How does WASH help people adapt to climate change?

This note is aimed at WaterAid country programmes, fundraisers and communications staff who wish to understand how water, sanitation and hygiene (WASH) services can help people adapt to the threat of climate change. It explains why improved WASH services are central to any climate change adaptation strategy and will help you communicate how WASH interventions address climate-related risks in proposal writing and programme design.

What are the impacts of climate change?

Rainfall is highly unpredictable in many of the countries where WaterAid works. Droughts and floods are not uncommon. Climate change threatens to make rainfall even more unpredictable, possibly bringing longer droughts, more intense wet periods and an increase in the frequency of extreme weather events. Gradual shifts like sea level rise could have big consequences for coastal communities and changing temperatures could affect the incidence of certain climate sensitive diseases. These changes, combined with other significant water-related threats, have impacts on water security, harvests, food security, livelihoods and health.

Left: WaterAid/GMB Akash/Panos Right: WaterAid

What other threats are there to water security?

People are water insecure when they don't have access to water of sufficient quantity and quality for basic human needs. Climate change is not the only threat to

water security, food security, livelihoods or health. Nor is it always the most significant threat. Increased demand for water resources from growing populations, unsustainable farming, deforestation, river damming, mangrove destruction, industrial pollution and uncontrolled discharge of wastewater are causing serious water security problems, even without the threat of climate change. For example, encroachment and real estate development in wetlands reduces their capacity to absorb flood waters and can accentuate the severity of flooding events.

How does WASH help people adapt to climate change?

WASH services increase water availability in times of scarcity, providing supplies for basic needs, health, food and livelihood security. Increased water storage provides a buffer in times of water scarcity. The combined benefits of improved water supply, sanitation and hygiene reduce the overall disease burden experienced by poor and marginalised communities, meaning they are better able to cope with the impacts of climate change.

What approaches to managing water resources and delivering WASH services help communities adapt to climate change?

Strengthening institutions to support service users

This involves district local government and service providers (usually in remote rural areas but could include utilities and private service providers in more urban environments) to strengthen planning, financing, monitoring, service delivery quality, post implementation support to users, revenue recovery, asset management, accountability mechanisms and coordination.

WaterAid/ Andrew McConnell

A high number of community managed water supply services fail because no support is available from permanent institutions to keep them running. Additionally, poorly sited, designed, constructed and supervised boreholes can fail prematurely. A failed WASH service does not provide resilience to current conditions, let alone future climate change. Work aimed at strengthening local institutions to provide high quality services, management, financial and technical support to service users, coupled with efforts to ensure institutions are accountable to users, is critical if people are going to be able to adapt to climate change.

Examples exist in Timor Leste, Nicaragua and Malawi.

Community-Based Water Resource Management (Securing Water Resources Approach)

The Securing Water Resources Approach combines principles of Water Resource Management (WRM) with WASH service delivery. It consists of the following steps:

1) Linking with national and sub-national ministries and agencies with water mandates to establish a task force that will take forward implementation

2) Understanding regions/districts where Water Resource Management will improve water security

3) Facilitating participatory assessment of who needs to use what water source for what purpose and when, taking into account how much water they need

WaterAid/ Andrew McConnell

4) Understanding threats to water resources and their possible impacts on water availability/quality for basic needs and small-scale livelihoods

5) Monitoring threats through hydrological monitoring of groundwater levels, rainfall, surface flows and demand

WaterAid/ Andrew McConnell

6) Using monitoring information to make decisions on what management processes must exist to govern water use (e.g. allocations, demand management, rationing)

7) Using monitoring information to make the case for improvements to services funded and implemented by national institutions

8) Sharing monitoring data with national agencies to build up a national picture of water-related risk

WaterAid/ Andrew McConnell

The approach is cyclical with steps 4-8 repeated.

