Technology Fact Sheet

Sector	Agriculture
Category	Irrigation Application, Supply – side
Adaptation needs	• Guaranteed yields of agricultural crops in an increasingly dry climate • Reducing of water and energy consumption for irrigation needs in agriculture
Technology Name	**Improved low pressure and water serving Sprinkler Irrigation technologies**[i]
How this technology contributes to adaptation	• Irrigation is an essential tool for getting guaranteed yields in conditions increasingly dry climate of Moldova when lack of natural moisture of the soil will only grow in the future. • Irrigation is the most climate-sensitive use of water. The yields and profitability of irrigated land relative to dryland farming tend to increase as conditions become hotter and drier. Consequently, in areas with available and affordable water supplies, hotter and drier conditions would increase both the land under irrigation and the amount of water applied per irrigated area. Increased water use efficiency attributable to higher atmospheric CO_2 levels would tend to counter the tendency to apply more water as temperatures rise (Kenneth Frederick, 1997). • In these conditions, to reduce consumption of energy and water for irrigation is a major challenge to adapt to climate change.
Background/Notes, Short description of the technology option sourced from ClimateTechWiki, Seminars, etc	At sprinkling irrigation, water on the field is usually served on pressurized pipelines, and then sprayed it in the form of artificial rain over the irrigated area by sprinkling machines and installations. The principles of creating energy and resource-saving irrigation systems. Depending on the method of irrigation, irrigation system must meet the following principles: • High-altitude location of irrigation lot should not exceed 30 m and 50 m in exceptional cases in relation to the source of irrigation; • Agricultural lands irrigated by sprinklers should have surface slope not more than 5% to prevent irrigation soil erosion; • Application low-pressure sprinkler irrigation devices with diameter of drops not more than 1.5 mm and average rain intensity does not exceed the intensity of the absorption of water into the soil (0.2 …0.3 mm/min); • Application of low-flow (local) irrigation methods to reduce the irrigation water consumption; • Eliminating losses of irrigation water from irrigation canals and pipelines and its flow into the groundwater; • Minimization of the impact of irrigation on soil through the use of irrigation regime based on the principle of additional moisture to natural rainfall; • Using of information-measuring systems for: -continuous recording and processing of agro-meteorological data on irrigation site: air temperature, relative humidity, rainfall, wind speed and direction, solar radiation, ultraviolet radiation, evapotranspiration, irrigation terms and forecast weather conditions; -continuous monitoring of the soil moisture movement; • Using of alternative energy sources for water supply: solar energy, wind energy, gravitational energy of the water in case the water source located higher on irrigated area. Improved Sprinkler Systems and Practices:

	Improved center pivots have been developed that reduce both water application losses and energy requirements. Older center pivots, with the sprinklers attached directly to the pipe, operate at relatively high pressure (4.0-5.5 bar), with wide water-spray patterns. Newer center pivots usually locate the sprinklers on tubes below the pipe and operate at lower pressures (1.0-3.0 bar). Existing center pivots have to be retrofitted with system innovations to reduce water losses and energy needs. ***Linear*** or ***lateral-move*** systems are similar to center-pivot systems, except that the lateral line and towers move in a continuous straight path across a rectangular field. Water may be supplied by a flexible hose connected to the pressurized underground pipe or from a concrete-lined ditch along the field edge. ***LEPA (Low-energy precision application)*** is an adaptation of center pivot (or lateral-move) systems that uses drop tubes extending down from the pipeline to apply water at low pressure below the plant canopy, usually only a few inches above the ground. Applying water close to the ground cuts water loss from evaporation and wind and increases application uniformity. On soils with slower infiltration rates, furrow dikes are often used to avoid runoff.
Implementation assumptions, How the technology will be implemented and diffused across the subsector?	At present, Moldova has already implemented several projects contributing to the reconstruction and improvement of old and creation of new modernized irrigation systems: • Transition to High Value Agriculture (THVA) Project funded by the Millennium Challenge Corporation (MCC) of the United States (*Centralized Irrigation System Rehabilitation Activity (CISRA), Irrigation Sector Reform Activity (ISRA)).* • RISP – II Program (For installation / improvements of irrigational systems the soft loan at a rate of up to $100.000 from fractions of the grant at a rate of up to 20 % is provided to farmers). • Rural Financial Services and Marketing Program – The Consolidated Unit for the Implementation of IFAD Programs. • Moldova – Japan 2KR Project. It is necessary to increase the number and the budgets of projects that will stimulate farmers to use advanced resource-saving irrigation systems. Creation and Government support of Water Use Associations to increase the purchasing capacity of farmer's communities to acquire modern irrigation systems and promote their sustainable use.
Costs	Center Pivot Sprinkler Irrigation System - 1,480 €/per 1 ha Source: Indicative price of Chamsa Urapivot machines (Spain)
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 • ***National Report "Millennium Development Goals Report: New Challenges – New Objectives", NHDR 2009/2010***

	http://www.undp.md/mdg/MDG1/poverty.shtml, http://www.endpoverty2015.org • ***National Report "***Climate Change in Moldova: *Socio-Economic Impact and Policy Options for Adaptation****", NHDR 2009/2010*** • Irrigation Engineering, Hydrologic, and Agronomic Assessment Report, Republic of Moldova. The Millennium Challenge Corporation (MCC)/ Utah State University (USU), 2009 • 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) • The National Development Strategy (NDS) for 2008-2011 • 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 • Impacts on water supply • Decreasing of irrigation water consumption
Country environmental development priorities	Decreasing of impact to the country environment
Social benefits	• Increasing of the population incomes from guaranteed high yields • Educational and scientific development • 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 hidroameliorației 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 • About half of this area (118,8th ha) will be equipped with **Improved low pressure and water serving Sprinkler Irrigation Systems**
Capital costs (per facility)	• 100 ha **Lateral-move Irrigation Systems** average capital cost – 150,000 € • Total capital investments for 118,8th ha – 178,2 million €
Operational and Maintenance costs (per facility)	• 100 ha **Lateral-move Irrigation Systems** average Operational and Maintenance costs – 35,000 €/ per season (120 working days) • Total Operational and Maintenance costs for 118,8th ha – 41,58 million €
Daily supply capacity per facility	Daily productivity – 15 ha

Up scaling potential	Daily productivity – 25 ha

[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/**