CLIMATE CHANGE AND ENVIRONMENT ASSESSMENT

THE WASH CONSORTIUM, DRC

Project implemented by MWH

Key experts: Peter Reid and Andre Clavareau

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EXECUTIVE SUMMARY

A Climate and Environment Assessment completed by a DFID Adviser for the DRC rural WASH component covered by the WASH NGO Consortium was categorised as likely to have medium climate and environment risks, with medium opportunities. As a result of this ranking, a more detailed CEA was undertaken by a team of two consultants, through a service delivery contract with MWH SA/NV, Belgium. This consultancy was undertaken largely during May, 2014. Field visits to two WASH Consortium operational sites were undertaken. These sites were selected as being broadly representative of DRC's agro-ecological zones (see Climate and Environment Management Framework for full details of AEZs), enabling some degree of extrapolation. Following the detailed field assessment, no changes to the original B ranking assessment were seen to be necessary.

Risk and opportunity ranking. Of the total of seven project outputs developed for the WASH Consortium project, only two are considered to provide medium category risks, and those are the ones which provide the project 'hardware' – drinking water and sanitation interventions. These two justify the overall B (medium) risk category selected by the DFID Adviser. All seven outputs however offer medium (ranked B) opportunities for building climate and environment awareness and adaptive capacity, leading to greater climate resilience.

The team looked at the livelihoods context of beneficiaries in the two areas visited.

Communities in AEZ 1 have an alternative source of livelihoods and nutrition through fishing, and rely on agriculture to provide their staple diet and also to market the surplus, which they do via boat trade to Kinshasa. They have ready access to rich alluvial soils, and are not very much aware of the impacts of climate change, by which they are not seriously threatened. Overall vulnerability is low.

Communities in AEZ 2 however are almost entirely dependent on agriculture, and agricultural production appears to be suffering as a result of climate change. These factors combine to make communities in the region highly vulnerable. Their asset levels are extremely low and their capacity to adapt is currently very limited. Few alternatives for diversification outside agriculture would appear to exist.

In terms of perceived climate and environment risks observed by communities interviewed, communities in AEZ 1 appeared less vulnerable to, and less aware of, the impacts of climate change. It seems likely that this is at least in part because they have diversified sources of livelihood and nutrition. However, the risks posed by the sanitation component of the programme do pose significant risks in terms of the potential to contaminate water tables through infiltration from pit latrines. Communities in AEZ 2 appear highly vulnerable to the risks of climate change, and are much more aware of the changes and the impacts that these are having on their lives. These communities have very limited assets, capacity and available resources to help them to diversify and adapt.

These observations appear to be backed up by the (very limited) meteorological data available, and by climate change simulations that have been run by various agencies. These suggest that very little change in temperature and climate will be observed in AEZ 1, but that reduced rainfall and rising temperatures are likely across large parts of AEZ 2.

Checklists of the possible impacts of climate change and the environment on the WASH Consortium programme, and also of the possible effects of its interventions on the environment, were compiled. From this information, a sensitivity analysis was run, which outlines the main risks and opportunities that were found. Mitigation measures against these risks and exploiting opportunities are suggested.

These are provided with more detail in the Climate and Environment Management Framework.

A summary of the main possible impacts, their nature, and how the project can respond to and mitigate against these, is shown in the following table. These are detailed in the report.

Table 1 - Risks, opportunities, impacts and responses

Risk/ opportunity	Nature of impact	Mitigation/intervention guidance
Effects of WASH interventions on climate change / the environment		
Risk	Water pollution from latrines	Design ecological sanitation latrines that do not allow infiltration into water tables, especially in AEZ 1. Use of WASH Consortium safeguard standards will prevent water pollution
Risk	Water pollution of aquifer from boreholes and hand wells	Design used by Wash Consortium prevent water infiltration into aquifer from the surface and so prevent this risk
Risk	Stagnant water at water collection points such as spring, tap areas or wells	Adequate drainage trenches with soak pits, according to standard used by the wash consortium, will prevent this risk.
Risk	Reduction of water quantity in the aquifer and decrease of water table	According to the dense hydrology network, it appears that there is no significant problem of water quantity but in water quality in DRC. This risk should not be a critical issue in DRC.
Risk	Deforestation from fencing biomass use – leads to increase of erosion, destruction of farmland, reduced infiltration of water into soil profile	Design minimal biomass-use fences and structures
Opportunity	Building resilience	Use climate resilient technologies Build awareness and adaptive capacity
Effect of climate change / the environment on WASH interventions		
Risk	Flooding of latrines and hygiene	Design flood-proof latrines, e.g. raised plinth or ecological system
Risk	Deteriorating rainfall patterns	Build climate and environment awareness and adaptive capacity Link up with livelihoods programmes where feasible (e.g. with Concern in Manono)
Risk	Water tables seem likely to fall in longer term	Use boreholes in preference to dug wells if feasible from economic and technical perspective Design dug wells to facilitate subsequent deepening Dug wells may be more sustainable than springs (local context to guide selection)
Risk	Water quality (i) from diminished sources, (ii) from flooding causing increased turbidity	Provide clean water from sustainable source such as dug wells, protected springs
Risk	Increased rainfall could raise water tables and cause water pollution (AEZ 1)	Improve domestic water treatment where necessary (esp AEZ 1) Use boreholes to access water from deeper aquifers if feasible from technical and economic perspectives
Risk	Increased rainfall could cause erosion	Increase drainage Implement anti-erosion technologies, e.g. planting along slope, reducing water velocity
Risk	Increased rain could cause flooding	Improve drainage site Use flood bunds to avoid flooding
Risk	Mining activities could cause chemical water pollution	Improve monitoring Use boreholes to access water from deeper aquifers
Opportunity	Diversification of livelihoods	Link up with livelihoods programmes

1. WASH Sector Climate and Environment Assessments

1.1 Overarching DFID C&E Assessment

An overarching C&E assessment was completed by a DFID Adviser for the entire WASH sector programme[1], rating its 4 main components using standard DFID ranking categories. The risks of the overall programme impacting adversely on climate and the environment were seen as slight, related directly to the infrastructure element of the programme. The risks of climate and environmental change and shocks impacting adversely on the programme were rated as medium, as water quality and quantity may be affected, and this would present problems for the project. In terms of opportunities, the DFID assessor felt that the programme would not have a large-scale impact on mitigating or adapting to climate change or managing environmental issues. However, it would impact at the local level, where the potential for attitude and behavioural change offered significant opportunities.

The analysis concluded that the rural component covered by the WASH Consortium is likely to have medium climate and environment risks, with medium opportunities. A high climate and environment risk was only deemed likely for the urban WASH component, to be implemented by Mercy Corps and not affecting this work.

