Appendix 1

Questionnaire

Assessment of the impact of climate change on MDG Target 7c

1. Introduction

Thank you for participating in the survey.

This survey is part of a larger project to assess the impact of climate change on the Millennium Development Goal Target 7c for drinking-water supply and sanitation. The project is being funded by the UK Department for International Development (DFID) and supported by WHO.

The questionnaire includes 54 questions divided between nine sections. It should take you less than 30 minutes to complete.

Several of the sections include a brief introduction that describes the purpose of the section and the types of information that we are trying to collect. This should help you to frame your answers to these questions.

You may find some questions are not relevant to your experience or the area in which you are working; you can leave these blank as the questionnaire does not require that you complete all sections.

The information that you provide in the questionnaire will be compiled into a report that will be presented to a meeting of climate and water and sanitation experts in October 2008. This meeting will identify the priorities for action based on the issues you have raised in the questionnaire and these will be published in a final report prepared by DFID and WHO.

Once again, thank you for participating in this survey.

2. Contact details

1. Contact Details

Name:

Organization:

Address:

Address 2:

City/ Town:

State:

ZIP/ Postal Code:

Country:

Email Address:

Phone Number:

2. Organization type: (please select one only)

jn Government jn Non-Governmental Organization jn Donor/International Agency jn Academic

Other (please specify)

3. Position:

4. Type of position: (please select one only)

jn Engineer jn Scientist jn Policy maker jn Field officer jn Water resource manager jn Water quality manager

jn Other (please specify)

5. Type of office within your organization? (please select one only)

jn Head office jn Regional office jn Country office jn Field office

6. Please indicate whether you would be willing for us to contact you at a later stage for further discussion and clarification. (please select one only)

jn Yes, please contact me by email jn Yes, please contact me by phone jn No, please don't contact me

3. Description of the relevant area

Please describe the area that you are answering this questionnaire for: please give the name, a brief description of the area and a brief characterisation of the climate of the area.

7. In what country or countries is the region you answering this questionnaire for?

8. Please give the name and a brief description of the area.

9. How would you describe the climate/ geography of the area? (select as many as are appropriate)

é mountainous é tropical é coastal

é polar é arid é inland

é temperate é Mediterranean

10. How many wet or rainy seasons do you experience annually in your area? (please select one only)

jn 1 jn 2 jn 3 jn 4 jn Not seasonal

11. How many years have you been working in this area? (please select one only)

jn < 1 jn 1 - 5 jn > 5

12. Has your national meteorological and hydrological service (NHMS) or equivalent regional organization issued an official statement on observed or predicted climate trends in your region? (please select one only)

	Yes	No	Don't know
Observed	jn	jn	jn
Predicted	jn	jn	jn

13. If so, what does this statement indicate about climate aspects: (please select one answer only per row)

	Increase	Decrease	Remain unchanged	Uncertain	No such statement issued
Observed rainfall	○	○	○	○	○
Predicted rainfall	○	○	○	○	○
Observed temperature	○	○	○	○	○
Predicted temperature	○	○	○	○	○
Observed frequency of extreme events (e.g. storms)	○	○	○	○	○
Predicted frequency of extreme events (e.g. storms)	○	○	○	○	○

Please name the organization making the statement:

4. Observations related to changes in weather patterns

14. Are you aware of changes that have already occured in the long-term annual rainfall patterns in the area defined in Section 3? (please select one only)

○ Yes ○ No

15. If yes, what are the changes to long-term annual rainfall that you are aware of? (please select one only per row)

	Increase	Decrease	Unchanged
Average annual rainfall	○	○	○
Rainfall intensity (mm per hour)	○	○	○

16. For the area defined in Section 3, has the rainy or wet season been getting: (please select one only)

○ Longer ○ Shorter ○ No change ○ Rainfall is not seasonal

17. Are your answers in this section based on: (select as many as are appropriate)

☐ Referenced report (if available, please add) ☐ Own perception

☐ Discussion with local community ☐ Monitoring data

☐ Other (please specify)

