Identify and appraise options

This session covers the identification and appraisal of options to improve climate resilience, including an overview of the Technical Briefs ‘Linking risk with response: options for climate resilient WASH’ and ‘Appraising and prioritising options for climate resilient WASH’.

1. Introduction
2. Identify options
3. Appraise options

Identify options

Water quality

Improve resilience of wells to flooding

Treating water at household level

Participatory water quality testing

Water quantity

Increase water storage

Rainwater harvesting technologies

Sanitation and hygiene

Raised pit latrines

Septic tanks

Relocation of latrines

Enabling environments

Capacity building

Decentralised management

Integration of climate resilience into strategies and plans

Identify options

Water quality: Household water treatment and safe storage (HWTS)

HWTS treats water in the home to improve the quality of drinking water and reduce waterborne disease. Various treatment technologies can be used, from filters to disinfectants. It is cost effective and there are simple systems available. It improves water quality at the point of use and increases climate resilience because it can still be used when other water sources are affected by a climate hazard, e.g. if a well is contaminated following a flooding event. However, contamination can still occur if systems are not properly used or maintained.

Source: Elliott et al. (2011), Van Steenbergen and Tuinhof (2010)

Examples of innovation/best practice in climate resilience development

Sanitation and hygiene: Latrine adaptation

Pit latrines can be adapted to reduce their vulnerability to floods and rising groundwater. A number of adaptations can be made. For example, latrines can be raised on mounds, above the highest water level, or pits can be emptied regularly. Various designs are available meaning that adaptation can be based on specific environmental conditions. It is a cheap and basic option. However, it is not suitable in areas that are prone to constant flooding so alternative options will have to be identified if this is the case.

Technical Brief

Linking risk with response: options for climate resilient WASH

Front cover of Technical Brief

Shows how an understanding of climate risk can inform WASH decision-making – from national programming to project implementation

Covers both rural and urban WASH, and a range of technologies for different steps on the drinking water and sanitation ladders

Proves illustrative case studies of different options, and includes a detailed ‘long list’ of adaptation options in appendix.

Case study – learning lessons from the El Nino drought

- The 2015-16 drought in Ethiopia caused widespread water insecurity, despite progress in extending access to improved sources.
- A key question: has progress in extending access masked an underlying problem with the resilience of basic technologies, or the water resources they depend on?
- Work now underway to answer this question

Appraise options

Is the option practical, given the timeframe and resources available?

How cost-effective is it?

How successful is it likely to be?

Will there be any unintended negative consequences?

How many people will benefit from its implementation?

Is the option socially acceptable at the local level?

How will the implementation of the option reduce developmental risks in other sectors?

Is the option compatible with local/ national development objectives?

