, companies and public administration bodies, but must work to visualize the interests of its critical mass and improve the relationship that they have. It is advisable to invest in coordination mechanisms that use monitoring indicators, in such a way that guarantees that innovation in the water sector reaches the market and projects that generate economic and social development through public-private collaboration.

It is necessary:

1. To finance lines based on indicators that guarantee high quality results.
2. To generate technical reports for public administrations.
3. To disseminate reports for final consumers and general public in order to modify their consumption habits and inform them about the problem of water scarcity in the Region of Murcia.

Therefore, RM must follow a line of work through collaborations that include regional, national and international financing to achieve, mainly, the implementation of innovation technologies in wastewater treatment and its future reuse efficiently to achieve its sustainability.

Translated into actions, RM would like to include the following actions into the action plan of iWATERMAP:

- Critical Mass Development
- Human Capital
- Interregional Collaboration