

STAGE 1 - ABSTRACT

At the level of the **Complex Project INNOVATIVE TECHNOLOGIES FOR IRRIGATION OF AGRICULTURAL CROPS IN ARID, SEMIARID AND SUBHUMID-DRY CLIMATE (SMARTIRRIG)**, stage 1, the planned activities were fully realized, the objectives degree of achievement being **100%**.

The result indicators are: 5 studies of technical analysis and documentation; 4 design themes; 1 article published in Proceedings indexed ISI; 3 articles accepted for publication in Proceedings indexed ISI; 3 articles accepted for publication in BDI indexed journal; 12 articles published in BDI indexed Proceedings; 1 chapter published in the book; 4 participations in international conferences; web page of the Complex Project (<http://smartirrig.inma.ro>); web pages of the component projects on the websites of the partner institutions.

Within the **component project 1 - Innovative technology for underground irrigation / fertilization of hoeing crops specific to arid areas**, 1 study of technical analysis and documentation was conducted, 2 design themes were elaborated and 2 articles were published in Proceedings BDI. The technical analysis and documentation study carried out includes: the study of the various irrigation technologies of the hoeing plants (peanuts, beans, corn, sorghum) grown in arid areas; the study of the technical and technological solutions for the underground irrigation system and the technological study regarding the equipment for the placement of irrigation / fertirrigation hoses into the ground, based on GPS technology. The elaborated design themes contain aspects related to the main component elements and the specific technical characteristics, expected, of the irrigation / underground irrigation system and of the equipment for placing the irrigation / fertirrigation hoses into the ground.

Within **the component project 2 - Innovative mobile system for powering irrigation and fertilization installations using photovoltaic and wind power**, 1 study of technical analysis and documentation was developed, 1 design theme was developed and 1 chapter was published in book. The technical analysis and documentation study carried out includes: the technological study regarding the evaluation of the energy consumption parameters and the determination of the operating graph during the irrigation periods; the technological study regarding the modelling, simulation and evaluation of the production of a photovoltaic energy source during the irrigation periods; the technological study on the realization of a photovoltaic source that satisfies the energy requirement of an irrigation / fertirrigation installation and the technological study on the development of a wind turbine system for the additional charging of the storage batteries used in the supply system of the irrigation installations. The elaborated design theme contains aspects related to the main component elements and the specific, expected technical characteristics of the photovoltaic energy source.

Within the **component project 3 - Innovative system for precision mobile irrigation of leguminous crops and hoeing plants**, 1 study of technical analysis and documentation was conducted, 1 design theme was elaborated and 1 article was published in ISI Indexed Proceedings. The technical analysis and documentation study carried out includes: the study on the parameters of plant cultivation technologies on sandy soils that influence the design of the experimental model and the study on the technical and technological solutions for the precision mobile irrigation system. The elaborated design theme contains aspects related to the main component elements and the specific technical characteristics, expected, of the precision mobile irrigation system.

Within the **component project 4 - Innovative technological solutions for utilization of waste water for irrigation of energy crops**, 1 study of technical analysis and documentation was conducted, 8 articles were published in BDI Indexed Proceedings, 3 articles are accepted for publication in an ISI Indexed Proceedings and 3 articles in a BDI indexed journal. The technical study of analysis and documentation carried out includes: the study regarding the pollution potential of waste water containing organic and nutrient substances and possibilities of eliminating them in the environment; study on conventional and advanced wastewater treatment methods containing organic and nutrient substances; the study regarding the pollutant loading of wastewater from livestock farms and the identification of chemical and microbiological parameters that limit the quality of the water for use in irrigation; experimental study on solutions for reducing pollutants from wastewater by advanced methods such as: electrochemical oxidation, UV degradation, ozonation, etc; the study on establishing the appropriate technological solution for wastewater treatment.

Within the **component project 5 - Innovative fertilization technology in fruit and vine plantations specific to arid and subhumid-dry climate**, 1 study of technical analysis and documentation was conducted and 2 articles were published in BDI Indexed Proceedings. The technical study of analysis and documentation carried out includes aspects regarding the methods and techniques of irrigation / fertilization of horticultural crops in arid and sub-humid-dry areas.