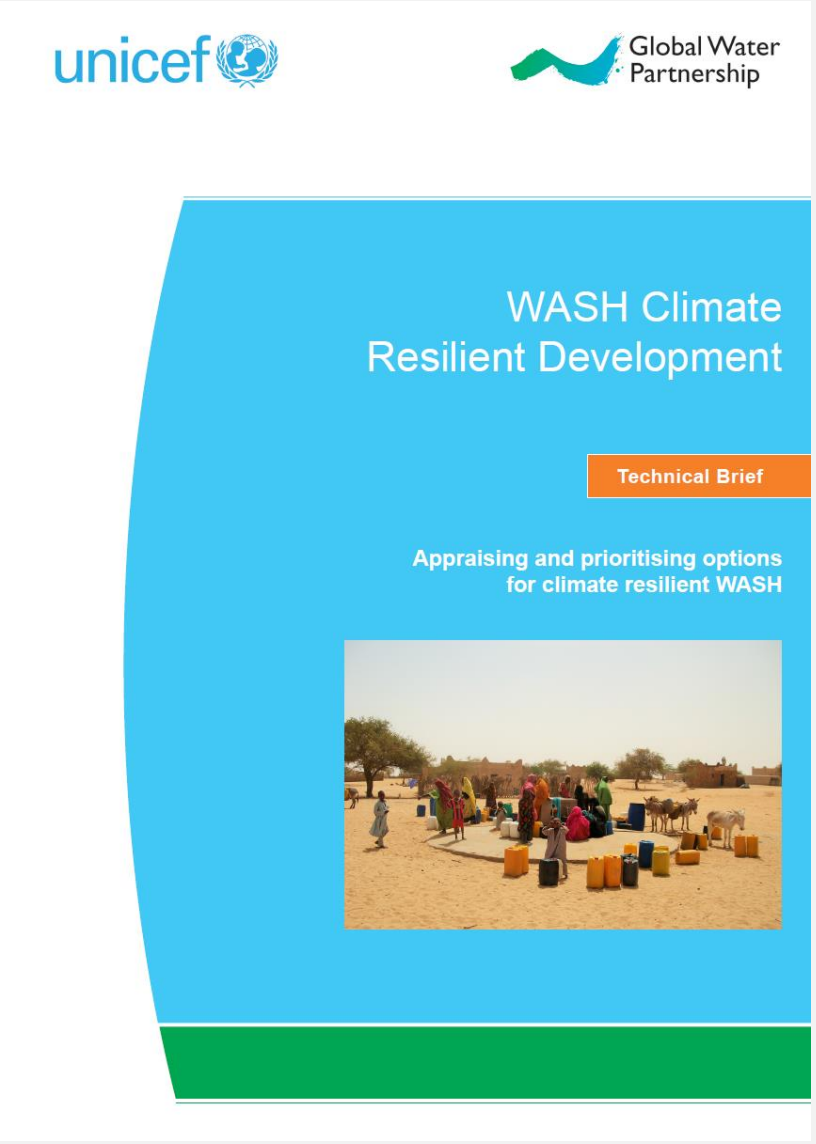
Technical Brief

Appraising and prioritising options for climate resilient WASH

Focuses on appraising and prioritising options for climate resilience with a view to informing WASH programme and project design.