Table 2 - WASH Sector: Summary of risks and opportunities

Component	CC&E risks and impacts	CC&E opportunities
1: Village Assaini	B – medium/manageable potential risk	B – medium/manageable potential opportunity
2: NGO Consortium	**B – medium/manageable potential risk**	**B – medium/manageable potential opportunity**
3: Mercy Corps	A – high potential risk	B – medium/manageable potential opportunity
4. Sanitation marketing	B – medium/manageable potential risk	B – medium/manageable potential opportunity

Definition of Categories:

A	High potential risk / opportunity
B	Medium / manageable potential risk / opportunity
C	No / Low potential impact / opportunity

1.2 WASH Consortium Project Outputs

There are a total of seven project outputs with varying potential for having an impact both on risk and opportunity, and for comparative purposes they have been reviewed separately here. The only two outputs with any potential for impacting adversely on the environment are the infrastructure outputs (Outputs 4 and 5). All 7 outputs offer potential opportunities for a positive impact, principally on enhancing people's capacity to adapt to climate change and to increase their resilience.

[1] DFID Business Case for DRC WASH Sector Programme, Climate and Environmental Assessment, Annex E.

Table 3 - Summary of climate and environment implications for WASH Consortium Outputs

No	Output summary	Broad C&E implications
1	Outreach – awareness campaigns	Possibility to include CC&E awareness messages
2	Institution building – government capacity	Possibility of building government CC&E capacity
3	Community strengthening	Possibility of empowering communities to demand CC&E related services
4	Infrastructure – drinking water	Possibility of increasing community resilience; some risk to environment
5	Infrastructure – sanitation	Possibility of increasing community resilience; some risk to environment
6	Coordination and planning	Possibilities of building in CC&E agendas into planning processes
7	Building and sharing evidence	Possibilities of building CC&E evidence and sharing that

These implications have been categorised, and are shown in the table below.

Table 4 Climate and environment categorisation by project output

Output no	Output detail	CC&E risks/impacts	CC&E opportunities
1	Outreach – awareness campaigns	C	B
2	Institution building – government capacity	C	B
3	Community strengthening	C	B
4	Infrastructure – drinking water	B	B
5	Infrastructure – sanitation	B	B
6	Coordination and planning	C	B
7	Building and sharing evidence	C	B
	OVERALL	**B**	**B**

2. The livelihoods context

Fieldwork was conducted in two locations. One of these is located in Agro-Ecological Zone 1, Mushie town in Bandundu Province, where the partner NGO Solidarite is implementing the WASH Consortium programme. The second fieldwork site was in Manono, Katanga Province, which is situated in AEZ 2, where Concern itself is implementing the programme. These two locations are considered to be reasonably representative of the AEZs in which they lie, albeit these zones are huge and not homogenous. The methodology followed in the fieldwork is in Annex 1. The main livelihoods issues identified in the surveys are detailed below:

AEZ 1, around Mushie

- The main source of livelihoods in this region is fishing; agriculture is also widely practiced by most households, but is of secondary importance; women undertake most agricultural tasks, men are either full-time or part-time fishermen;
- This livelihoods diversification, combined with the improved nutrition provided by an all year round source of protein, mean that people are less vulnerable – better off and not threatened by food insecurity;
- Access to markets via the road network is very limited, and rarely used; all use the river as the main means of access;
- A large proportion of communities are located close to the river Congo or its tributaries; this provides them with a relatively easy access to markets in Kwamouth, and as is more often the case, Kinshasa; many trading boats ply these waters; soap, oil, sugar, clothes and other necessities are brought back on return journeys;
- All of the marketable agricultural surplus, which maybe represents some 50%+ (some said up to 80%) of production (principally cassava and maize), is carried to Kinshasa to sell at the markets there;
- There are no hunger months in particular, when food is short and people are obliged to go hungry;
- Soils in this area are rich alluvial types, providing high yields with no additional agricultural inputs required;
- Farmers usually own their own land; the average farm size is about 0.25-0.5 hectares;
- There is a significant proportion (maybe 10%) of the population that make their living from petty trading (e.g. simple foodstuffs, consumable items, sold from counters in village
- The range of crops grown here is comparatively small, a maximum of 6 crops in total are cultivated (cassava, maize, rice, sorghum, beans, sweet potato);
- Some reported that the reliability of rains has reduced with climate change, with periods of drought during rainy seasons, leading to reduced crop yields; more reliance is placed now on cassava which is more drought tolerant;
- However, people in this region in general were not really aware of the impacts of climate change, and did not appear to be greatly affected by them;
- Access to livelihoods resources is limited; there is either very limited or no access to finance, to information, or to roads; access to services such as health and education is also poor but improving;
- Female headed households are the poorest and most vulnerable, and have no capacity to supplement diets or income through fishing;
- *In summary, communities in AEZ 1 have an alternative source of livelihoods and nutrition through fishing, and rely on agriculture to provide their staple diet and also to market surplus which they do via boat trade to Kinshasa. They have ready access to rich alluvial soils, and are not very much aware of the impacts of climate change, by which they are not seriously threatened. Overall vulnerability is low.*

AEZ 2, around Manono

- Communities in this area gain their livelihoods primarily from agriculture; a small number located around rivers engage more or less fulltime in fishing, and many more engage in occasional part-time fishing activities; however, they are by and large a people who rely more or less wholly on agricultural production;

