

Technology Fact Sheet for Adaptation

Surface Runoff Rainwater Harvesting ⁱ

Surface Runoff Rainwater Harvesting

7. Sector – Water

8. Technology characteristics

a. Introduction

In Sri Lanka about 60% of rain water is running to the sea without direct use⁽¹⁾. Non-availability of adequate rainfall during “Yala” season is a problem for crop production in the dry zone. In this technology, surface run-off rain water is collected in ponds. This is a micro storage facility and especially suitable for arid and semi-arid regions. It provides supplementary irrigation for about 1-2 ha. of land.

Collection of surface runoff rainwater as pokuna/pathaha is presently practising in certain areas and it has to be expanded. This technology contributes to adaptation for climate change in following ways⁽²⁾.

- Additional water supply
- Reduce pressure on surface and ground water resources
- Control soil erosion due to rain storm flow
- Reduce flood inflow to rivers and channels
- Stabilise ground water table

b. Technology characteristics/Highlights

- Low cost
- Simple technology

c. Institutional/ organisational requirements

- Expert assistance should be given by experts to select appropriate sites based on soil permeability, run-off direction etc.
- Information on quantity of water required for irrigation purpose, rainfall pattern of the area and amount of investment that can be made should be made available when constructing a pond.
- Technical advice should be given whenever necessary by skilled persons

9. Operations and maintenance

a. Endorsement by experts

i. Operations⁽³⁾

Major components of a surface runoff rainwater system are as follows.

- Microscale water harvesting ponds (Unlined: 300–500 m³ capacity or lined ponds (3-3.6m depth and 3-4m diameter: 120-150m³capacity) are excavated using soil excavators; These ponds should be built at lower elevation of the farm land via contour drainage using the gravitational flow⁽³⁾.
- Based on the soil type unlined or lined ponds have to be selected, If the soil type is sandy, it is necessary to build lined ponds
- Depth of the pond is important to minimise evaporation (e.g.3-4.5 m diameter; 3-3.6 m depth)
- Lined ponds are completely lined with bricks and cement
- Construct the earth bunds using excavated soil
- Use a soil trap to trap the silt coming with run off
- Mud- filters are used to reduce the flow of waste items into the tank.
- Spill space (outlet) should be constructed in order to facilitate the flow of excess water
- Hand pumps or peddle pumps can be used to lift water from lined ponds.

ii. Maintenance

- Owned and maintained by individual beneficiaries.
- To prevent soil erosion, maintain grass on the bund around the ponds.
- A small thatched hut and fence should be constructed around the tank to reduce the evaporation of water and for the security of children & domestic pets/other animals.
- When the tank is empty, remove all soil deposits and other waste products from the bottom of the tank and clean it well.
- Should not let aquatic plants to grow in the tank as these will increase water loss through evapotranspiration.
 - Still waters are breeding grounds for mosquitoes. Therefore fish which kill mosquito larvae eg. ' Korali'- Oreochromis mossambicus should be introduced into the tank.
- When the soil type is sandy, it is necessary to build lined ponds and it is expensive.

b. Adequacy for current climate

Negative consequences of the adaption option:

- Mosquitoes can breed in water in the pond
- During severe droughts pond can get dried due to evaporation
- Technical errors and poor quality construction can cause leakage of stored water within a short period of time
- Low water availability will also be a failure

c. Size of beneficiaries groups

About 30% of the total population (dry zone)

10. Costs

a. Cost to implement adaptation options

Rs. 25000 - 150000/= per tank (cost varies with the size and the type of the tank)

b. Additional costs to implement adaptation option, compared to “business as usual”

Additional cost is required to increase the capacity of the pond

11. Development impacts , indirect benefits

a. Economic benefits

- **Employment** – Medium (construction, agriculture, aquaculture)
- **Investment** - Medium (Cost for construction of lined or unlined ponds)

b. Social benefits :

Income

- Medium
- Additional income through agricultural intensification, enhanced livestock and aquaculture
- Decrease the expenditure for obtaining piped water for agricultural purposes
- Income through soil excavation, construction etc

Education

- Awareness programs and initial training required should be given by skilled persons.
- Technical advice should be given whenever necessary by experts.

Health

c. Environmental benefits

- Reduce pressure on surface and ground water resources
- Effect on ground water recharge– Very high
- Effect on surface water – Medium

- Control floods and soil erosion due to rain storms
- Release of GHG –Medium; Energy consumption- Medium

12. Local context

a. (i) Opportunities

- In Sri Lanka about 60% of rain water is running to the sea without direct use⁽¹⁾.
- The land area under the dry zone is about 4.5 million ha and it is about 65% of the land in Sri Lanka. The dry zone receives most of the rain from the NE monsoon rains. At present, out of the total land area of the dry zone only about 2 million ha are used for agriculture mainly due to unavailability of adequate water⁽³⁾.
- Various NGOs and other organisations have given the necessary support to construct surface run-off rainwater harvesting systems

(ii) Barriers

- Longer droughts
- Unless the most suitable sites are not selected scientifically, it can be a failure
- Lined ponds are not economically feasible
- Low water availability and the lost of harvested water within a short period in certain ponds

b. Status

- At present, available in districts such as Puttalam, Moneragala, Hambata and Anuradhapura.
- Capacity of most of the unlined and lined ponds are about 300–500 m³ and ponds: 120-150 m³respectively).
- Life time of a pond is about 10 years.

c. Acceptability to local stake holders

This technology will be acceptable due to following reasons:

- Simple technique
- Low cost
- Additional water supply for agriculture, aquaculture etc.

13. References

- (1) Rain Water harvesting, Practitioners guide for Sri Lanka; Lanka Rain Water Harvesting Forum (ISBN 978-955-1064-06-8);2009

- (2) Technologies for climate change adaptation-The water sector; Mark Elliot, Andrew Armstrong, Josep Lobuglio and Jamie Bartram, UNEP, (ISBN 978-87-550-3902-5); 2011
- (3)Runnoff rainwater harvesting interventions in Sri Lanka, M.A.C.S. Bandara and M.M.M. Aheeyar; (ISBN 978-955-612-116-2; 2010

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