

SMART USE OF WASTE WATER HELPS TO SAVE THE PLANET

The TREAT&USE project offers technologies for rural and urban areas

The project: Bringing forward innovative and safe waste water treatment systems for irrigation in agriculture and horticulture

TREAT&USE technology will enable the smart, safe and sustainable recycling of waste water. Given the growing water scarcity on our planet, the technology can be tailored for agricultural irrigation as well as to horticulture and urban or peri-urban gardening. The compact system design makes it very appropriate for small agglomerations in rural areas. But the TREAT&USE system can be also used in areas where a centralised treatment of the waste water is implemented. There, the new technology can add an up-graded treatment to already pre-treated, local waste water. This will allow compliance with the strict legal standards required for water reuse in agriculture. A main goal of the project it to increase the number of southern European farmers who have access to a reliable amount of safe irrigation water and nutrients for their plants.

The product: An automated and safe waste water irrigation system with fertilizing properties

TREAT&USE aims for the construction of a pre-commercial prototype which combines water treatment with membranes and an adapted irrigation system so that the overall process is completely automated, keeping operation and maintenance requirements to a minimum. The product which will come out of the project comprises four individual modules: the water-treatment module; the mixing station; the fertigation module; and the control-and-monitoring module.

A membrane bioreactor (MBR) has been designed for the water-treatment module in such a way that plant nutrients contained in waste water (mainly nitrogen and phosphorus) are recovered after the treatment, while pathogens are killed.

The mixing station will mix the appropriate proportion of fresh water and the treated waste water coming from the MBR and feed the fertigation module, which is a combination of fertilisation and irrigation.

To achieve this, the level of nutrient content in the soil is detected by sensors and this information is sent by remote devices to the control-and-monitoring unit, which will translate the signals received into specific orders to the valves of the mixing unit.

The end-users: Farmers, associations, cities, governments and their water managers

TREAT&USE will cater for farmers and farmers associations. Two target groups in agriculture are envisaged: farmers who already use waste water and wish to see better product quality ; and farmers who suffer from water shortages and are interested in alternative water sources.

Other end-user groups are horticulturists and farmers or gardeners in urban and peri-urban areas. Aside from the economic reasons to save water and energy, they could be interested in caring for the overall water resources. The waste water nutrients will be reused within the offered fertigation system to nourish new plants.

The inventors: Academics, technology transfer experts and SMEs

TREAT&USE is built on the outcomes of two successful, completed European research projects on waste water treatment, reuse technologies and fertigation and monitoring systems: PURATREAT and WACOSYS. In PURAREAT several promising low-energy-consuming MBR systems (laboratory prototypes) have been developed, adapted and tested with the aim of treating communal waste water in a low cost way for agricultural reuse options. Likewise, WACOSYS has developed, tested and optimised a monitoring-and-control system for waste water irrigation of agricultural production schemes (biomass production).



TREAT&USE has combined the results of both PURATREAT and WACOSYS projects and upgraded the technology already developed to a system which has the capacity to irrigate food crops. The expected result is a prototype of a suitable, safe and low-cost MBR waste water treatment unit.

The overall coordinator of TREAT&USE is the Spanish company BIOAZUL, also developer of the MBR system. The project also includes the participation of six other European organisations: ttz-Bremerhaven (scientific coordinator), HYDRO-AIR (developer of the irrigation system), ISITEC (developer of the control unit), PESSL (developer of the monitoring system), Soil Moisture Sense (developer of irrigation schemes), and GUADECOL (end user).

Development stage: Scaling-up, prototyping and validation

The project's goal is to demonstrate the technical and economic viability of the developed system. Therefore a prototype will be the main output of the TREAT&USE project. This would enable the project to reach the last stage in the innovation-and-development cycle before entering industrial production and markets.

Testing and validation within the project are the main activities that will enable SMEs' uptake of the technology for production and marketing. Most of the efforts are focused on low operation and maintenance costs. Energy consumption is being optimised during the last phase of the project and is achieving important results.

A toolbox of technological solutions and released guidelines for decision makers will be provided to take informed decisions on effective environmental strategies.

Policy impact: Influence on legislation to reduce freshwater consumption and to reuse treated water with new technologies

In Europe, 46% of the population live in places that are water-stressed. Most of these regions have high abstraction for irrigated agriculture. It is likely that predicted climate change will exacerbate this situation in the future. Although the reuse of waste water is encouraged at high levels, many EU Member States still lack appropriate guidelines and national legislations addressing the issue of waste water reuse. The dissemination of the project through its website, social networks, press releases and presentations in conferences, aims to influence future policies or legislations. TREAT&USE aims to minimise fertiliser and water consumption. The share of farmers using treated wastewater as a safe source of irrigation could be increased by 15% in Spain and 10% throughout southern Europe. Overall, the technology could lead to a 35% substitution for freshwater abstraction for irrigation, and a 15% reduction in fertiliser use in Europe. In other terms: 30 000 mega cubic meters of water and 4,5 m tons of fertilisers could be saved.

Next steps: Networking, market analysis and marketing strategies

One of the strategies of the TREAT&USE partners is to act as an environmental lobby. In this context, the strong participation of different action groups or networks is anticipated. Several TREAT&USE partners are already involved in other initiatives such as SuWaNu project with this purpose. Due to the different benefits of water re-using technologies (environment,

economic, etc.) it is important to involve public-private partnerships in this network in order to promote the waste water reuse and share the costs.

An initial market analysis will be performed in the frame of the project. Afterwards, the consortium will hire the services of a professional firm to carry out an in-depth market analysis and define a more specific marketing strategy. The market niche for TREAT&USE will be water-scarce regions with intensive agricultural production such as Southern Europe (Spain, Greece, Italy) or North Africa where governments are willing to promote waste water treatment or where water scarcity is so acute that they are obliged to cut supply.

The current model of subsidies to freshwater irrigation does not only prevent farmers to produce more sustainably, it also externalises the environmental costs to future generations: they will suffer the consequences of groundwater salinity (already a problem in countries like Spain, Malta or Italy) and freshwater scarcity. Public authorities therefore are one of our future targets in the dissemination and exploitation strategy of the project.



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