Examples exist in Burkina Faso, Mali and Ghana. WaterAid Bangladesh also carries out a Participatory WASH Vulnerability Analysis which is based on similar principles of communit

The Securing Water Resources Approach provides a means of managing water-related threats, which include climate change. Helps to identify appropriate adaptation strategies tailored to the various threats that exist in a particular location. Complements national Integrated Water Resource Management (IWRM)* and climate change adaptation plans, ensuring that they are based on ground realities. Provides monitoring data which can be used to understand issues driving water insecurity, reducing the dependence on anecdotal hearsay which may or may not explain why water resource problems have emerged. Strengthens the link between water users, government institutions and service providers, acting as a channel for water users to call for assistance when necessary.

***** *The Global Water Partnership defines IWRM as 'a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems'.*

Multiple Use Services (MUS)

A Multiple Use Services approach involves designing WASH services to accommodate multiple water needs, including livelihood uses, such as cattle watering and small scale irrigation.

Examples exist in Burkina Faso, Mali and Madagascar.

WASH services that are designed to accommodate multiple water needs not only strengthen water security but food and livelihood security too, particularly in areas where other water sources dry up during the dry season

WaterAid/ Basile Ouedraogo

Increased food and livelihood security provide greater overall resilience to climatic change. If services are not designed to accommodate multiple water needs, users may modify them, resulting in damage. Damaged services do not provide resilience to climate change.

WaterAid/ Andrew McConnell

What practical interventions help communities adapt to the impacts of climate change?

Groundwater development (using boreholes or tubewells)

Groundwater acts as a giant natural storage reservoir that can provide water when surface sources have dried up or are contaminated. The natural filtering property of aquifers ensures that water is generally (although not always) of good quality. If groundwater is well managed and protected from pollution, it can provide reliable year-round supplies. Groundwater can be accessed and developed by drilling boreholes into underground water-bearing fractures, soil or rock formations. Boreholes may be fitted with a manually operated pump that can lift water from 45-60m or a motorised pump that can lift water from deeper depths. Motorised pumping can supply large piped schemes.

WaterAid/ Chileshe Chanda

Examples exist in most WaterAid country programmes.

Research undertaken by the British Geological Survey investigating the likely impact of climate change on groundwater indicates that groundwater is more resilient to changes in climate than other sources of water. Well sited, designed, constructed and supervised boreholes tapping into groundwater are a credible climate change

adaptation strategy. The fact that groundwater can usually be developed close to the home reduces the hardship of water collection, meaning people can collect more water to meet their daily needs. Well sealed and protected boreholes provide water for hygiene, helping to reduce the incidence of water-transmitted disease, meaning people are better able to adapt to climate change.

Groundwater development (using dug wells)

Hand-dug wells are manually constructed using hand tools. They vary in diameter from 1.5m to several metres across. They are typically no deeper than 30m as digging becomes increasingly difficult (and unsafe) at depth, but there are some examples of wells that exceed 30m. If wells are dug using de-watering techniques they are more likely to be able to accommodate seasonal fluctuations in water availability. Wells dug without de-watering are prone to drying which could mistakenly be attributed to climate change.

WaterAid/ Andrew McConnell

Examples exist in many WaterAid countries.

Dug wells can provide year-round access to water and are a suitable climate change adaptation option in areas where groundwater is relatively close to the surface. In areas where groundwater moves at very slow rates, wide diameter dug wells are an appropriate solution as they provide greater storage capacity than boreholes. This storage is less likely to be exhausted by manual pumping.

Groundwater development (using springs)

In its most basic form, spring development involves protecting the immediate area around a spring and constructing a facility where water can be collected safely. The flow from upland springs (which are often some distance away from water

WaterAid/ Guilhem Alandry

users) can be partially diverted into pipes and tanks which supply tap stands in communities. Such schemes can serve large numbers of users.

Examples exist in Ethiopia, Madagascar, Timor Leste and Nicaragua.

Springs can provide a reliable year-round supply of clean water, provided that their catchment areas are protected from environmental degradation, and leakage in distribution systems is well controlled.

Elevated water points

Hand pumps installed on elevated platforms in flood-prone areas. These pumps tap into groundwater.

Examples exist in Bangladesh.

Provides access to groundwater in times of flooding. Provided that the borehole the pump draws from is well sealed, it is possible that water supplies will be protected from ingress of contaminated water.