- There is a small proportion (2-3%) of the population that earn a living from petty trading;
- A wide range of crops (between 15-20) has traditionally been grown in the area, always rainfed; main staple crops are cassava and maize; other crops are: Irish and sweet potato, finger millet, groundnut, bambarra nut, tobacco, beans, rice, sesame, sorghum, yam, and a range of vegetable crops including pumpkin, tomato, water melon, aubergine, okra and cucerbits; papaya, citrus, pineapple, mango, banana and plantain are common fruits;
- All communities unanimously articulate that yields and productivity have been falling with declining fertility and reduced rainfall; this has forced them to seek out alternative farming land (*kazubele*) which is often very distant to their home village, up to 15 km away; owing to this long distance, whole households migrate to the farmlands during busy times of the agricultural calendar;
- New kazubele farmland is frequently closer to rivers and in riverine areas; this places more pressure on livelihoods and natural resources in these areas as migrating populations increase;
- There are 3 hunger months, from June to August, when cassava cannot be harvested, mainly during the dry season; these can be very difficult months in bad years;
- Some traditional crops can no longer be grown caused by the reduced rainfall; among these are finger millet, cotton (used to be sold to Belgians, so maybe more of an access to market issue), sesame and yam; traditional landrace varieties of sorghum (long maturity periods) are also becoming more rare and difficult to cultivate;
- They have no knowledge of improved short-duration, drought resistant varieties of any crop;
- Crops that are more resistant to periods of drought, such as cassava, are becoming more widespread; cassava is a poor source of nutrition, with clear implications;
- Where rice can be grown (not widespread) it is usually sold as a cash crop, and is not the preferred food staple (cassava);
- There are a small number of livestock (sheep, goats) in some villages, but not all; some communities said they were unable to purchase animals owing to lack of access to cash; many children have never eaten meat;
- One reason given for not keeping more livestock was that in times of conflict, the first thing that soldiers steal is the animals;
- Villages that appear better-off have been able to diversify into alternative livelihoods, possibly through better access to sources of fish, or mining of mineral tailings; the number of livestock in these villages appears higher, though still small;
- Fish used to be more plentiful, and could also be found in swamps and ponds; previously women also engaged in this activity; now, however the few remaining fish are only found in rivers and there are not sufficient to justify this activity for women, so this has become an exclusively male occupation;
- With the reduction in fish stocks, in addition to much reduced wildlife as a source of bush meat, nutritional status and protein consumption is falling, and communities say that malnutrition among children is becoming more commonplace; food insecurity is looming as a growing issue;
- Forest cover is diminishing, and charcoal burning is a major source of this deforestation; charcoal production provides a livelihood for a small number of specialised households;
- Reduced river flow was said to have had a big impact on fishing, with the number of fish having declined significantly;

- Access to livelihoods resources is extremely limited; there is either very limited or no access to finance, to information, to roads and markets, and to services such as health and education;
- Female headed households are the poorest and most vulnerable, and have no capacity to supplement diets or income through alternative livelihood sources;
- *In summary, people in this AEZ are almost entirely dependent on agriculture, and agricultural production appears to be suffering as a result of climate change; these factors combine to make communities in the region highly vulnerable; their asset levels are extremely low and their capacity to adapt is currently very limited; few alternatives for diversification outside agriculture appear to exist.*

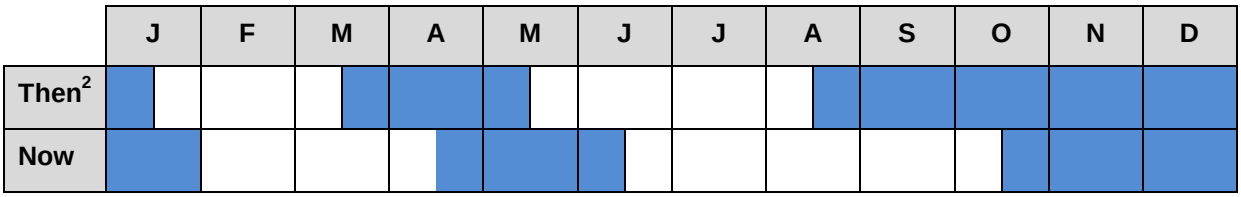
3. Climate change - community perceptions

Climate change perceptions were assessed as the second series of questions during the fieldwork, in the same locations. One of these is located in Agro-ecological Zone 1, the second in AEZ 2. These two locations are considered to be reasonably representative of the AEZs in which they lie, albeit these zones are huge and not homogenous. The methodology followed in the fieldwork is in Annex 1. The following narrative contains the main climate change issues identified in the surveys. In addition some case studies are in Annex 2.

Reporting on community perception often adds weight to the limited data and hard evidence which exist. However, in AEZ 1 (Bandundu) simulation and Metellesat results suggest an average increase of rainfall, whereas in interviews with communities householders reported a decrease in rainfall in some instances.

AEZ 1, around Mushie

- The rainfall in this region is bimodal (two rainy seasons). There were many reports of perceived changes in rainfall patterns as a result of climate change, and a reduced overall amount of rain;
- Rains were thought to start later but also to finish later, with reduced overall duration of rainy seasons (see chart);



- The most critical change has been in the reliability of rains, with long periods of drought during rainy seasons, leading to reduced crop yields;
- Very heavy downpours in this region lead to prolonged periods of standing water in some villages where there is limited slope and drainage; this leads to increased disease incidence, in particular malaria;
- Highly intense rains also cause damage to buildings through heavy erosion and run-off, particularly for those households living close to the river, where there is a significant slope down to the river;
- Most communities in this AEZ access their drinking water from surface springs, which are highly susceptible to contamination from pollutants;

[2] Within the memory of the oldest inhabitants, probably within the last 40 years

- Water tables are rarely far from the surface for at least some villages or for households living closer to the river, making latrine design and location a critically important factor, with high risks of water table infiltration, contamination and pollution;
- Open defecation is the norm here; most people defecate either in the river or inland in the bush; there appears to be a strong reluctance to engage in the digging of closed pit latrines;
- Water quality has also been affected by reduced rainfall, and diarrhoea incidence increases in dry seasons when water is least available;
- Some communities with acute drinking water shortages drink water from the river at critical times of the year, which leads to high incidence of diarrhoea; this is worst when households move closer to the river to fish during the dry season;
- *In summary, communities in AEZ 1 appear less vulnerable to the impacts of climate change, as they have diversified sources of livelihood and nutrition. However, the risks posed by the sanitation component of the programme do pose significant risks in terms of the potential to pollute water tables through pit latrines.*

AEZ 2 – around Manono

- This area has a high rainfall; the rainfall pattern is uni-modal (single rainy season); the perception of rural communities is that the duration of the rainy season has decreased, with rains starting later and finishing earlier:

	J	F	M	A	M	J	J	A	S	O	N	D
Then[3]	■	■	■	■	■				■	■	■	■
Now	■	■	■	■						■	■	■

- The intensity of rain has also changed, with some very intense tempests occurring more frequently; with these storms rains the water runs away, often causes crop damage, and does not penetrate the soil; other rains are very light and inadequate;
- People in the area believe that the number of days when it rains has reduced, and that, maybe most importantly, the predictability of rainfall has reduced dramatically, with erratic and irregular rainfall providing unreliable conditions for agriculture; there are often prolonged drought periods within the rainy season which are very damaging to crops;
- The overall amount of rain is perceived to have fallen to about 60% of its original level, as remembered by older individuals with longer memories;
- River flow is perceived to be much reduced, with estimates of around 60% of previous levels; river beds now dry out earlier, and no longer provide a source of water throughout the dry season, meaning that communities have to walk long distances to alternative water sources;
- Alternative water sources in some communities are very busy in the dry season, and examples of women going for water at 01:00 AM to avoid the queues were cited;
- River beds have traditionally been used as a year-round source of water, but these are now dry for up to 3 months of the year; where they still provide water the quality is poor;
- People are conditioned to open defecation, and appear reluctant to adopt the idea of pit latrines, although this seemed to be of a lower order than in Mushie; rocky laterite soils make it hard to dig these, which is a further disincentive;
- In some villages located nearer to rivers the water table is not far from the surface; in these locations there is a very real risk of contamination of water sources from pit latrines, where