18. Are you changing your strategy for the implementation of drinking-water supply and sanitation options based on your awareness of changes in long-term annual rainfall? (please select one only per row)

	Yes	No
Drinking-water supply	○	○
Sanitation	○	○

19. Do you feel that there is adequate information relating to climate change predictions available for your area? (please select one only)

jn Yes jn No

If no, please specify what information you would like to receive

5. Year-to-year changes in drinking-water sources

These questions refer to the drinking-water sources in the area defined in Section 3. For each drinking-water source below, please indicate any year-to-year changes. Please give only one answer per row.

For each section under "Evidence" please give the reason for any noted change, an indication of the time scale if known, and the knowledge source. For example the source might include a referenced report, own perception, local knowledge, monitoring data, etc.

20. Groundwater

	Risen	Fallen	Stable	More variable	Unknown
Average groundwater level	jn	jn	jn	jn	jn

Evidence

21. Rivers

	Risen	Fallen	Stable	More variable	Unknown
Average levels	jn	jn	jn	jn	jn
Maximum levels	jn	jn	jn	jn	jn
Minimum levels	jn	jn	jn	jn	jn
Frequency of flooding	jn	jn	jn	jn	jn
Frequency of droughts	jn	jn	jn	jn	jn

Evidence

22. Lakes

	Risen	Fallen	Stable	More variable	Unknown
Average levels	jn	jn	jn	jn	jn

Evidence

23. Rainwater

	Increased	Decreased	More variable	Remained stable	Unknown
Availability	jn	jn	jn	jn	jn

Evidence

24. Quality of drinking-water source

	Improved	Deteriorated	More variable	No change	Unknown
Groundwater	○	○	○	○	○
Rivers	○	○	○	○	○
Lakes	○	○	○	○	○
Rainwater	○	○	○	○	○

Evidence

25. Please use this box to provide further details of evidence

6. Climate predictions

These questions refers to any climate predictions for the area defined in Section 3. Please identify what impact the predicted changes in climate might have on components of water resources in the area? Please give the reason for any noted change, and the knowledge source in the box provided at the bottom of the page if different from the NHMS statement in Question 12. For example the source might include a referenced report, own perception, local knowledge, monitoring data, etc.

Please select only one answer per row.

26. Climate predictions - hydrology

	Increase	Decrease	More variable	No change	Unknown
Run-off	○	○	○	○	○
Groundwater recharge	○	○	○	○	○
Floods	○	○	○	○	○
Storms	○	○	○	○	○
Droughts	○	○	○	○	○
Sea level	○	○	○	○	○
Other extreme events (please specify)	○	○	○	○	○

Other extreme events:

27. Climate predictions - water quality

	Improve	Deteriorate	More variable	No change	Unknown
Surface water quality	○	○	○	○	○
Groundwater quality	○	○	○	○	○

28. Please use this box to provide details of evidence for climate predictions if different from NHMS statement detailed in Section 3

7. Drinking-water and sanitation options

Which of the following drinking-water and sanitation options are in use in the area defined in Section 3? Please rank these (where 1 is the dominant source in use and 10 is the least used option).

Assessment of the impact of climate change on MDG Target 7c

Please interpret 'dominant' as referring to the option which serves the greatest number of people.

Only one answer per row and per column.

29. For URBAN areas, please rank the following drinking-water sources in use from 1-10.

	1 - Most common	2	3	4	5	6	7	8	9	10 - Least common	N/A
Piped water supply											
Public standpipes											
Borehole											
Protected dug well											
Protected spring											
Unprotected well											
Unprotected spring											
Untreated surface water											
Rainwater											
Other (please specify at end of section)											

30. For RURAL areas, please rank the following drinking-water sources in use from 1-10.

	1 - Most common	2	3	4	5	6	7	8	9	10 - Least common	N/A
Piped water supply											
Public standpipes											
Borehole											
Protected dug well											
Protected spring											
Unprotected well											
Unprotected spring											
Untreated surface water											
Rainwater											
Other (please specify)											