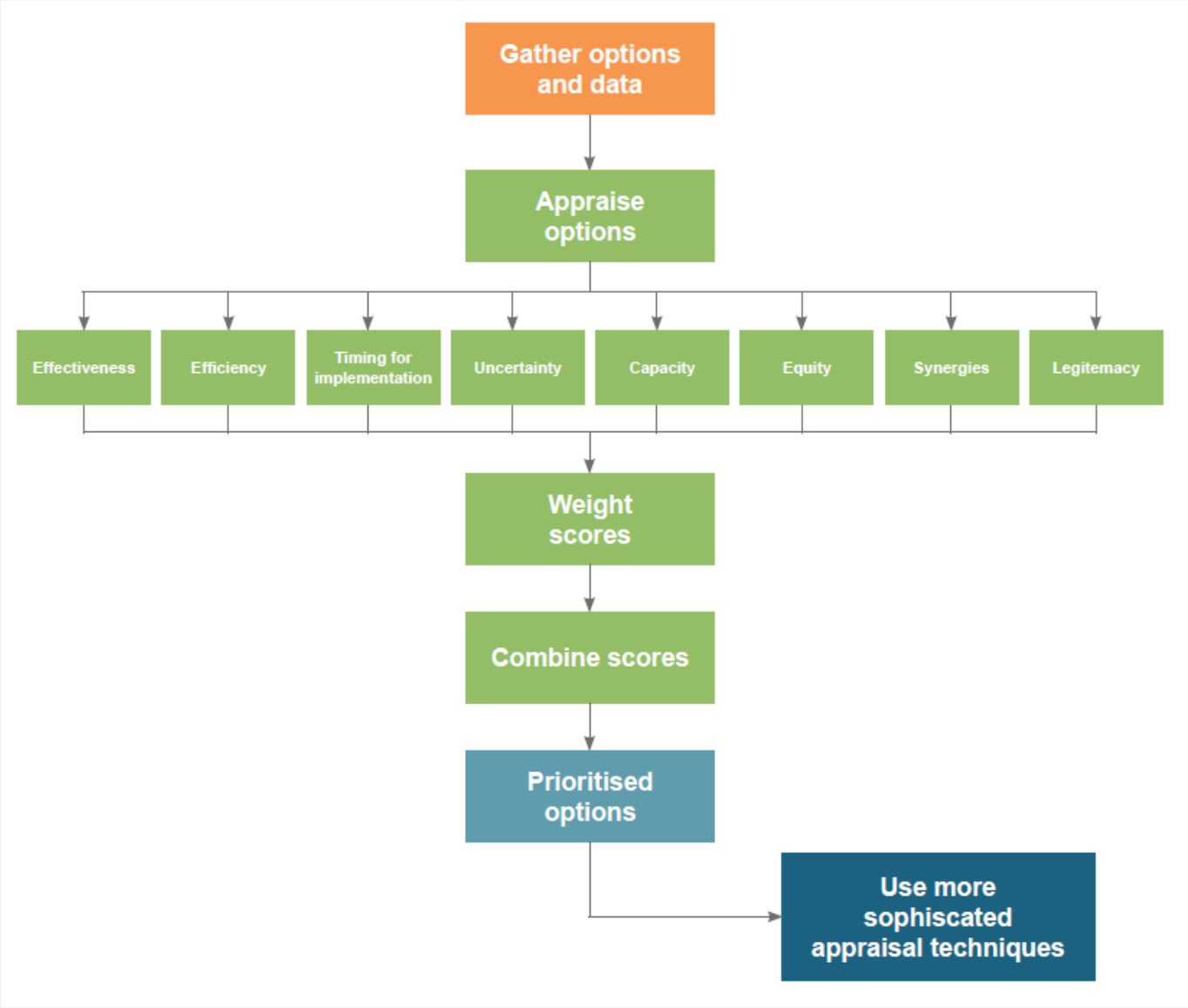
Provides a simple scorecard/checklist approach to use as a starting point for appraising and prioritising options, and as an awareness-raising activity.

Focuses on current and near future options, over the next 15-20 years. This fits in with WASH programming timescales and development.



Approach

- The simple scorecard approach, to be used mainly with no or low-regret options
- More sophisticated techniques should then be used to complete more complex analyses
- Designed to use in a consultative way, for example, in a workshop setting



Appraising options - criteria

The criteria to consider are:

- Effectiveness – will the option ensure sustainable and resilient WASH service delivery or behaviours?
- Efficiency – how much will it cost to implement the option? What economic benefits will there be as a result of the option being implemented and do these benefits exceed the costs?
- Timing for implementation – how soon does action need to be taken and can the option be implemented accordingly?
- Uncertainty – is the option highly sensitive to uncertainties in future climate?
- Capacity – is there the necessary capacity to implement the option? Do people/communities have the capacity to sustain interventions after implementation?
- Equity – does the option have any adverse effects on other areas or vulnerable groups? Will it ensure access for the poorest and most marginalised?
- Synergies – would implementing the option also have benefits for other strategic objectives?
- Legitimacy – is the option acceptable both politically and socially?

Scoring

In the scorecards:

Example: weighting scores

One group decided that some of the criteria were of greater importance than others in their assessment. They used a total of 12 points to assign weights to the criteria. Effectiveness, efficiency, timing for implementation, uncertainty and capacity were considered the most important; these were each assigned 2 points. Equity and legitimacy were considered less important, and these were each assigned 1 point. The group did not include the synergies criterion in their assessment.

The score for each criterion was then multiplied by the weight assigned to it. The overall score for the option was obtained by adding together all the weighted scores.

A value of 0-2 can be given. These scores correspond to ‘high’, ‘medium’ and ‘low’.

For most criteria, a high score is 2, a medium score is 1, and a low score is 0.

For costs and uncertainty, a high score is 0 while a low score is 2.

For the timing for implementation criterion, options are assigned scores of 1 or 2.