[3] Within the memory of the oldest inhabitants, probably within the last 40 years

the required 1.5 metres between the bottom of the latrine and the water table may be hard to achieve; this is however less of a critical issue than in AEZ 1;

- *In summary, communities in AEZ 2 appear highly vulnerable to the risks of climate change, with very limited assets, capacity and available resources to help them to diversify and adapt.*

4. Climate and Environment Sensitivity Analysis

Checklists have been completed using evidence gathered during fieldwork and from the desk review. The DFID How to Note on CEA for Business Case preparation4 provides these checklists, which have been used as a framework for summarising climate change and environment risks and opportunities in DRC. The checklists are in Annex 3, and cover a series of questions and scenarios that provide the substance of the C&E Sensitivity Analysis, the results of which are summarised below.

4.1 Effect of WASH interventions on climate change / the environment

A range of possible risks were considered, but most of these were judged not to be significant (see Chapter 2, Climate and Environment Context in the Climate and Environment Management Framework report for fuller detail). Examples of these are the risk of polluting water tables through construction of boreholes and the risk of water interventions having an effect on water availability. However, it was considered that these risks are more relevant in terms of effect of climate change on the intervention, and as such as discussed in more detail in Section 4.2.

Risk: water pollution from latrines. Digging pit latrines is an integral and obligatory requirement that beneficiary communities are required to complete prior to any significant water intervention taking place. There is a technical WASH water safety requirement that a 1.5 metre gap be maintained between the bottom of the latrine pit and the water table. In areas where water tables are high, such as in AEZ 1, it may not be possible to maintain this gap. This provides a substantial risk for human health. In AEZ 2 the water tables are lower and the risks less, but nonetheless care will have to be taken when siting latrines. Mitigation: in AEZ 1, specific latrine designs will need to be used to minimise risks of pollution, such as raising the overall level of the latrines, or utilising ecological latrines that have been used with some success in Nepal[5]. In AEZ 2, latrines will need to be dug with careful attention to siting, and current guidance on this is sufficient.

Risk: water table and aquifer decrease: installation of boreholes or hand dug wells, which take water from the aquifer, might lower the water table; however given the hydrologic context in DRC, where underground water is in a continuously supplied by surface water, this risk is low and confined only to localised and specific aquifers which WASH Consortium staff will need to look out for. Mitigation: A geological survey should be performed for each borehole, with water taken from deeper aquifers.

Risk: depletion of biomass. Where new water points are installed, or where existing ones are upgraded and enhanced, sites are cleaned up and fenced off. In most rural areas, the only fencing material available is from cutting down trees. An average water point may require the cutting of over 2 tonnes of biomass to complete this fencing, leading to significant deforestation[6]. This is likely to be a particular problem in AEZ 2, where the *miombo* woodland is being depleted and regrowth is slow. Mitigation: water point surrounds need to be designed and built that minimise biomass use, especially in AEZ 2.

Opportunity: building resilience. WASH Consortium interventions take place as a planned sequence of events implemented through a 12-step process. These start with 8 steps which are all designed to build awareness and capacity of project stakeholders. Throughout this sequence, and also those that follow, opportunities exist for ensuring that both those implementing the programme, as well as

[4] DFID How to Note - A DFID Practice Paper. Technical Note: Climate & Environment Assessment for the Business Case. March 2014.
[5] See examples: WaterAid in Nepal (2011) Technical handbook - Construction of ecological sanitation latrine (ECOSAN).
[6] From consultant's personal calculations and field notes

community members themselves, become more aware of environmental issues as a whole, of the threats surrounding climate change, and how they may better adapt themselves to these threats. Physical interventions themselves will need to be climate-resilient, meaning that they will be able to withstand any changes which may occur, and continue to provide the service required of them in a sustainable manner. This will be of more importance in AEZ 2, where levels of livelihood assets and thus adaptive capacity are very low. Exploiting opportunity: technical interventions used will need to be climate-resilient; climate and environment awareness should be built wherever appropriate, integrated into the 12-step implementation process.

4.2 Effect of climate change / the environment on WASH interventions

Risk: flooding. One of the features becoming closely associated with climate change is an increase in rainfall intensity, and this weather characteristic appears to be more widely observed now in DRC. This can often lead to flooding, which in turn can lead to erosion of physical infrastructures, crops and soil. The possible impacts are: damage to or destruction of buildings; crop damage or failure; soil erosion; and prolonged standing water (with associated risks to sanitation facilities and health). Mitigation: WASH interventions that are designed to withstand the effects of flooding should be used where technical staff feel that there is a risk, and it is anticipated that these will be identified in PRA exercises. Awareness about the risks associated with flooding will need to be built among beneficiary communities, along with measures that may be taken to minimise those risks.

Risk: deteriorating rainfall patterns. A number of rainfall-associated trends have been recorded above. These include rains that start late and finish early (reduced duration); increasing unpredictability of rain (reduced number of rain days); more intense rains (leading to reduced infiltration, more run-off); and a reduced overall amount of rain. All of these factors combined appear to be leading to reduced agricultural productivity, and the impact of this is an increase in the vulnerability of the rural poor. Increases in vulnerability in turn have an adverse effect on the capacity and willingness of communities to adopt WASH interventions. These problems are particularly acute in AEZ 2, as may be seen above both from data and people's perceptions of the issue. Mitigation: awareness about the risks associated with changing rainfall patterns will need to be built among beneficiary communities, along with measures that may be taken to minimise those risks and to diversify livelihoods.

Risk: falling water tables. Although there is no evidence of this to date, it seems probable that the effects of declining rainfall and increased run-off are likely to lead to declining water tables in the medium to long term, and this is especially the case with AEZ 2. Although not backed by evidence, it is considered that this is a relatively low risk. Agriculture is likely to remain low-input, extensive and rain-fed in the foreseeable future, with limited opportunities for investment. Prospects for industrial investment are also limited in areas which have largely very low population densities. Since the large majority of rural communities access their water from surface points or dug wells, this is likely to have a significant negative impact on people's access to readily-available water. Mitigation: where surface water sources are seen to be threatened, the selection of boreholes may be a more appropriate intervention (if deemed feasible by technical staff from a long-term economic and technical perspective), since ground water sources are likely to be more robust and sustainable in the long term.