31. For URBAN areas, please rank the following sanitation options in use from 1-9.

	1 - Most common	2	3	4	5	6	7	8	9 - Least common	N/A
Connection to a public sewer	○	○	○	○	○	○	○	○	○	○
Pour-flush latrine	○	○	○	○	○	○	○	○	○	○
Connection to a septic system	○	○	○	○	○	○	○	○	○	○
Ventilated improved pit latrine	○	○	○	○	○	○	○	○	○	○
Service or bucket latrines	○	○	○	○	○	○	○	○	○	○
Public latrines	○	○	○	○	○	○	○	○	○	○
Open latrines	○	○	○	○	○	○	○	○	○	○
Open defaecation	○	○	○	○	○	○	○	○	○	○
Other (please specify)	○	○	○	○	○	○	○	○	○	○

32. For RURAL areas, please rank the following sanitation options in use from 1-9.

	1 - Most common	2	3	4	5	6	7	8	9 - Least common	N/A
Connection to a public sewer	○	○	○	○	○	○	○	○	○	○
Pour-flush latrine	○	○	○	○	○	○	○	○	○	○
Connection to a septic system	○	○	○	○	○	○	○	○	○	○
Ventilated improved pit latrine	○	○	○	○	○	○	○	○	○	○
Service or bucket latrines	○	○	○	○	○	○	○	○	○	○
Public latrines	○	○	○	○	○	○	○	○	○	○
Open latrines	○	○	○	○	○	○	○	○	○	○
Open defaecation	○	○	○	○	○	○	○	○	○	○
Other (please specify)	○	○	○	○	○	○	○	○	○	○

33. Please use this box to provide information of other drinking-water supply and sanitation options used in your area, and their prevalence.

8. Vulnerability and reliability (in terms of quality and quantity) of the opt...

Please indicate where there have been any failures of the water supply or sanitation options in the past two years.

34. Have you experienced any failures in the drinking-water supply options over the past two years? (please select one only per row)

	Yes, commonly	Yes, intermittently	Yes, rarely	No	Not applicable
Piped water supply	○	○	○	○	○
Public standpipes	○	○	○	○	○
Borehole	○	○	○	○	○
Protected dug well	○	○	○	○	○
Protected spring	○	○	○	○	○
Unprotected well	○	○	○	○	○
Unprotected spring	○	○	○	○	○
Untreated surface water	○	○	○	○	○
Rainwater	○	○	○	○	○
Other (please specify)	○	○	○	○	○

Other (please specify)

35. If yes, what were the circumstances around the failure(s) of the drinking-water supply options? (eg technology failure, pollution event, climatic event..etc)

36. Have you experienced any failures in the sanitation options over the past two years? (please select one only per row)

	Yes, commonly	Yes, intermittently	Yes, rarely	No	Not applicable
Connection to a public sewer	○	○	○	○	○
Connection to a septic system	○	○	○	○	○
Pour-flush latrine	○	○	○	○	○
Ventilated improved pit latrine	○	○	○	○	○
Public latrines	○	○	○	○	○
Open latrines	○	○	○	○	○
Other (please specify)	○	○	○	○	○

Other (please specify)

37. If yes, what were the circumstances around the failure(s) of the sanitation options? (eg technology failure, climatic event..etc)

38. In your opinion, if climate change is predicted to result in a significant *increase in rainfall* for the area defined in Section 3, how would that affect the vulnerability to failure of the drinking-water supply options? (please select one only per row)

	Increased vulnerability	Decreased vulnerability	No change
Piped water supply	○	○	○
Public standpipes	○	○	○
Borehole	○	○	○
Protected dug well	○	○	○
Protected spring	○	○	○
Unprotected well	○	○	○
Unprotected spring	○	○	○
Untreated surface water	○	○	○
Rainwater	○	○	○

