# Technology Fact Sheet

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| Sector | Agriculture |
| Category | Water Requirements and Irrigation Scheduling, Demand - side |
| Adaptation needs | Reducing of water consumption for irrigation at farm and field scale using real time soil moisture monitoring |
| Technology Name | **Real time wireless soil moisture monitoring system IRISTAR Pro2 Plus**<br>**(Operational Irrigation Scheduling Technologies at farm and field scale using real time electronic instruments monitoring).**[i] |
| How this technology contributes to adaptation | Irrigated agriculture generally uses large volumes of water compared to cities and industries, and competition for good water quality is really high in many regions. It is recognized that improved water management practices in agriculture can lead to important benefits in terms of water availability for expanded agricultural activity and for other uses, and can reduce many environmental problems.<br>However, it is difficult to successfully implement efficient practices without field measurements and analytical tools that allow water managers to have a good estimation of crop water use, situation which is constraining water management. Regular feedback of information from the field into water management decision making can substantially improve the performance of water delivery services. However, obtaining repeated objective evaluations about actual field conditions is difficult so that operational tools are needed to facilitate water managers to take right decisions about crop water use and water deliveries.<br>Within the new technologies currently used for irrigation scheduling and crop water use is Operational Irrigation Scheduling Technologies at farm and field scale using real time electronic instruments monitoring, in particular, Real time wireless soil moisture monitoring system. |
| Background/Notes, Short description of the technology option sourced from ClimateTechWiki, Seminars, etc | Real time wireless soil moisture monitoring system IRISTAR Pro2 Plus.<br>This soil moisture monitoring system is based on the application of electronic technologies TDR (Time Domain Reflectometry) and consists of the following components:<br>• Wireless Station for measuring of the soil moisture with receiver-transmitter of the 1-st level DL1-10RT model, which includes:<br>- 4 inputs for soil moisture sensors of the IRIS-40Mh;<br>- 1 input for temperature sensor;<br>- 1 input for air temperature sensor;<br>- 1 input for sensor of air humidity;<br>- 3 output clamps to connect with operating devices as URL-4RT;<br>- Receiver-transmitter universal DL1-10RT for the collection, accumulation and radio transmission of information obtained by wire communication from measurement devices.<br>• Controller of the 2-nd level with wireless receiver-transmitter universal DL2-24RTR model, which includes:<br>- 4 inputs for soil moisture sensors of the IRIS-40Mh;<br>- 1 input for temperature sensor; |

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| | - 1 input for air temperature sensor;<br>- 1 input for sensor of air humidity;<br>- 3 output clamps to connect with operating devices as URL-4RT;<br>- Receiver-transmitter universal DL2-24RTR for the receiving and recording information from the receiver-transmitter DL1-10RT, decoding and visualization it at the on-board display, or downloading to the personal computer through the USB port;<br>- Solar battery.<br>• Controller of the 3-th level with wireless receiver-transmitter universal DL3-4SAT model, which includes:<br>- 4 inputs for soil moisture sensors of the IRIS-40Mh;<br>- 1 input for temperature sensor;<br>- 1 input for air temperature sensor;<br>- 1 input for sensor of air humidity;<br>- 3 output clamps to connect with operating devices as URL-4RT;<br>- receiver-transmitter universal DL3-4SAT for the receiving and recording information from the receiver-transmitter DL2-24RTR, decoding and visualization data at the on-board display, or downloading to the personal computer through the USB port, or GPRS transmission of information to the remote computer using Internet.<br>• Wireless device URL- 4RT for solenoid valves operation.<br>• IrrigationLink software for personal computer that allows real-time display of information obtained in graphic or tabular forms, as well as setting up the electronic devices and management operations of the irrigation system, both manually and automatically.<br>• The developer and manufacturer of Real time wireless soil moisture monitoring system IRISTAR Pro2 Plus, including software IrrigationLink is "Iristar-Com" Company (Moldova).<br>The Real time wireless soil moisture monitoring system IRISTAR Pro2 Plus awarded a gold medal and diploma of the Ministry of Agriculture and Food Industry of Moldova at the XXI International Exhibition ' MOLAGROTECH -2011 ' in Chisinau. |
| Implementation assumptions, How the technology will be implemented and diffused across the subsector? | • To introduce this technology in building codes as a mandatory step in the irrigation systems design<br>• Each irrigating system again entered into operation should be equipped by monitoring system IRISTAR Pro2 Plus<br>• Support of local scientists on the implementation of **"Real time wireless soil moisture monitoring system IRISTAR Pro2 Plus."**, developed in Moldova |
| Costs | • Set of equipment for 100 ha Drip Irrigation System with 10 Wireless Measuring Stations – 4700 €<br>• Set of equipment for 100 ha Lateral-move Sprinkler Irrigation System with 2 Wireless Measuring Stations – 1500 € |
| Country social development priorities | • Hotărîre cu privire la aprobarea Programului de dezvoltare a gospodăririi apelor şi a hidroamelioraţiei în Republica Moldova pentru anii 2011-2020 (nr. 751, 5 octombrie 2011) Monitorul Oficial Nr. 170-175<br>• *National Report "Millennium Development Goals Report: New Challenges – New Objectives", NHDR 2009/2010* |