Risk: water quality. Rural communities frequently have very limited access to a good supply of drinking water, and are often forced to walk long distances to a water source. This is particularly the case in AEZ 2. Rivers are the most common sources of water, and often these dry out in the dry season. Digging into the river beds is a traditional but increasingly unreliable source. One of the increasing effects of climate change that were reported during field visits are that these are now drying out completely with greater frequency (see examples in Annex 2), thus providing a direct impact on water quality. One of the implications of this escalating problem is that communities are forced to access water of inferior quality, leading to increasing health risks. Another water quality risk is presented by temporary contamination of water springs and higher turbidity caused by more intense

rainfall that appears to be a feature of climate change. Mitigation: WASH interventions that provide high quality water sustainably should be used. Awareness about the risks associated with poor water quality will need to be built among beneficiary communities, along with measures that may be taken to minimise those risks and to diversify livelihoods. Springs should be protected, including from the effects of intense rainfall.

Opportunity: diversification of livelihoods. Although this may be a secondary and indirect benefit, the severity of the problem is such as to justify committed development resources. This will provide the opportunity for development of new agricultural technologies that should prove more adaptable to the impacts being realized through climate change, such as short-season and/or drought resistant crop varieties. Diversification of livelihood sources needs to be encouraged throughout, to help increase community resilience. This is particularly relevant in AEZ 2. Exploiting opportunity: links to livelihoods projects or components should be made wherever possible and practicable. Technical interventions used will need to be climate-resilient; climate and environment awareness should be built wherever appropriate.

4.3 Summary of Sensitivity Analysis

Table 5 - Summary of impacts of WASH Interventions on climate and environment

Negative Impacts. *Are proposed WASH interventions likely to contribute to:*		
climate change	No	C
environmental degradation	Yes. Water pollution and biomass depletion	B
increased vulnerability from C&E degradation	Yes. Both water pollution and deforestation might increase community vulnerability.	B
OVERALL RISK RATING	**Medium**	**B**
Positive Impacts. *Could the proposed WASH interventions help to:*		
tackle climate change	No	C
improve environmental management	Yes. Improved WASH facilities will provide better environmental conditions	B
reduce vulnerability and/or build resilience and adaptive capacity to C&E degradation and shocks	Yes. Improved WASH facilities and associated awareness/capacity building will reduce vulnerability and increase community resilience	B
OVERALL OPPORTUNITY RATING	**Medium**	**B**

Table 6 - Summary of impacts of climate change and environment on WASH interventions

Negative Impacts. *Are the objectives of the WASH project likely to be at risk from:*		
climate change	Yes. Flooding, changing rainfall patterns and reduced water quality present direct risks. Also longer-term possibility of falling water tables	B
environmental degradation	Yes. Degradation provides threats to health and rural livelihoods.	B

increased vulnerability from C&E degradation	Yes. Already vulnerable communities will be made more so.	B
OVERALL RISK RATING	***Medium***	**B**
Positive Impacts. *Could the outcomes of the WASH intervention be enhanced by:*		
tackle climate change	No.	C
improve environmental management	No.	C
reduce vulnerability and/or build resilience and adaptive capacity to C&E degradation and shocks	Yes. Indirect benefits brought about by necessary development effort towards diversification of livelihoods	C
OVERALL OPPORTUNITY RATING	**Low**	**C**

5. Climate-appropriate Interventions

Some broad kinds of intervention that are needed to address the identified risks and opportunities are summarised below. These are addressed in greater detail in the Climate and Environment Management Framework.

Table 7 - Nature of intervention appropriate to risk/opportunity

Risk/ opportunity	Nature of impact	Mitigation/intervention guidance
Effects of WASH interventions on climate change / the environment		
Risk	Water pollution from latrines	Design ecological sanitation latrines that do not allow infiltration into water tables, especially in AEZ 1. Use of WASH Consortium safeguard standards will prevent water pollution
Risk	Deforestation from fencing biomass use – leads to increase of erosion, destruction of farmland, reduced infiltration of water into soil profile	Design minimal biomass-use fences and structures
Risk	Water pollution of aquifer from boreholes and hand wells	Design used by Wash Consortium prevent water infiltration into aquifer from the surface and so prevent this risk
Risk	Stagnant water at water collection points such as spring, tap areas or wells	Adequate drainage trenches with soak pits, according to standard used by the wash consortium, will prevent this risk.
Risk	Reduction of water quantity in the aquifer and decrease of water table	According to the dense hydrology network, it appears that there is no significant problem of water quantity but in water quality in DRC. This risk should not be a critical issue in DRC.
Opportunity	Building resilience	Use climate resilient technologies Build awareness and adaptive capacity
Effect of climate change / the environment on WASH interventions		
Risk	Flooding of latrines and hygiene	Design flood-proof latrines e.g. raised plinth or ecological system
Risk	Deteriorating rainfall patterns	Build climate and environment awareness and adaptive capacity Link up with livelihoods programmes where feasible (e.g. with Concern in Manono)
Risk	Water tables seem likely to fall in longer term	Use boreholes in preference to dug wells if feasible from economic and technical

		perspective Design dug wells to facilitate subsequent deepening Dug wells may be more sustainable than springs (local context to guide selection)
Risk	Water quality (i) from diminished sources, (ii) from flooding causing increased turbidity	Provide clean water from sustainable source such as dug wells, protected springs
Risk	Increased rainfall could raise water tables and cause water pollution (AEZ 1)	Improve domestic water treatment where necessary (especially AEZ 1) Use boreholes to access water from deeper aquifers if feasible from technical and economic perspectives
Risk	Increased rainfall could cause erosion	Increase drainage Implement anti-erosion technologies, e.g. planting along slope, reducing water velocity
Risk	Increased rain could cause flooding	Improve drainage site Use flood bunds to avoid flooding
Risk	Mining activities could cause chemical water pollution	Improve monitoring Use boreholes to access water from deeper aquifers
Opportunity	Diversification of livelihoods	Link up with livelihoods programmes

Annex 1: Methodology

Terms of Reference

The full Terms of Reference are contained in: "Climate and Environment Assessment and development of a climate and environmental management framework for the WASH Consortium, Democratic Republic of the Congo".

Field trip objectives

1. Understand what and how climate risks might affect the project and local livelihoods;
    a. Identify which livelihood resources are most likely to be affected by climate risks and assess which are most important for response strategies;
2. Assess how project activities might affect the environment;
    a. Including any impact on access to, or availability of, critical livelihood resources;
3. Assess the capacity of men and women to adapt and respond to future climate hazards;
4. Examine what project adjustments (revision of existing activities and/or design of new activities) might need to be made to mitigate risks, increase resilience and support climate adaptation;
5. Assess to what extent the project can provide opportunities to contribute to climate adaptation.