Please provide information on the key problems or benefits that you foresee

39. In your opinion, if climate change is predicted to result in a significant *decrease in rainfall* for the area defined in Section 3, how would that affect the vulnerability to failure of the drinking-water supply options? (please select one only per row)

	Increased vulnerability	Decreased vulnerability	No change
Piped water supply	○	○	○
Public standpipes	○	○	○
Borehole	○	○	○
Protected dug well	○	○	○
Protected spring	○	○	○
Unprotected well	○	○	○
Unprotected spring	○	○	○
Untreated surface water	○	○	○
Rainwater	○	○	○

Please provide information on the key problems or benefits that you foresee

40. In your opinion, if climate change is predicted to result in a significant *increase in the frequency and severity of storms* for the area defined in Section 3, how would that affect the vulnerability to failure of the drinking-water supply options? (please select one only per row)

	Increased vulnerability	Decreased vulnerability	No change
Piped water supply	○	○	○
Public standpipes	○	○	○
Borehole	○	○	○
Protected dug well	○	○	○
Protected spring	○	○	○
Unprotected well	○	○	○
Unprotected spring	○	○	○
Untreated surface water	○	○	○
Rainwater	○	○	○

Please provide information on the key problems or benefits that you foresee

41. In your opinion, if climate change is predicted to result in a significant *increase in rainfall* for the area defined in Section 3, how would that affect the vulnerability to failure of the sanitation options? (please select one only per row)

	Increased vulnerability	Decreased vulnerability	No change
Connection to a public sewer	○	○	○
Pour-flush latrine	○	○	○
Connection to a septic system	○	○	○
Ventilated improved pit latrine	○	○	○
Service or bucket latrines	○	○	○
Public latrines	○	○	○
Open latrines	○	○	○
Open defaecation	○	○	○

Please provide information on the key problems or benefits that you foresee

Assessment of the impact of climate change on MDG Target 7c

42. In your opinion, if climate change is predicted to result in a significant *decrease in rainfall* for the area defined in Section 3, how would that affect the vulnerability to failure of the sanitation options? (please select one only per row)

	Increased vulnerability	Decreased vulnerability	No change
Connection to a public sewer	○	○	○
Pour-flush latrine	○	○	○
Connection to a septic system	○	○	○
Ventilated improved pit latrine	○	○	○
Service or bucket latrines	○	○	○
Public latrines	○	○	○
Open latrines	○	○	○
Open defaecation	○	○	○

Please provide information on the key problems or benefits that you foresee

43. In your opinion, if climate change is predicted to result in a significant *increase in the frequency and severity of storms* for the area defined in Section 3, how would that affect the vulnerability to failure of the sanitation options? (please select one only per row)

	Increased vulnerability	Decreased vulnerability	No change
Connection to a public sewer	○	○	○
Pour-flush latrine	○	○	○
Connection to a septic system	○	○	○
Ventilated improved pit latrine	○	○	○
Service or bucket latrines	○	○	○
Public latrines	○	○	○
Open latrines	○	○	○
Open defaecation	○	○	○

Please provide information on the key problems or benefits that you foresee

9. Changing drinking-water supply and sanitation options

This section refers to the drinking-water supply and sanitation options selected in Section 7. Are these changing, or likely to change in the near future?

44. How is the use of drinking water-supply options changing? (please select one only per row)

	Increasing use	Decreasing use	No change
Piped water supply	○	○	○
Public standpipes	○	○	○
Borehole	○	○	○
Protected dug well	○	○	○
Protected spring	○	○	○
Unprotected well	○	○	○
Unprotected spring	○	○	○
Untreated surface water	○	○	○
Rainwater	○	○	○

45. What are the drivers behind the changes in use of drinking-water supplies? (if there is more than one, please rank according to importance, with 1 being the most important driver)