Example - efficiency

Costs

Question	Class	Response	Score
How much will it cost to implement the option?	LOW	Low cost	2
	MEDIUM	Medium cost	1
	HIGH	High cost	0
Will there be any operating and maintenance costs involved with implementing the option?	LOW	No costs	2
	MEDIUM	Yes – minor costs	1
	HIGH	Yes – major costs	0

Benefits

Question	Class	Response	Score
What economic benefits will there be as a result of implementing the option (or what are the costs of not adapting) and do these benefits exceed the costs?	HIGH	High benefits	2
	MEDIUM	Medium benefits	1
	LOW	Low benefits	0
Will the option reduce major damages?	HIGH	High	2
	MEDIUM	Medium	1
	LOW	Low	0

Example: scoring efficiency

A group appraised options for improving the resilience of dug wells to the increased risk of contamination of groundwater. They looked at two options, and assessed efficiency as follows:

- Site dug wells away from sanitation and other sources of pollution risk. This option scored 3 for costs. It was assessed to be a medium-cost option, but there would be no additional operating and maintenance costs involved. The option scored 4 for benefits, with a likely reduction in major damages. The total score for this option was 7.
- Improve well lining to prevent ingress of shallow groundwater flows. This option scored 2 for costs, with medium costs to implement the option and some maintenance costs involved. The option also scored 2 for benefits, which were considered less significant than those from the first option. The total score was 4.

Example – timing for implementation

Scoring options to improve the resilience of pit latrines to inundation or overflowing from increased rainfall and flooding:

1. Site latrines away from areas of known flood risk
2. Implement land management measures to reduce flood severity
3. Install robust upper foundations or other similar measures

Question	Response	Score	Option 1	Option 2	Option 3
Are there any early benefits to implementing the option?	Yes	1			
	No	0			
Does the option have a long lead time?	Yes	1			
	No	0			
Can the option be implemented now, or is there a need to delay to gather more information?	The option can be implemented now	1			
	There is a need to delay implementation to gather more information	0			

Prioritising options

Combining scores to prioritise options

Criterion	Option A	Option B	Option C
Effectiveness	2	2	1
Efficiency	5	6	4
Timing for implementation	1	0	0
Uncertainty	2	3	1
Capacity	2	3	2
Equity	2	5	3
Synergies	3	3	1
Legitimacy	3	4	2
Total score	**20**	**26**	**14**

Available appraisal techniques

Tool	Overview	Application in climate resilient WASH appraisals		Further information
		Strengths	Weaknesses	
Conventional tools				
Cost-benefit analysis	Identifies options that have the greatest benefits compared to costs, or assesses whether a particular criterion is met	■ Most suited to assessing options in the short term, particularly no- and low-regret options	■ Does not account for uncertainties that are unquantifiable; e.g. those associated with projections of long-term climate	Berger and Chambwera (2010) Beyond cost-benefit: developing a complete toolkit for adaptation decisions. IIED Briefing Note. Published by IIED, London.
Cost-effectiveness analysis	Compares and ranks different options in non-monetary terms	■ Near-term assessment, particularly no- and low- regret options ■ Works best with technical options	■ Less suitable for complex or cross-sectoral risks as ignores portfolios of options ■ Does not work as well with non-technical options, and can give these lower priority ■ Not suited to considering uncertainty	Watkiss, P. and Hunt, A. (2012). Cost-effectiveness analysis: Decision Support Methods for Adaptation, MEDIATION Project, Briefing Note 2. Funded by the EC's 7FWP.

Conventional tools:

- Cost-benefit analysis
- Cost-effectiveness analysis
- Multi-criteria analysis

Tools for decision-making under uncertainty:

- Real options analysis
- Robust decision making

Key points

Key points

- The emphasis should be on finding options that increase resilience to climate change, but still make sense under the current climate.
- Work with stakeholders to identify alternative designs or management practices that may enable them to better cope with climate variability and change.
- Screening to rank and prioritise options is an important step to ensure the most appropriate ones are implemented.

