

## 2.5 Action Plan for Boreholes/Tube Wells

### 2.5.1 *Target for Technology Transfer and Diffusion*

As indicated under section 1.2.2 above, the main target groups for actions on climate change adaptation in the water sector with respect to this technology of Boreholes/tube Wells for Domestic Water Supply are communities of Region I. The pilot project will target 10,000 HHs for water supply for domestic use, irrigation and animal watering.

Drilling of boreholes and tube wells will improve access to groundwater by rural populations. It will prevent reliance on poor quality alternative supplies and reduce man hours spent on travelling to far distance reliable water points. Some of the benefits of the technology include better access to water for irrigation and other uses such as watering livestock. It also increases the productivity of women as they now access water near their homes.

The costs of drilling new boreholes vary widely depending on many factors including the geological characteristics of an area. Interviews with some private suppliers indicate that a 40 to 60 metres solar powered borehole would cost between \$8,000 and \$12,000 including a 2,000 litres tank and pipes (GRZ, October 2012).<sup>v</sup> The cost depends on geographical location, soil type-sandy or rocky and distance to site.

## 2.5.2 Proposed Action Plan for Boreholes/Tube Wells

Barrier	Root cause(s)	Proposed Measure(s)	Justification	Relevant Agency	When	Funding Sources	Indicators for Success	Possible Risks
Cost of drilling and installing boreholes/tube wells is very expensive	The high price of building materials (e.g. cement) due to high demand	<ul style="list-style-type: none"> <li>Promote investments in the manufacturing of building materials</li> <li>Accelerate investment in infrastructure such as housing</li> <li>Promote a reduction in commercial bank's reliance on physical collateral when providing credit for construction)</li> </ul>	<ul style="list-style-type: none"> <li>To create competition &amp; increase supply to reduce price</li> <li>Reduce infrastructure deficit and demand for cement in the long run.</li> <li>Difficult for many SMEs firms to mobilize collateral for security. Will allow construction companies arrange credit to buy cement and other materials</li> </ul>	<ul style="list-style-type: none"> <li>MCI, MOF, ZAM, ZACCI, BOZ</li> <li>MCI, ZAM, ZACCI, CBs, BOZ</li> <li>BOZ, CBs, NBFIs, MOF</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> <li>2014 &amp; ongoing</li> <li>From 2013 but ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budgets of relevant agencies</li> <li>As above</li> <li>Budgets of relevant agencies</li> </ul>	<ul style="list-style-type: none"> <li>Investment in mfg industry for building materials</li> <li>Reduced infrastructure deficit such as houses</li> <li>Proportion of loans given without physical collateral</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to regulate markets</li> <li>Global &amp; domestic factors</li> <li>Over-regulated financial sector</li> </ul>
	The high cost of fuel that leads to high mobilization costs	<ul style="list-style-type: none"> <li>Streamline fuel procurement process, reduce number of taxes &amp; promote transparency</li> <li>Promote use of alternative and cheaper sources of fuel</li> <li>Introduce subsidy on fuel for Climate Change projects</li> </ul>	<ul style="list-style-type: none"> <li>Will reduce the final price paid by oil consumers</li> <li>Will reduce the cost of fuel</li> <li>Need to reduce high transportation costs &amp; import duty</li> </ul>	<ul style="list-style-type: none"> <li>Min of Com &amp; Industry, ERB, MEWD, CBs, BOZ</li> <li>ERB, MEWD, Research Institutions</li> <li>Min of Com, ERB, MEWD, CBs, BOZ</li> </ul>	<ul style="list-style-type: none"> <li>2014-ongoing</li> <li>2014 &amp; ongoing</li> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budgets of relevant agencies</li> <li>As above</li> <li>As above</li> </ul>	<ul style="list-style-type: none"> <li>Procurement of fuel is tendered to credible bidders</li> <li>Alternative sources of fuel promoted &amp; used</li> <li>Fuel prices and import duty reduced</li> </ul>	<ul style="list-style-type: none"> <li>Failure by Government to adhere to tender procedure</li> <li>Alternative fuels not accepted by users</li> <li>Distortions in markets</li> </ul>
	The high cost of equipment (imported heavy equipment expensive)	<ul style="list-style-type: none"> <li>Promote conditions for ease of access to affordable finance</li> <li>Remove import duties on construction equipment</li> </ul>	<ul style="list-style-type: none"> <li>Many contractors unable to get loans to buy equipment</li> <li>Will help reduce land cost of construction equipment</li> </ul>	<ul style="list-style-type: none"> <li>BOZ, CBs, NBFIs, MOF, Contractors</li> <li>MOF, Contractors</li> </ul>	<ul style="list-style-type: none"> <li>2014-18</li> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budgets of relevant agencies</li> <li>As above</li> </ul>	<ul style="list-style-type: none"> <li># of contractors accessing loans</li> <li>Import duty removed or reduced</li> </ul>	<ul style="list-style-type: none"> <li>Failure to convince CBs</li> <li>Failure to convince MOF</li> </ul>

