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| Sector | Agriculture |
| Sub-sector | Crop production |
| Technology name | Application of water saving technologies, such as drop or spray irrigation |
| Option name | Drip irrigation |
| Scale | Small-scale |
| Availability | Available |
| Technology to be included in prioritization? | Yes |

***Background/notes***

Drip irrigation is based on the constant application of a specific and focused quantity of water to soil crops. The system uses pipes, valves and small drippers or emitters transporting water from the sources (i.e. wells, tanks and/or reservoirs) to the root area and applying it under particular quantity and pressure specifications. The system should maintain adequate levels of soil moisture in the rooting areas, fostering the best use of available nutrients and a suitable environment for healthy plant roots systems. Managing the exact (or almost) moisture requirement for each plant, the system significantly reduces water wastage and promotes efficient use. Compared to surface irrigation, which can provide 60% water-use efficiency and sprinkler systems which can provide 75% efficiency, drip irrigation can provide as much as 90% water-use efficiency.

Drip irrigation technology will support farmers to adapt to climate change by providing efficient use of water supply. Particularly in areas subject to climate change impacts such as seasonal droughts, drip irrigation reduces demand for water and reduces water evaporation losses (as evaporation increases at higher temperatures). Scheduled water application will provide the necessary water resources direct to the plant when required. Furthermore, fertilizer application is more efficient since it can be applied directly through the pipes.

***Advantages of the technology:***

Drip irrigation can help use water efficiently. A well-designed drip irrigation system reduces water run-off through deep percolation or evaporation to almost zero. If water consumption is reduced, production costs are lowered. Additionally, conditions may become less favorable for the onset of diseases including fungus. Irrigation scheduling can be managed precisely to meet crop demands, holding the promise of increased yield and quality.

Agricultural chemicals can be applied more efficiently and precisely with drip irrigation. Since only the crop root zone is irrigated, nitrogen that is already in the soil is less subject to leaching losses. In the case of insecticides, fewer products might be needed. Fertilizer costs and nitrate losses can be reduced. Nutrient applications can be better timed to meet the needs of plants.

***Disadvantages of the technology****:*

The initial cost of drip irrigation systems can be higher than other systems. Higher costs are generally associated with the costs of pumps, pipes, tubes, emitters and installation. Unexpected rainfall can affect drip systems either by flooding emitters, moving pipes, or affecting the flow of soil salt-content. Drip systems are also exposed to damage by rodents or other animals. It can be difficult to combine drip irrigation with mechanized production as tractors and other farm machinery can damage pipes, tubes or emitters.

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| Implementation assumptions<br>(How the technology will be implemented and diffused across the subsector) | Such technology will be applied at agricultural lands with irrigation water scarcity, as well as areas with potential risks of droughts and high temperatures. |
| **Impact statements<br>(How the options impact countries development priorities)** | |
| Countries social development priorities | • Contributes to food security priority by increasing productivity<br>• Leads to increase in income of rural population<br>• Reduces migration to urban areas from rural communities |
| Countries economic development priorities | • Contributes to diversification of economic |

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| | activities priority of the country<br>• Leads to improvement of economic condition of rural population<br>• Leads to efficient use of resources such as land, water and fertilizers |
| Countries environmental development priorities | • Reduces use of irrigation water<br>• Reduces amount of applied fertilizers to agricultural lands<br>• Increases land fertility |
| Other considerations and priorities such as market potential | • Agricultural production will increase leading to decrease in the dependence of imported agricultural products at local markets |
| **Costs** | |
| Capital costs over 10 years | The cost of a drip irrigation system ranges from 1000 USD to 3500 USD per hectare depending on the specific type of technology, automatic devices, and materials used as well as the amount of labor required. Financing for equipment may be available from financial institutions via leasing operations or direct credit. Assuming that most parts of cultivated lands are suitable for spring irrigation (as most crops are cereals), there are 180 thousand ha of cultivated lands, in total, in need of drip irrigation. There will be need for investment of around 400 million USD. The process is long-term and should be applied step-by-step. The source of investment could be government budget, financial institutions and international financial organizations. |
| Operational & maintenance costs over 10 years | Operational cost for technology will be around 50-100 USD per hectare per year. |
| Other costs over 10 years | Additional costs will be needed to provide necessary capacity building activities for local farmers. |