Elevated latrines

Latrines built on stilts or a concrete/brick plinth. Waste may drain into a sealed chamber that is emptied or into a septic tank buried beneath the ground.

Examples exist in Nicaragua and Bangladesh.

Elevated latrines provide access to sanitation facilities in times of flooding.

Rainwater harvesting (rooftop catchment with tank)

Rainwater falls onto a clean roof surface and is channelled by guttering and pipes into a storage tank. Storage tanks can vary in capacity and can provide for households, schools or health centres. People draw water from a tap connected to the storage tank.

WaterAid/ Behailu Shiferaw

Examples exist in Uganda, Pakistan, Nicaragua, Burkina Faso, Papua New Guinea and Rwanda.

Provides a means of capturing and storing a relatively clean supply of water that can be used in times of scarcity. If used sparingly, for drinking, washing and cooking only, rainwater can provide essential supplies during dry periods. Supplies may not last for a full dry season but can act as a buffer, supplementing water available from other sources.

Rainwater harvesting (ground catchment with water flowing into protected tanks)

In certain areas, where there are outcrops of impermeable rock, it is possible to capture rainwater runoff and direct it into storage tanks. Relatively large catchments can be enclosed within small walls resulting in collection and storage of large amounts of water. In some desert areas in South Asia this ancient practice is employed to capture precious rainwater in protected tanks.

WaterAid/ Mustafah Abdulaziz

Example exists in Pakistan.

Provides a means of capturing and storing a relatively clean supply of water that can be used in times of scarcity. Supplies can be used for kitchen garden and small livestock watering, strengthening household food security and meaning people are better able to adapt to impacts of climate change.

Rainwater harvesting (ponds)

Involves the construction of ponds that collect rainwater or runoff diverted into them from the surrounding area.

Examples exist in Bangladesh which have used slow sand filters to treat the water.

In areas where the groundwater is saline or contaminated, rainwater collection in sealed ponds can make critically-needed supplies of fresh water available in times of scarcity. Pond water must however be filtered before it can be used for human

consumption. These supplies can provide much needed water in areas where rainfall may be intermittent.

Managed groundwater recharge

Involves capturing and channelling water into recharge wells that replenish groundwater during the rainy season.

Examples exist in Nepal and Bangladesh.

In areas where there is high groundwater salinity, fluoride, arsenic or obstruction of recharge (for example in urban areas), managed groundwater recharge can help to dilute salinity, arsenic and fluoride concentrations in the area around a well, provided that groundwater flows do not take diluted water away from the well area. Increased availability of cleaner water helps people adapt to water shortages that may emerge due to climate variability.

Storage

Involves the construction of tanks, cisterns, dams and reservoirs to capture and store water when it is available.

Examples exist in many WaterAid country programmes.

Storage is an essential component of any water supply system. Without storage, there is no way to make water available in times of scarcity or accommodate changing demands. Storage capacity in many countries is extremely low, meaning water is not always available in times of need. Tanks and reservoirs provide much needed storage to cover water shortages, helping to adapt to climate variability.

WaterAid/ Miguel Samper

WaterAid/ Behailu Shiferaw

Sand dams

Involves constructing a barrier across a river channel that contains high volumes of coarse grained sediments. The barrier allows water to flow but traps coarse grained sediment behind it. This sediment acts as an artificial aquifer, storing water below the surface and protecting it from contamination. Sand dams are only appropriate in very specific hydrogeological conditions.

Examples exist in Ethiopia and Burkina Faso.

Sand dams can store and provide large volumes of water in times of scarcity. They may contribute to increased soil water availability in the immediate vicinity of dams, improving prospects for crop growth. Water can be used for irrigation and livestock watering, strengthening food security.

Sub-surface dams

Involves digging into a river bed and building a dam under the surface, which acts to slow down the underground flow of water.

No recent examples exist in WaterAid country programmes.

Like sand dams, sub-surface dams constructed in river channels can retain water behind them, making supplies available in times of scarcity.

Small dams

Involves constructing a barrage across a river channel, storing surface water in a pond or reservoir behind it.

Examples exist in Mali and India (check dams).

