DEVELOPMENT WORKSHOP
Desenvolvimento Comunitário
Human Settlements & Development

CP3360 · Luanda · ANGOLA
Rua Rei Katyavala 113 · Luanda
Tel: (244 222) 448366 / 71 / 77 Fax: 449494
Email: devworks@angonet.org
www.dw.angonet.org

WATER RESOURCE MANAGEMENT UNDER CHANGING CLIMATE IN ANGOLA'S COASTAL SETTLEMENTS

IDRC PROJECT NUMBER: 107025

1ST PROGRESS REPORT

OCTOBER 2012 TO MARCH 2013

DEVELOPMENT WORKSHOP ANGOLA

Luanda - 30 April 2013

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1. SYNTHESIS

The overall objective of the proposed project is to strengthen Angola's efforts in climate change adaptation by developing tools and providing information that address information gaps about rainfall patterns and hydrology and their likely impact on environmental risks and water-supply issues in Angola's coastal urban areas.

The specific objectives are to:-

1 Reconstruct lost data so as to improve knowledge about rainfall patterns and hydrology in coastal areas of Angola and develop a framework for future continuous data collection and analysis
2 Improve information about settlement patterns and population in three of Angola's urban coastal areas, and assess the risks, impact and vulnerability from flooding and erosion at present and under future climate scenarios, especially for vulnerable social groups
3 To promote the improvement of water access in Angola's urban coastal areas, assess the impact of climate change on water supply issues, especially for vulnerable social groups, and develop options for better water management mechanisms for these areas.

These objectives contribute to Angola's efforts to begin to address some of the serious issues related to adaptation to climate change. Angola's water resources will be increasingly important in the southern Africa region (which, according to climate model projections, is likely to become drier). Angola has urbanised rapidly and with little coherent urban planning. There have been a number of recent flooding events in urban areas of Angola that have drawn attention to the issue of environmental risks and to the fact that cities have developed and grown without taking these risks into account.

However Angola only achieved peace in 2002 and has been late beginning to address such long-term issues. The period in which significant meteorological and hydrological records were collected is short: 1940 to 1975 for meteorological records and 1960 to 1975 for hydrological records. Limited information is available on the vulnerability of coastal cities, on rainfall variability and trends, on river flows and on areas at risk (now and in the future). Similarly limited demographic and socio-economic information is available. However new institutions have been set up to improve information and analysis in these areas and to improve civil protection against disasters. Improved information on rainfall and new data collection methods will be a contribution to the lack of information for modelling and planning. Assessment of the impact on water supply and environmental risks in urban areas will provide a good entry point for practical adaptation planning in the short to medium term.

The planned activities in the first six-month period involved establishing relations with relevant institutions, collecting and archiving existing information, and preparing for field-work in the next six-month period.

2. RESEARCH PROBLEM

The growth of coastal cities in areas which usually have a low rainfall implies constraints on water supply for these settlements. Urban coastal settlements in Angola are supplied through urban water distribution systems with inadequate quantities of low quality water. The functioning of these water systems is incompletely understood, as are the constraints on supply and how these could be overcome. The expansion of coastal cities means that the population has grown in areas with a low but very variable rainfall.

Planning of water management infrastructure requires climate and hydrological information that is lacking, even though water investments should be designed to perform under future climate regimes as well as present-day ones. The lack of data for many areas of Angola during the period since 1975 also creates uncertainties for international scientific research and climate change modelling. The supply of urban services to coastal urban areas has not grown in line with the growth in population for almost all the cities. Most urban water and sanitation infrastructure is immobile and long lasting, making rapid shifts in urban location very costly.

Similarly hydrological information for Angola is scarce. With significant geographical and historical gaps in the rainfall record, it is difficult to assess whether a heavy storm or an extreme drought is part of normal variability or part of a trend.The pace at which mapping of river basins and collection of information on stream flows is developing is too slow to meet the demands of the fast growing coastal cities. The limited hydrological monitoring network which had been set up in Angola before 1975 was disrupted by the lack of staff and by conflict from 1975 onwards and it has only been since 2002 that this work has been effectively re-established (DNA, 2005).