Field trip outputs:

1. List of livelihood resources that are most affected by identified climate hazards and most important for responding to climate impacts;
2. Comprehensive field notes;
3. Possible adjustments to project activities to support climate adaptation;
4. List of desired adaptation outcomes and important influencing factors to be monitored.

List of persons met

Name	Organisation	Position
Antoine Esclatine	Concern Worldwide	Country Director
Sebastien Longueville	WASH Consortium (Consortium Coordination Unit)	Director
Stephen Jones	WASH Consortium (Consortium Coordination Unit)	Coordinator, WASH M&E
Other staff	WASH Consortium, Kinshasa	Various
Emmanuel Ayigah	CRS	Director, WASH
Sidy Niang	Oxfam	M&E, Learning, Quality
Ashley Meek	Oxfam	WASH Coordinator
Anne Cecile Vialle (ph)	UNICEF	WASH Specialist, environment lead
Lisa Rudge	DFID	Progr Officer, WASH
Jo Yvon	DFID	Progr Head, Basic Services
Celine Jacmain	PNUE, Kinshasa	Program manager
Hubert Kapiata	Ministere de l'environnement, Kinshasa	Head of Office
Pierre et Cyrille Massamba	CNAEA	Program Officer
Boukari Tare	UNICEF	Wash Specialist
Jean Luc Mouzon	KFW	Consultant

Name	Organisation	Position
Bibi Kasonga	Metelsat	Secretaire
Professor Maite	UniKin	Professor
Dierdre Delaney	Concern, Lubumbashi	Area manager
Chaungo Barasa	Concern, Manono	WASH Programme Manager
Gabrielle	Concern, Manono	Head of Base
Cedric Bernard	Concern, Manono	Irish Aid l/hoods progr
Other staff	Concern, Manono	Various
Nouhou Isaaka	Solidarite, Mushie	Head of Office
Seraphin Bwanakweli	Solidarite, Mushie	Acting EHA
Other staff	Solidarite, Mushie	Various
Doctor Nkela	BCZS, Moshi	Medecin Chef de Zone

Villages surveyed

Zone/area	Village	Date
AEZ 2, Manono	Lwakato	10th May
	Malata	10th May
	Katchambue	11th May
	Lusonde	12th May
	Kitu	12th May
AEZ 1, Mushie	Ngamboni	17th May
	Molima	17th May
	Lediba	18th May
	Moshi	19th May
	Masia Kwa	19th May
	Elieme	19th May

Approach

DFID has clearly defined policies for addressing climate change[7], and these have underpinned the work. There is a clearly defined DFID methodology for conducting CEAs[8], and this has provided an operational framework. In addition, strong emphasis has been placed on the clear opportunities that exist for the WASH Consortium's work to build resilience for the most vulnerable groups of beneficiaries. To this end, the DFID resilience framework has provided a conceptual framework, and has aided the development of a strategy for the WASH Consortium. Disaster resilience now draws together many strands of DFID's policy work across development sectors, and climate resilience is an integral and increasingly important element of that[9].

[7] See www.dfid.gov.uk/what-we-do/key-issues/climate-and-environment
[8] Climate and Environment Assessment How-to-Note. DFID, November 2013
[9] See DFID/TANGO's Resilience Framework. DFID Disaster Resilience Framework (2011), TANGO Livelihoods Framework (2007).

Methodology

The team used a highly participatory approach, involving as wide a range of stakeholders as possible, but most importantly working closely with the relevant Consortium team members throughout the process, to ensure that there is full ownership of the climate change and environment policy from the outset.

In the fieldwork, the main tool used to obtain information from communities was the Focus Group Discussion. A checklist was used during these discussions, covering: main sources of livelihoods, detailed information about these, other sources of income, levels of community and household assets, perceived threats to livelihoods, perceptions about climate change, changes necessitated by climate change, changes in the environment, levels of vulnerability. FGDs were usually of around 2 hours in duration. Participation by female community members was sought, with a target of 50% of FGD members. Their participation was sought actively if seen to be insufficient. Where seen as useful, Key Informant Interviews were held to elicit more specific information, such as in selection of older community members where, for example, information was sought on climate change patterns that required longer memories.

Schedule

The consultancy team spent 6 days conducting the contextual review. The desk review covered a broad scoping of relevant literature, covering the policy environment, legislative and regulatory frameworks, any relevant research, impact and evaluation studies, and best practice from other programmes. This was supported by a further 2 days of key informant interviews in Kinshasa. A detailed field visit schedule was developed in this period. The larger part of the team's input was spent in the field, covering 2 WASH Consortium and 2 AEZs. Wrap-up meetings with the Consortium and other key stakeholders were conducted after fieldwork. The team finalised its deliverables in draft form for presentation to WASH during the second half of May. A final working week has been allocated to a return visit to DRC, where the final presentation will be made, and where training can be conducted for staff in use of the operational tools that have been developed.

The actual schedule is outlined below and is in light with the agreement with DRC WASH Consortium.

Date	No days Peter Reid	No days Andre Clavareau	Activity	Location
7 – 11 April	4	0	Desk review	Home-base
8 – 9 May	0	2	Desk review	Home-base
5 May	0,5	0	Travel day to DRC	
6 - 7 May	2	0	Key informant interviews	Kinshasa
11 May	0	0,5	Travel day to DRC	
8 - 22 May	6 8	0	Field visits	Manono Mushie
12-14 May	0	3	Key informant interviews	Kinshasa
15-22 May		8	Field Visits	Bandundu, Moshi
23 May	1	1	Drafting reports, wrap-up meetings	Kinshasa
24 May	0,5	0,5	Travel day back to Europe	
27-30 May	4	4	Finalising reports	Home-base
June	2	0	Editing reports	Home-base
Subtotal	**28**	**19**		
Mid-July		0,5	Travel to DRC (2nd mission)	Home-base
Second mission		1+2	Workshop & staff training	Kinshasa
		0,5	Travel back to Europe	
Final revisions	**1**			
TOTAL DAYS	**29**	**23**		

Total days Peter Reid: 28 + 1 travel to/from – mission 1
Total days Andre Clavareau: 18 + 1 travel to/from – mission 1
3 + 1 travel to/from – mission 2

Annex 2. Case studies

The following case studies are provided as a reference point, to summarise the kinds of risks and hazards that may be encountered in project areas. Their purpose is to guide technical staff in planning and making decisions regarding interventions.