Assignment

- Assignment: identifying and appraising options

- Objectives:
- To review options and identify any additional options
- To appraise different options identified to help understand the process

- Tasks:
- **Review and identify options:** Consider the options given in the Technical Brief, review these options and add any additional options of relevance
- **Appraise and prioritise options:** Work through the different criteria set out in the Technical Brief and come up with a prioritised list of options.

Assignment

You may have an example you want to use, otherwise choose one of the following examples

A: Addressing seasonal or drought-related reductions in water availability

- Option 1: Select most reliable springs for development
- Option 2: Site boreholes in most productive parts of aquifer
- Option 3: Implement catchment protection measures to enhance long-term infiltration and groundwater recharge

B: Assessing different water storage options to address water scarcity risks (example for scoring capacity given in the brief).

- Option 1: Install in-channel structures to enhance aquifer recharge
- Option 2: Rainwater harvesting
- Option 3: Direct infiltration techniques

C: Addressing the risk of contamination of water sources due to inundation of pit latrines (example for scoring synergies in the brief).

- Option 1: Site latrine away from areas of known flood risk
- Option 2: Design pit to allow regular pumping or emptying
- Option 3: Implement land management measures to reduce flood severity.

Extract: climate risks and responses – water supply

Climate risk	Adaptations
Physical damage to water infrastructure from increased rainfall/floods.	• Implement water safety plan. • Site water points away from areas of known flood risk. • Implement catchment management measures to reduce flood risk. • Adopt robust construction standards.
Threats to water quality from increased rainfall/floods.	• Implement water safety plan. • Site water points away from flood-prone areas and sources of pollution risk. • Implement catchment management measures to reduce flood risk. • Raise awareness of risks from water quality deterioration during and after flooding and need for household water treatment. • Improve design and construction of water points to prevent ingress of contaminants. • Elevate and extend radius of sanitary apron around well head.
Threats to water availability and supply in drying conditions/droughts.	• Implement water safety plan. • Use appropriate investigation techniques to target most productive parts of aquifer. • Position and use appropriate screen to maintain yield (boreholes). • Dig wells in dry season to ensure adequate depth (dug wells). • Develop supplementary/backup sources and storage. • Implement demand management to reduce losses (piped schemes). • Adapt intake structures on rivers/reservoirs to accommodate low flows.

Extract: climate risks and responses - sanitation

Climate risk	Adaptations
Physical damage to sanitation infrastructure from increased rainfall/floods.	• Implement water safety plan. • Build bunds/drains to divert flow away from latrines; implement wider catchment management measures to reduce flood risk and protect infrastructure and treatment. • Site latrines, storage and treatment facilities away from areas of known flood risk. • Adopt robust design and construction standards in risky areas.
Flooding of sanitation infrastructure and threats to public health from water and wider environmental contamination.	• Implement water safety plan. • Strengthen flood defences and upstream catchment management. • Regular pumping or emptying of latrines to prevent overflows, and clearing of drains and sewers to prevent blockages. • Adapt or design new systems: e.g. elevated latrines; non-return valves on septic tanks; separate sewage and stormwater removal (urban). • Public awareness and education around risks to public health and protection measures.
Less water available for flushing and cleaning of systems in drying/drought conditions.	• Implement water safety plan. • Adapt or design new systems: e.g. low/zero water use latrines; modified and/or decentralised sewerage systems; treatment processes that can function effectively with reduced dilution. • Step up maintenance programme to detect and clear blockages in sewers.

References

- Elliott, M., Armstrong, A., Lobuglio, J. and Bartram, J. (2011) In: De Lopez, T. (ed.), Technologies for Climate Change Adaptation – The Water Sector. UNEP, Roskilde.
- Van Steenbergen, F. and Tuinhof, A. (2010) Managing the Water Buffer for Development and Climate Change Adaptation. Groundwater Recharge, Retention, Reuse and Rainwater Storage. BGR, the Co-operative Programme on Water and Climate (CPWC) and the Netherlands National Committee IHP-HWRP.