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| | http://www.undp.md/mdg/MDG1/poverty.shtml, http://www.endpoverty2015.org<br>• ***National Report "***Climate Change in Moldova: *Socio-Economic Impact and Policy Options for Adaptation****", NHDR 2009/2010***<br>• Irrigation Engineering, Hydrologic, and Agronomic Assessment Report, Republic of Moldova. The Millennium Challenge Corporation (MCC)/ Utah State University (USU), 2009<br>• National Strategy for Sustainable Development of the Agricultural Complex of the Republic of Moldova for 2008-2015 (Government Decision No. 282 of 11.03.2008.Official Monitor No. 57-60, 21.03.2008)<br>• The National Development Strategy (NDS) for 2008-2011<br>• Program of Water Supply and Sewerage in Communities of the Republic of Moldova until 2015 (Government Decision No. 1406 of December 30, 2005, Decree No. 662 of June 13, 2007) |
| Country economic development priorities – economic benefits | • High value agricultural development<br>• Impacts on water supply<br>• Decreasing of irrigation water consumption<br>• Increasing of crop yields |
| Country environmental development priorities (Environmental benefits) | • Decreasing of impact to the irrigated soils<br>• Prevention of "over-water"<br>• Prevention of rising groundwater level<br>• Prevention of secondary soil salinization |
| Social benefits | • Increasing of the population incomes from guaranteed high yields<br>• Educational and scientific development<br>• Increased community welfare |
| Other considerations and priorities (such as market potential) | • According to the "Hotărîre cu privire la aprobarea Programului de dezvoltare a gospodăririi apelor şi a hidroamelioraţiei în Republica Moldova pentru anii 2011-2020 (nr. 751, 5 octombrie 2011) Monitorul Oficial Nr. 170-175" till 2020 in Moldova 116,0th ha of new irrigation systems will be built and 121,6th ha will be rehabilitated, totally – 237,6th ha<br>• About half of this area (118,8th ha) will be equipped with Sprinkler Irrigation Systems and other 118,8th ha - with Drip Irrigation Systems<br>• Every Irrigation System has to be equipped with one set of IRISTAR Pro2 Plus. |
| Capital costs (per facility) | • Total capital investments for 118,8th ha irrigated by Lateral-move Irrigation Systems average capital cost – 0,178 million €<br>• Total capital investments for 118,8th ha irrigated by Drip Irrigation Systems average capital cost – 5,58 million € |

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| Operational and Maintenance costs (per facility) | • 100 ha irrigated by Lateral-move Irrigation Systems – 250 €/per year<br>• Total Operational and Maintenance costs for 118,8th ha irrigated by Lateral-move Irrigation Systems average capital cost – 297th €/per year<br>• 100 ha irrigated by Drip Irrigation Systems – 550 €/per year<br>• Total Operational and Maintenance costs for 118,8th ha irrigated by Drip Irrigation Systems average capital cost – 654th €/per year |
| Up scaling potential | The increasing of technology application will follow the construction of new and rehabilitation of existing irrigation systems by an average of 24 th ha per year and may reach up to 237.6 th ha in 2020 totaling 5.8 million euro of investments. |

[i] This fact sheet has been extracted from TNA Report - Technology Needs Assessment for climate change adaptation - Republic of Moldova. You can access the complete report from the TNA project website **http://tech-action.org/**