Technology Fact Sheet for Adaptation

Boreholes/Tubewells as a drought intervention for domestic water supply [i]

1. **Sector** – Water
2. **Technology characteristics**

2.1 Introduction

Tube wells and Boreholes can be used as alternative domestic water supplies specially during drought periods. Tube wells consist of a narrow, screened tube (casing) driven into a water bearing zone of the subsurface. Tubewells penetrating bedrock with casing not extending below the interface between unconsolidated soil and bedrock is called a Bore hole. Life time is about 10 years.

2.2 Technology characteristics/Highlights

- Medium-cost
- High technology

2.3 Institutional/ organisational requirements

- Technical advice should be given whenever necessary by skilled persons.
- If used for drinking purposes, arrangements should be provided to test quality of water in a regular basis

3. **Operations and maintenance**

3.1 Endorsement by experts

3.1.1 (i) Operations

- Tube wells can be installed by hand-auguring; Boreholes require a drilling method with an external power source.
- A hand powered or automated pump is used to draw water to the surface.
- Major components of a tube well are:
  - Plastic or metal casing
  - In unconsolidated soils, it is necessary to have a screened portion of casing below the water table that is perforated
  - A sanitary seal consisting of clay to prevent water seeping around the casing
  - A pump to extract water

  Technology should be implemented based on the following data:
  - Population distribution
  - Ground water resources
  - Water point location
  - Geological environment
- Water quality should be monitored if use for drinking purposes

3.1.2 Maintenance

- To increase borehole water supply during droughts:
  - Drill new boreholes
  - Repair damaged borehole

3.2 Adequacy for current climate

Negative consequences of the adaption option:

- Ground water shortage

3.3 Size of beneficiaries groups

8% of the total population

4. Costs

4.1 Cost to implement adaptation options

Drilling, casing and completion Rs. 20,000/= to Rs. 80,000/= (depends on the type)

Additional costs to implement adaptation option, compared to "business as usual"

Additional cost is required for monitoring of water quality – Rs. 3000/=

5.0 Development impacts, indirect benefits

5.1 Economic benefits

- **Employment** – medium (drilling)
- **Investment -** Tubewell or Borehole, hand pump/pump

5.2 Social benefits :

- **Income**
  - Decrease the expenditure for purchasing water from other sources
  - Income through employment (horticulture during dry season, agriculture, bottled water industry)
- **Education**
  - Technical advice should be given whenever necessary by experts.
  - Awareness programs, school education and research on this technology - medium
- **Health**
  - Medium impact - Decrease in waterborne diseases, If ground water is polluted – negative impacts

5.3 Environmental benefits

- Impact on ground water quality and quantity – high (this technology can increase the pressure for ground water withdrawal)
- Impact on surface water quality and quantity –No impact
- Impact on flood forming –No impact
- Release of GHG – very little (only during construction)

6. Local context

6.1 (i) Opportunities

- Save time and cost
- Continuous water supply
- Off season vegetable production

(ii) Barriers

- Water can contain iron, fluoride etc.
- Ground water abstraction

6.2 Status

- Tube wells and Boreholes are presently being used in Sri Lanka
- Expanding abstraction of ground water may affect the ground water table

6.3 Acceptability to local stake holders

Because of the low cost, this technology will be acceptable to stakeholders.

7. References

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.

[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/**