	1 - Most important	2	3	4	5	6	7	8	9 - Least important
Economy	○	○	○	○	○	○	○	○	○
Ease of use	○	○	○	○	○	○	○	○	○
Climate change	○	○	○	○	○	○	○	○	○
Improved technology	○	○	○	○	○	○	○	○	○
Community preferences	○	○	○	○	○	○	○	○	○
Risk assessments	○	○	○	○	○	○	○	○	○
Government policy/legislation	○	○	○	○	○	○	○	○	○
NGO policy	○	○	○	○	○	○	○	○	○
Other (please specify)	○	○	○	○	○	○	○	○	○

46. Is your answer for the previous two questions based on: (select as many as are appropriate)

☐ Referenced report (if available, please add) ☐ Discussion with local community ☐ Own perception ☐ Monitoring data

☐ Other (please specify)

47. How is the use of sanitation options changing? (please select one only per row)

	Increasing use	Decreasing use	No change
Connection to a public sewer	j○	j○	j○
Pour-flush latrine	j○	j○	j○
Connection to a septic system	j○	j○	j○
Ventilated improved pit latrine	j○	j○	j○
Service or bucket latrines	j○	j○	j○
Public latrines	j○	j○	j○
Open latrines	j○	j○	j○
Open defaecation	j○	j○	j○

48. What are the drivers behind the changes in use of the sanitation options? (if there is more than one, please rank according to importance, with 1 being the most important driver)

	1 - Most important	2	3	4	5	6	7	8	9 - Least important
Economy	j○	j○	j○	j○	j○	j○	j○	j○	j○
Ease of use	j○	j○	j○	j○	j○	j○	j○	j○	j○
Climate change	j○	j○	j○	j○	j○	j○	j○	j○	j○
Improved technology	j○	j○	j○	j○	j○	j○	j○	j○	j○
Community preferences	j○	j○	j○	j○	j○	j○	j○	j○	j○
Risk assessments	j○	j○	j○	j○	j○	j○	j○	j○	j○
Government policy/legislation	j○	j○	j○	j○	j○	j○	j○	j○	j○
NGO policy	j○	j○	j○	j○	j○	j○	j○	j○	j○
Other (please specify)	j○	j○	j○	j○	j○	j○	j○	j○	j○

49. Is your answer for the previous two questions based on: (select as many as are appropriate)

é Referenced report (if available, please add) é Discussion with local community é Own perception é Monitoring data

é Other (please specify)

10. Policy issues

This section relates to government, NGO and other policies in place or in draft that relate to the implementation of drinking-water supply and sanitation options.

50. For drinking-water supply options, are the relevant policies (please select as many as relevant):

	Adequate for present climate conditions	Adequate for predicted climate conditions	Inadequate for present climate conditions	Inadequate for predicted climate conditions	Don't know	No policy
Government policy	¢	¢	¢	¢	¢	¢
NGO policy	¢	¢	¢	¢	¢	¢
Other policy	¢	¢	¢	¢	¢	¢

51. For sanitation options, are the relevant policies (please select as many as relevant):

	Adequate for present climate conditions	Adequate for predicted climate conditions	Inadequate for present climate conditions	Inadequate for predicted climate conditions	Don't know	No policy
Government policy	¢	¢	¢	¢	¢	¢
NGO policy	¢	¢	¢	¢	¢	¢
Other policy	¢	¢	¢	¢	¢	¢

52. For the area defined in Section 3, are you aware of any policies (governmental, NGO or other) in place or in draft that deal with issues surrounding potential climate changes and drinking-water and sanitation options?

jn Yes jn No

If Yes, please give details

53. Are you aware of any planned changes to policy in the area of drinking-water supply and sanitation in response to climate change: (only one answer per row)

	Has been reviewed	Under review	Planned review	No review	Don't know
Drinking-water supply	jn	jn	jn	jn	jn
Sanitation	jn	jn	jn	jn	jn

54. Give your view as to how policies are being implemented in the area defined in Section 3 with respect to drinking-water supply and sanitation to address climate change. Please specify whether these are government, NGO or other policies.