Case 1: A household living in villages around Bandundu

Situation 1:

- the water table is at a level more than 6 meters, and the village is located within a reasonable distance from river blank, in a sloping area.
- Because of slope and of the level of the water table, in this case there is no risk of flooding, and few risks of water table contamination.
- In this province there is an increase of average annual rainfall of 1,100 mm/yr.

Water source	Sanitation	C&E hazard	Direct impact	Hazards	risks
Unprotected Springs	Householder using individual latrines	Increase average rainfall	Increase of water table level	Contamination of water table	Few
				Contamination of water springs	Few
		Intensive rainfall during rainy season	Turbidity of water	Temporary contamination of water springs	Medium
			Intensive run-off causing erosion	Destruction of houses or public infrastructure – erosion + ravines	High
			Increase of water table	Contamination of water tables	Few
Unprotected dug wells used for domestic water + unprotected springs for drinkable water	Householder using individual latrines	Increased average rainfall	Increase of water table	Contamination of water table , especially caused by infiltration through unprotected dug wells	Medium
				Contamination of water spring	Medium
		Intensive rainfall during rainy season	Water surface and underground pollution	Contamination of water spring and of hand dug wells	High
			erosion	Destruction of public housing Ravine erosion	High
Drinking water from protected springs and protected dug wells with hand pumps	Householder using individual latrines	Increase average rainfall	Increase of water table level	Contamination of water table , especially caused by infiltration through unprotected dug wells	Few
				Contamination of water spring and water table	Few
		Intensive rainfall during rainy season	Water surface + underground pollution	Contamination of water spring and of hand dug wells	High
			erosion	Destruction of public infrastructure or housing Formation of ravines	High
N/A	N/A	Change of season	Extension of dry season and temporary decrease of water table and of surface water	Temporary decrease of spring flow Temporary drying of hand dug wells Reduction of surface water Increase of surface water pollution	Medium

Situation 2:

- the water table is at a level less than 1 – 2 meters, and the village is located close to a river – the water table has no resilience to contamination.
- Because of underground water level, there is unsafe drinkable water provision.
- Flat area and subject to flooding
- In this province there is an increase of average annual rainfall.

Water source	Sanitation	C&E hazard	Direct impact	Hazards	Risks
Provision of water from swamp or spring	Open defecation	Increase of average rainfall	Contamination of water surface	Contamination of drinking water	High
			Stagnant water and local swamp	Spread of mosquitoes and of water-borne disease	High
		Intensive rainfall during rains	Contamination of water surface	Contamination of drinking water	High +
			Flooding	Spread of mosquitoes and of water-borne disease	High +
N/A		Change of season	Extension of dry season, temporary decrease of water table and surface water	Reduction of surface water Increase of water surface pollution	Few/Middle
Borehole or dug wells	Ecosan toilet for community	Increase of average rainfall	Contamination of water surface	Contamination of drinking water	Few
			Stagnant water and local swarm	Spread of mosquitoes and of water-borne disease	High
		Intensive rainfall during rainy season	Contamination of water surface	Contamination of drinking water	Few
			Flooding	Spread of mosquitoes and of water-borne disease	High +

Case 2. Household living in villages around Katanga Province

Situation 1:

- There is a decrease of average rainfall
- There is an increase of rainfall during rainy season.
- There is an extension of dry season of one to two months.
- **water table mote then 6 meters below ground level**
- **no interaction with river**
- **Village in sloping area**

Water source	Sanitation	C&E hazard	Direct impact	Threats	Risks
Unprotected source – swamp or surface water	Individual latrines	Decrease of average rainfall	Decrease of water level table	Reduction of flow spring or spring becoming completely dry	High
			Decrease of surface water flow	Increase of pollution	Medium
		Intensive rainfall during rainy season combined with biomass depletion	Turbidity of water	Contamination of water springs	Medium
			Erosion	Destruction of housing or public infrastructure	High
Hand dug wells with pumps	Individual latrines	Decrease of average rainfall	Decrease of water level table	Reduction of flow spring or spring becoming completely dry	Low
			Decrease of surface water flow	Increase of pollution	Low
		Intensive rainfall combined with deforestation or land burning	Turbidity of water	Pollution of underground water	Low
			Erosion	Destruction of housing or public infrastructure	High
N/A	N/A	Change of season	Extension of dry season + temp decrease of water table and of surface water	Temp decrease of spring flow Temp drying of hand dug wells Reduction of surface water Increase of surface water pollution	High
Springs or swamps	N/A	Minor industries	water table contaminated	Contamination of drinkable water	High
Hand dug wells / Bore holes with hand pumps					Low

Situation 2:

- There is a decrease of average rainfall
- There is an increase of rainfall during rainy season.
- There is an extension of dry season of one to two months.
- **water table less than 1-2 meters below ground level**
- **village closer to river or swamp**
- **Village in flat area**

Water source	Sanitation	C&E hazard	Direct impact	Threats	Risks
Spring/swamp or surface water	Open defecation	Decrease of average rainfall	Decrease of water level table	Reduction of flow spring or spring dries up	Medium/ High
			Decrease of surface water flow	Increase of pollution	High
		Intensive rainfall combined with biomass depletion	Turbidity of water	Temporary Contamination of water surface	High
			Flooding	Spread of mosquitoes and water-borne disease	High
		Change of season – increase of dry season	Decrease of water level table	Temporary reduction of flow spring	High
		Minor industries	surface water contaminated or water table	Contamination of drinkable water	High
Bore hole wells with pumps	Ecosan latrines	Decrease of average rainfall	Decrease of water table	Reduction of available drinkable water	Low
			Decrease of surface water flow	Increase of pollution	Low
		Intensive rainfall combined with biomass depletion	Turbidity of water	Pollution of underground water	Low
			Flooding	Spread of mosquitoes and water-borne disease	High
		Minor industries	surface water contaminated or water table	Contamination of drinkable water	Low

Annex 3: Climate and Environment Checklist[10]

1. Impact of Climate Change and/or Environment on WASH Interventions			
1.1 Positive Benefits	**Yes / No**	**Detail**	**Measures to realize potential benefits**
1. Opportunity for economic growth through development and dissemination of technologies	**No**		
2. Opportunity for job creation	**No**		
3. Increased revenue generating opportunities	**No**		
4. Opportunity for new agriculture and livelihood options	**Yes**	AEZs 1 and 2: There is an opportunity for development of new agricultural technologies that should prove more adaptable to the impacts being realized through climate change, such as short-season and/or drought resistant varieties. Diversification of livelihood sources needs to be encouraged throughout, to help increase community resilience.	AEZs 1 and 2: This is a WASH programme and thus this is an indirect potential benefit, but nonetheless important. These opportunities can only be realized through linking up with livelihoods programmes. This may be achieved where, for example, implementing NGOs have a livelihoods programme running alongside the WASH programme, as is the case with Concern in Manono. Here, and in other situations like it, every effort should be made to seek information sharing and cross-learning
1.2 **Negative Impacts**	**Yes / No**	**Detail**	**Measures to mitigate or manage risks**
1. In a climate or environmentally sensitive area	**Yes**	AEZ 1. Riverine areas such as the Congo Basin have high water tables and are very sensitive to pollution. AEZ 2: the rainfed areas of DRC are particularly prone to the changing rainfall patterns that are being observed.	All interventions in AEZ 1 will need to show a high level of sensitivity to the possibilities of water pollution in all WASH interventions AEZ 2: the WASH Consortium should seek to link up with livelihoods programmes wherever possible, to encourage activities that promote alternative, diversified livelihoods.