Some places in the country are not suitable for this type of technology	Pollution of ground water sources due to industrial effluent	<ul style="list-style-type: none"> <li>Enforce environmental laws and other regulations</li> <li>Sensitize industries on environmental pollution issues</li> </ul>	<ul style="list-style-type: none"> <li>There is need for stronger regulation to protection ground water sources.</li> <li>Lack of knowledge on environmental issues leading to</li> </ul>	<ul style="list-style-type: none"> <li>Min of Environment, Min of Health, ZEMA, Min of Commerce &amp; Industry</li> <li>MLENAR, MOH, ZEMA</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budgets of relevant agencies</li> <li>As above</li> </ul>	<ul style="list-style-type: none"> <li>Penalties &amp; regulations for polluters are revised &amp; enforced</li> <li>Number of sensitization meetings held</li> </ul>	<ul style="list-style-type: none"> <li>Lack of funds</li> <li>Implementation by the judiciary</li> <li>Failure to implement</li> </ul>
	Wrongly sited activities due to inadequate use of Land Use Plans leading to ground water pollution	<ul style="list-style-type: none"> <li>Promote the development and enforcement of Land Use Plans as a management tool</li> </ul>	<ul style="list-style-type: none"> <li>Lack of land use plans has led to unplanned settlements &amp; developments</li> </ul>	<ul style="list-style-type: none"> <li>MLENAR MLGH</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budgets of relevant agencies</li> </ul>	<ul style="list-style-type: none"> <li>Reduced unplanned settlements &amp; developments</li> </ul>	<ul style="list-style-type: none"> <li>Failure to enforce plans</li> </ul>
	Indiscriminate use of agricultural chemicals leading to ground water contamination	<ul style="list-style-type: none"> <li>Promote effective regulation of the use of agricultural chemicals</li> <li>Increase awareness on use of agricultural chemical to farmers</li> </ul>	<ul style="list-style-type: none"> <li>Indiscriminate use of chemicals leading to contamination of underground and surface water sources</li> <li>As above</li> </ul>	<ul style="list-style-type: none"> <li>Min of Agriculture, ZNFU, ZEMA</li> <li>Min of Agriculture, ZNFU, ZEMA</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>As above</li> <li>Budgets of relevant agencies</li> </ul>	<ul style="list-style-type: none"> <li>License &amp; monitor all agriculture chemicals outlets</li> <li>Number of sensitization meetings held</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to regulate markets</li> <li>Failure to implement due to lack of funds</li> </ul>
	Unsustainable farming Methods leading to ground water depletion	<ul style="list-style-type: none"> <li>Promote sustainable farming methods such as conservation farming practices</li> </ul>	<ul style="list-style-type: none"> <li>Poor farming methods leading to depletion of underground</li> </ul>	<ul style="list-style-type: none"> <li>Min of Agriculture, ZNFU, CFU</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budgets of relevant agencies</li> </ul>	<ul style="list-style-type: none"> <li>Number of farmers practicing conservation farming</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to enforce the practice as it not law</li> </ul>

Inadequate technical skills in the design and construction of dams	Culture (that rejects some skills)	<ul style="list-style-type: none"> <li>Review current education system to change people's mindset to value every sector and job</li> </ul>	<ul style="list-style-type: none"> <li>Learners and society in general has mindset that does not appreciate construction related skills</li> </ul>	<ul style="list-style-type: none"> <li>Min of Education, TEVET, Trade Schools, Colleges/Universities</li> </ul>	<ul style="list-style-type: none"> <li>2014-18</li> </ul>	<ul style="list-style-type: none"> <li>As above</li> </ul>	<ul style="list-style-type: none"> <li>Tertiary education system reviewed</li> </ul>	<ul style="list-style-type: none"> <li>Inadequate funds</li> </ul>
		<ul style="list-style-type: none"> <li>Introduce career guide courses at tertiary level</li> </ul>	<ul style="list-style-type: none"> <li>To create a pool of career guide specialists in schools, colleges &amp; universities</li> </ul>	<ul style="list-style-type: none"> <li>Min of Education, TEVET, Colleges &amp; Universities</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budgets of relevant agencies</li> </ul>	<ul style="list-style-type: none"> <li>Career guide programs introduced</li> </ul>	<ul style="list-style-type: none"> <li>Failure to implement</li> </ul>
		<ul style="list-style-type: none"> <li>Promote outreach programs for awareness and sensitization</li> </ul>	<ul style="list-style-type: none"> <li>The need for awareness creation &amp; sensitization is high</li> </ul>	<ul style="list-style-type: none"> <li>Min of Education, TEVET, Colleges &amp; Universities</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budgets of relevant agencies</li> </ul>	<ul style="list-style-type: none"> <li>Outreach programs initiated</li> </ul>	<ul style="list-style-type: none"> <li>Failure to implement due to inadequate funds</li> </ul>
	Inadequate training facilities	<ul style="list-style-type: none"> <li>Promote easier conditions for accessing loans – less reliance on physical collateral</li> </ul>	<ul style="list-style-type: none"> <li>Training institutions face problems to arrange adequate collateral. Other criteria should be sufficient in sometimes</li> </ul>	<ul style="list-style-type: none"> <li>BOZ, CBs, NBFIs, MOF</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Budget of relevant agencies</li> </ul>	<ul style="list-style-type: none"> <li>Loans awarded to training institutions without collateral</li> </ul>	<ul style="list-style-type: none"> <li>Difficult to regulate financial markets</li> </ul>
High cost of training	<ul style="list-style-type: none"> <li>Provide scholarships for skills training in dam construction</li> </ul>	<ul style="list-style-type: none"> <li>Will give incentive for people to choose training in these skills</li> </ul>	<ul style="list-style-type: none"> <li>MOE, TEVET, Tertiary institutions</li> </ul>	<ul style="list-style-type: none"> <li>2014 &amp; ongoing</li> </ul>	<ul style="list-style-type: none"> <li>Establish GRZ bursary for training in dam construction</li> </ul>	<ul style="list-style-type: none"> <li>Number of students GRZ bursary for dam construction</li> </ul>	<ul style="list-style-type: none"> <li>No funds to establish GRZ bursary</li> </ul>	