Technology Fact Sheet for Adaptation

Drip Irrigation for Sustainable Water use and Management- Solar-Powered [i]

1. *Sector:*	Food
2. *Technology Characteristics:*	
2.1Technology Name:	**4. Drip Irrigation for Sustainable Water use and Management- Solar-Powered**
2.2 Introduction: *low/high Brief introduction to the technology*	Water is a scarce resource and due to CC impacts, its consequences will be aggravated more than in the past. Drip irrigation is a supportive technique that can be used to increase water use efficiency and reduce evaporation, runoff, and deep percolation. It also improves irrigation uniformity. Drip irrigation, not only saves water but also saves fertilizer by allowing water to drip slowly to the plant roots, either onto the soil surface or directly onto the root zone. Application of fertilizers through the drip irrigation system increases fertilizer use efficiency and thereby increases 2-3 fold times production and productivity. Adaptation of this technology promotes Sustainable Management of Energy, Water, Land, and Labor. A majority of small farmers who cultivate highlands in the dry zone of Sri Lanka, operate holdings that are too small for use of mechanized technology and benefit from scale-economies. Also these farmers face serious shortage of irrigation for year round cultivation using traditional lift-irrigation systems and experience capital shortage to adopt expensive new technologies. Through the use of an innovative combination of small-capacity drip-irrigation technology with solar-powered water pumping and fertigation units that save capital and on-farm labor requirement, will completely redefined the small-scale highland farming in the dry zone. Use of an innovative combination of small-capacity drip-irrigation systems with solar-powered water pumping and fertigation units that save capital and on-farm labor requirement, will completely redefined the small-scale highland farming in the dry zone of the country.
2.3 Technology	• High cost (Potentially high initial cost)

Characteristics/Highlights: *Few bullet points, i.e. low/high cost; advance technology; low technology.*	• Advance technology (adoption requires • Hard Technology
2.4 Institutional and Organizational Requirements: *How much additional capacity building and knowledge transfer is required for the adaptation option to be implemented.*	Capacity building is required both at the institutional level, i.e. for increasing research capability, and the organizational level, i.e. for extension of research findings and to carryout field demonstrations.
3. Operations and maintenance	
3.1 Endorsement by Experts:	To increase water use efficiency and productivity water saving technologies along with energy saving methods must be introduced specially to the OFC and Vegetable growers in the dry zone. Although over 18,000 “agro-wells” have been constructed in the dry zone to encourage dry-season cultivation with shallow groundwater irrigation, reliability of water supplies from them during the peak drought months has been poor. This has resulted in non-cultivation or crop loss during the dry months. By increasing the ‘effective capacity’ of agro-wells through the withdrawal of well water for irrigation at a rate compatible with the dry-season recharge, farming can be done without fear. Large scale implementation of drip irrigation technology can be contributed to improve the efficiency of significant investments already undertaken in the dry zone.
3.2 Adequacy for current climate: *Are there negative consequences of the adaptation option in the current climate? Some adaptation may be targeted at the future climate but may have costs and consequences under the current climate.*	Advantages of this technology non-related to adaptation can be reaped even in the current climate thereby making its early adoption economically and socially desirable. Under conditions of increased water stress resulting from climate change the benefits of the technology rises quite significantly.
3.3 Size of beneficiaries group: *Technology that provides small benefits to larger number of people will often be favored over those that provide larger benefits, but to fewer*	The scale of the drip irrigation technology is highly flexible making it appropriate for use by small or large farmers.

people.	
4. ***Costs***	
4.1 Cost to implement adaptation options: *Cost measures*	Rs. 35.00 M as a soft technology.
4.2 Additional costs to implement adaptation option, compared to "business as usual":	This is a relatively new technology requiring full development of facilities.
5. ***Development Impacts, indirect benefits***	
5.1 Economic benefits: **Employment -** *Jobs* **Investment -** *Capital requirements*	• Reduce risk and increase yields (by 2-3 fold) and profitability • Reduced costs of production and higher prices enabled realizing greater incomes • Reduce price fluctuation of vegetables and other field crops by introducing off season cultivation • Easy to install and Low maintenance

5.2 Social benefits: **Income -** *Income generation and distribution* **Education -** *Time available for education* **Health -** *Number of people with different diseases.*	• Newest Agro Knowledge and Technologies and bring about progressive farmers • Because of the solar powered technology, (unattended operation) saves time used for application of water, fertilizer and weeding • Women can take the responsibility for operation and management • Improve personal hygiene • Facilitated gainful employment of the farm family labour throughout the year. • Facilitated women participation in farming through the operation of the system and carrying out regular maintenance operations. • The time spent overall decreased as a result of less time spent on irrigating crops and participating in weeding, fertilizer and other practices. Time saved was used mostly (70%) for more housework and partly (30%) for entertainment or spent with family.
5.3 Environmental benefits: *Reductions in GHG emissions,* *Local pollutants,* *Ecosystem degradation etc*	• Use of solar energy being one of the most environmentally benign forms of energy replacing fossil fuel based pumps have local and global benefits through the reduction of pollutants and emission of green-house-gases and generate CDM credits. • Lowered water withdrawal from ground water resources, particularly during more sensitive dry months, drip technology prevents depletion of ground water table and pollution from infusion of saline and other contaminants. • Increased use efficiency of chemical fertilizer through fertigation prevents resource waste and development of water pollution problems such as eutrophication which is a worsening environmental problem in some parts of the country. • Reduced use of agricultural chemicals such as weedicides and pesticides minimizes adverse environmental impacts

	such as pollution of water bodies, biodiversity loss. • Drip technology also reduces soil degradation from top-soil erosion associated with flood irrigation. This can also be a contributing factor to water resource degradation and silting of reservoirs.
6. *Local context*	
6.1 Opportunities and Barriers: *Barriers to implementation and issues such as the need to adjust other policies.*	To be effective drip irrigation systems require periodic maintenance. No matter how clean the water looks, a water quality analysis should be completed to determine if precipitates or other contaminants are present that could affect operation of the irrigation system.
6.2 Status: *Status of technology in the country*	The Filtration system included with the drip system alone is not always adequate to solve all water quality problems. Chemical treatment is often required to prevent emitter plugging due to microbial growth and/or mineral precipitation. Otherwise, implementation of solar powered drip irrigation technology is a sustainable system to increase water use efficiency
6.3 Timeframe: *Specify timeframe for implementation.*	Life time
6.4 Acceptability to local stakeholders: *Whether the technology will be attractive to stakeholders*	Yes

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment Reports For Climate Change Adaptation – Sir Lanka. You can access the complete report from the TNA project website http://tech-action.org/**