Technology Fact Sheet for Adaptation

Technology: Rainwater collection from ground surfaces [i]	
Technology characteristics	
Introduction	This technology covers collection, storage and use of rainfall that lands on the ground as opposed to collection from roofs. In many water-poor areas, small-scale runoff collection infrastructure can contribute greatly to the volume of freshwater available for human use. This is especially true in arid and semi-arid regions, where the little rainfall received is usually very intense and often seasonal. Because of this, runoff and river flows can be abundant for brief periods and non-existent throughout the rest of the year, as is the case in Northern Ghana. Rainwater collection from ground surfaces is typically used in areas with seasonal rainfall to ensure that adequate water is available during the dry season. The technology consists essentially of collecting flows from a river, stream or other natural watercourse (sometimes called floodwater harvesting). This technique often includes an earthen or other structure to dam the watercourse and form "small reservoirs." Another flood water harvesting technique is "Check-dams." These are small barriers constructed of rock, gravel bags, sandbags, etc, across the direction of water flow on shallow rivers, streams and other natural small water channels for the purpose of water harvesting, for erosion and sediment control. The small dams retain excess water flow during the rains in a small catchment area behind the structure. Collection of rainfall from ground surfaces utilizing "micro-catchments" to divert or slow runoff so that it can be stored before it can evaporate or enter watercourses is another technique. However, micro-catchments are often used to "store" water as soil moisture for agriculture and are rarely used for water supply for other purposes. Rainwater collection from ground surfaces contributes to climate change adaptation at the community level by providing a convenient and reliable water supply during seasonal dry periods and droughts.
Institutional and organizational requirements	Policies, legislation and institutional capacity are needed to address conflicts and externalities that can result from to rainwater collection. The "demand-driven, community-managed" model that has worked for small drinking water supplies is likely to work small reservoir systems as well.
Operation and maintenance	Operation and maintenance for community-owned systems are straight forward. Appropriate post construction support systems would be required to enable communities undertake proper and timely maintenance of small reservoirs such as repairing and re-

Technology: Rainwater collection from ground surfaces [i]	
Technology characteristics	
	enforcing eroded embankments and to ensure sustainability.
Endorsement by experts	Small reservoirs have been endorsed by experts as a means of ensuring the continuous availability of water in the dry season for rural communities, particularly for irrigated agriculture and livestock watering.
Adequacy for current climate	Very suitable for both current variability and future climate change. It empowers communities to adapt appropriately to seasonal and short duration rainfall conditions now and in the future.
Size of beneficiaries group	The technology is targeted to communities or clusters of communities and not few individuals.
Disadvantages	The main disadvantage is cost of construction of robust water collection systems. Also, if systems are not demand-driven they could malfunction as the critical element of ownership would be missing.
Capital costs	
Cost to implement adaptation options	These are made up of construction costs and expenditures on training beneficiary communities to properly operate and maintain the systems. Construction and implementation costs of rainwater collection projects depend on many factors including the type of collection systems and the scale and location of the project. Construction costs of a small reservoir system could exceed US $50,000.00.
Additional cost to implement adaptation option, compared to "business as usual" (extra storage capacity)	
Development impacts, indirect benefits	
Reduction of vulnerability to climate change, indirect	Reduces the current high vulnerability of communities in arid and semi-arid regions to impacts of climate variability and change
Economic benefits Employment Investment Public and private expenditures	 Creation of jobs to support operation and maintenance of water systems and to provide training to users/households. . Expenditure on food imports could be reduced.
Social benefits Income	 Ensuring availability of water in communities would reduce household expenditure on more expensive potable water sources

Technology: Rainwater collection from ground surfaces [i]	
Technology characteristics	
	such as from water tankers and bottled water. The water can also contribute to productive and economic livelihood through irrigation and maintenance of livestock.
Learning	Training elements from capacity building in operation and maintenance Improved health improves school attendance
Health	Contributes to water availability and eliminates dependence of communities on unimproved water sources. Systems also used for irrigation, for example, could result in improved nutritional status of beneficiary communities. These will result in improved health for households including women and children.
Environmental benefits	Groundwater recharge is an added benefit of unlined reservoirs; stored water will infiltrate permeable soils during storage and eventually reach the groundwater table.
Local context	
Opportunities and Barriers	Increased agricultural productivity, the potential for year-round water supply, and decreased time spent collecting water provide strong incentives to communities considering rainwater collection. Increased opportunities for ground-level rainwater collection should arise when rainfall is highly variable or seasonal, agricultural productivity is clearly hindered by dry periods, and alternative water supplies are distant, such as is the case for northern parts of Ghana. Barriers include the potential for adverse hydrological impacts downstream and the need for adequate capacity to assess these impacts. However, the environmental and hydrological impacts of small reservoirs have been reported to be minor. Additionally, surface storage can lead to parasite/vector breeding, algal blooms and poor water quality, particularly in small reservoirs fed by agricultural runoff.
Market potential	The technology is relevant and, though a bit expensive has market potential in the arid and semi-arid regions.
Status	Small reservoirs and check dams are already being used in various communities in Ghana, is promoted by the Ministry of Water Resources, Works and Housing, Ministry of Agriculture and NGOs. Their numbers are currently inadequate and many of the existing ones are poorly maintained due to lack of resources.

Technology: Rainwater collection from ground surfaces [i]	
Technology characteristics	
Timeframe	The implementation can start now. Communities could be assisted in adapting to climate variability now while preparing for adaptation to climate change impacts in the future.
Acceptability to local stakeholders	The technology is acceptable to local stakeholders.

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