[10] Format from DFID How to Note, Annex B, June 2013

2. In an area subject to environmental or climatic shocks / variability (floods /droughts /temperature)	**Yes**	AEZ 1: more intense rains lead to prolonged periods of standing water, with threats to health and hygiene. There are growing issues associated with deteriorating water quality. AEZ 2: Increasingly dry climate is leading to threats to rainfed agriculture and the livelihoods that depend on it. There are growing issues associated with deteriorating water quality. Also longer-term risks exist with regard to falling water tables with declining rain and more run-off.	AEZ 1: the design of latrines and sanitation arrangements will have to be carefully designed to minimize risks where flooding may occur from intense rains AEZ 2: the WASH Consortium should seek to link up with livelihoods programmes wherever possible, to encourage activities that promote alternative, diversified livelihoods. In both AEZ 1 and 2, the issue of water quality needs to be addressed through WASH interventions. Falling water tables may require greater reliance on boreholes in future.
3. In an area where climate change could lead to conflict	**Yes**	AEZ 2: In the rainfed areas where food and other resources are in short supply, there is the chance that conflict over scarce resources may be generated between communities, and exacerbated by any armed groups with various agendas	There is little that the WASH Consortium can do to minimise the impacts of any potential conflict, but all implementing partners will need to ensure that their safety and security routines and procedures are adhered to rigidly
4. Community has poor capacity to deal with or adapt to climate change or environmental shocks	**Yes**	AEZ 1: adaptive capacity is reasonably high AEZ 2: adaptive capacity of communities to respond to growing climate change stresses and shocks is very low, with a narrow livelihoods base, minimal assets, and few resources at their disposal to support diversification and alternatives.	AEZ 2: the WASH Consortium programme will need to ensure that in its awareness building and capacity development components include material that will ensure communities increase their capacity to adapt to shocks and stresses
5. Programme dependent on specific climatic condition (agriculture, aquaculture)	**No**		
6. Climate sensitive policies / laws / regulations result in social / development impacts	**No**		

2. Impact of Intervention on Climate Change and/or Environment			
2.1 Positive Benefits	**Yes / No**	**Detail**	**Measures to realize potential benefits**
1. Increases mitigation capacity	**No**		
2. Reduces CO_2 emissions	**No**		
3. Provides opportunity for low-carbon development	**No**		
4. Depends on natural resource use for its success	**No**		
5. Opportunity for improved environmental management	**No**		
6. Opportunity to contribute to MDG 7 (Sust Development)	**No**		
7. Opportunity for co-financing of environmental management	**No**		
2.2 Negative impacts	**Yes / No**	**Detail**	**Measures to mitigate or manage risks**
1. Increases CO_2 emissions	**No**		
2. Decreases mitigation capacity	**No**		
3. Does not support low-carbon development	**No**		
4. Depends on natural resource use for implementation / success	**Yes**	AEZs 1 and 2: improved water points and latrines all require use of biomass for fencing and protective structures. This leads to deforestation.	AEZs 1 and 2: WASH interventions will need to calculate carefully the amount of biomass required to construct necessary protective structures, and seek ways of minimising use of biomass.

2.2 Negative impacts	Yes / No	Detail	Measures to mitigate or manage risks
5. In a climate change or environmentally sensitive area	**Yes**	AEZ 1: not climate sensitive, but is in an environmentally sensitive riverine area with much surface water and high potential for water pollution	AEZ 1: Every effort will need to be made when implementing WASH interventions in this AEZ owing to the potential for polluting waterways which are always at - or close to - the surface
6. Risks causing direct and significant negative impact on environment	**Yes**	AEZ 1: there are strong potential risks associated in particular with the location and design of latrines, which are a fundamental and integral part of the WASH interventions AEZ 2: some limited risks of impact of WASH interventions on environment, in particular where water tables are higher	AEZ 1: the design and implementation of WASH interventions especially sanitation will need to be addressed and take potential pollution into careful consideration with appropriate designs that will minimize environmental risks AEZ 2: risks are minimal, but nonetheless latrine interventions must take care to ensure a minimum of 1.5 metres between the bottom of the latrine and the water table

3. Impact of Intervention on Vulnerable Communities			
3.1 Positive Benefits	**Yes / No**	**Detail**	**Measures to mitigate or manage risks / realize potential benefits**
1. Opportunity to reduce the vulnerability of communities to climate change	**Yes**	AEZ 2: communities in this AEZ are especially vulnerable, being subjected to climate change impacts especially reduced rainfall, and having very few assets and resources to support adaptation	AEZ 2: this can be reduced by building adaptive capacity, by implementing climate resilient interventions, and by encouraging links with livelihoods programmes to promote livelihoods diversification
2. Opportunity to build the capacity of communities to adapt to climate change	**Yes**	AEZs 1 and 2: capacity of communities to adapt to climate change can be increased through a programme of awareness building and capacity development	AEZs 1 and 2: the WASH programme will need to build in climate and environment elements into all its awareness and capacity building components, through the 12-Step process and all training components
3. Opportunity to build the resilience of communities to climate change	**Yes**	AEZs 1 and 2: resilience of communities can be built through use of WASH interventions that increase communities ability to respond to climate change stresses and shocks	AEZs 1 and 2: All WASH interventions will need to be climate resilient, and through these to support the process of building resilience of communities to climate change
4. Opportunity to mitigate climate change impacts for a community	**No**		
3.2 Negative impacts	**Yes / No**	**Detail**	**Measures to mitigate or manage risks / realize potential benefits**
1. Reduces adaptive capacity of a community to climate change	**No**		
2. Reduces resilience of a community to climate change	**No**		
3. Increases vulnerability of communities to climate change	**No**		
4. Reduces capacity of a community to mitigate climate change	**No**		