Small dams constructed in river channels store water making it available for crop watering or other uses in times of scarcity.

Improved sanitation

Involves promoting solutions that remove faecal waste from the environment. Sanitation solutions typically capture, store, transport, treat and safely dispose of faecal waste.

WaterAid/ Ernest Randriarimalala

Examples exist in all WaterAid country programmes.

Safe capture, storage, transportation, treatment and disposal of faecal waste is critical if exposure to disease is to be minimised. With reduced exposure to disease, people are better able to cope with the impacts of climate change.

WaterAid/ Tom Saater

Hygiene promotion

Involves promoting improved hygiene behaviours such as handwashing with soap at critical times of the day, e.g. after using the toilet, and before food preparation and meals.

Examples exist in all WaterAid country programmes.

WaterAid/ Ernest Randriarimalala

Improved hygiene behaviours help reduce exposure to waterborne and water-washed diseases that occur now and may be accentuated under future climate change scenarios. With reduced exposure to disease, people are better able to cope with the impacts of climate change.

WaterAid/ Tom Greenwood

WaterAid/ Mani Karmacharya

Water treatment

Involves the removal of harmful constituents from water so that it is safe to drink. This can be done using a variety of techniques which include sedimentation, filtration, addition of chemicals, adsorption, boiling, distillation, ion exchange, reverse osmosis, and solar disinfection.

Examples exist in Nicaragua, Nepal, India, Pakistan, Bangladesh, Uganda and other country programmes.

Water treatment, coupled with improved hygiene and sanitation can help to reduce the incidence of debilitating diseases which weaken people's ability to farm and grow crops. With reduced exposure to disease, people are better able to cope with the impacts of climate change.

WaterAid/Asim Hafeez

What is climate resilient WASH?

Whilst it's clear that WASH supports communities to adapt and be more resilient to climate change, there is a question over how resilient WASH interventions are to its impacts. When it comes to droughts, many WASH interventions are already climate resilient, as they make water available in times of scarcity (if properly implemented). Modifications can be made to WASH interventions making them accessible during times of flooding and more able to withstand the destructive force of floods.

In disaster prone areas, homes, schools, health centres and WASH infrastructure are at risk of damage during extreme weather events, such as hurricanes/cyclones. Adaptation to these events cannot only be about making pumps and latrines stronger or elevated up off the ground, as some level of damage or inaccessibility will often be inevitable. Emphasis also has to be on ensuring that the institutions and finances are in place to renew infrastructure and services when they are damaged or destroyed. This requires attention to planning, financing, service support and disaster risk reduction measures in place within permanent government institutions. WaterAid Bangladesh has good examples of piloting climate resilient technologies.

How can climate change policy and finance improve access to WASH services?

World leaders signed up to a historic new climate change agreement in Paris in December 2015, which means that all countries now have new, internationally binding obligations to reduce carbon emissions in addition to significant opportunities to secure funding for their adaptation efforts. The seriousness of the climate threat, combined with the binding nature of the climate agreement and the financing that is available, means that climate change is often a very high priority for policy-makers.

It is important to ensure that WASH sector strategies and institutions incorporate climate risk, and that these are then reflected in emerging climate change adaptation plans. Ensuring coordination and coherence between new climate institutions and existing WASH institutions is critical.

Globally, new specialised climate funds are being created (such as the Green Climate Fund which aims to channel over USD 100 billion per year by 2020) and traditional donors (such as the World Bank) are seeking to ensure that their development funding secures climate resilience benefits. Nationally, many countries have created their own climate funds to channel finance to activities that help build climate resilience. WaterAid has a role to play in demonstrating how WASH builds resilience to climate change.

For poor and marginalised people to be resilient to climate change, as well as other threats to water security, they need WASH services that will last, day after day, year after year. Climate financing and the renewed political and policy focus on threats to sustainable WASH services offer new opportunities to ensure WASH services that deliver long-term benefits.

This note was written by Vincent Casey with inputs from Om Prasad, Louise Whiting, Miriam Denis Le Seve, Remi Kaupp and Richard Carter.

March 2016 – revised December 2016