Floods have been experienced in recent years in many Angolan urban areas as settlements have developed in an unplanned manner and then unusually high rainfall has flooded these areas. Limited information is available on population and land-use in coastal cities and on the vulnerability of these coastal cities and how they may be affected by climatic hazards. This has been identified as a priority area for developing adaptive capacity in Angola, as it is an actual problem which could become more serious with a changing climate.

3. RESEARCH FINDINGS

3.1. Improve Knowledge on Rainfall Patterns and Hydrology in Coastal Areas

3.1.1. Obtaining and Digitalisation of Existing Rainfall Data

Historical rainfall data from 50 stations in Angola has been obtained and put into a digital database in Access. The database is being further developed as a tool that might be of use in future for partner organisations, as it could contain (with further development) a unique record of monthly rainfall data in Angola and be programmed to easily add data when available and to provide monthly, seasonal and annual parameters simply. This has used an existing digitalised database obtained from Namibia, which was used for analysis of rainfall patterns in Namibia in 1999, but which does not include stations in the north of Angola. Scans of the published records have been obtained from the NOAA website and from the UK Meteorological Office, and these have been used to check and correct the data in the existing database and to fill in gaps in the database. Scans of published records have also been used to create digitalised records for stations in the north of Angola.

The process of setting up meteorological stations in Angola in the early 20th century was very slow, and it was only in about 1940 that a real effort was made to improve coverage of all areas of Angola and to ensure a continuous record at meteorological stations (reducing the number of gaps in records at any particular station). Up to that date Angola had considerably fewer stations recording rainfall than neighbouring countries and other Portuguese colonies: in 1935 Angola was listed as having 23 stations recording rainfall while Mozambique had 66. The supervision of the collection of rainfall data was poor up until the 1940s (as is admitted in

contemporary reports) and there are a considerable number of gaps in the records.[1] The network of stations collecting rainfall data ceased to function in 1975 and there is still not a fully functioning network of stations throughout the country. There is thus only a period of about 30 years (between the early 1940s and 1975) for which there are reasonable rainfall records.

The 50 stations that have been selected are throughout Angola though with a bias towards coastal areas of Angola, which is the focus of the project and because there tend to be longer records for areas closer to the coast. Stations have been chosen on the basis of the completeness of the record at that station, coverage of various areas of the country and inclusion in previous analyses (to allow comparison)[2].

There is only a complete rainfall record for Luanda (where data is available since 1880 save for a one year gap). A number of other stations were set up in a few important cities on the coast and the central plateau in 1913, but after 3 to 5 years these ceased to function. Other stations were set up along the Benguela Railway soon after but, if they continued to collect data, this was not centralised and only a few years of data are available. No scans have as yet been located for the years 1920 to 1926, and the records for this period at the UK Meteorological Office are on crumbling paper. Thus the data pre-1940 for stations outside Luanda have significant gaps, so analysis can be challenging. It is, however, potentially an important database of the rainfall records of Angola.

3.1.2. Calculation, Mapping and Graphing of Means and Variations of Existing Rainfall Data

A process has been set up to analyse the database of rainfall records, taking into account the large number of gaps in the records. This process is being used to calculate monthly, seasonal and annual parameters. The main indicators being calculated are:

- Mean
- Median
- Difference between mean and median as a percentage of the median

[1] Although meteorological observations began a long time ago in Angola it is clear that, in the majority of cases, these were carried out in precarious conditions for a long time in terms of continuity, the installation of equipment and the care taken in observations. This state of affairs continued longer than it should have and, even today … we cannot say that the problems have been completely overcome. The long travel distances and other difficulties of communication with many points in Angola make it difficult to supervise the work of many posts, and make it impossible to provide continuous assistance during a reasonable period so as to perfect the work of personnel at stations and posts that belong to entities outside the Meteorological Services. … This can be seen when we examine the periods of availability of useful data at each station. (Serviço Meteorológico de Angola. “O clima de Angola”. Luanda, 1955)

[2] Such as Serviço Meteorológico de Angola “O clima de Angola”, Luanda (1955).

Also Dr Dário X Queiroz “A variabilidade das chuvas em Angola”, as Serviço Meteorológico de Angola, Luanda (1955)

- 25th percentiles
- 75th percentiles
- Coefficient of variation
- Seasonal rainfall as a percentage of annual rainfall.

A working paper is being prepared. This will pay particular attention to the indicators of variability because little work has been done on the variability of rainfall in Angola since the work of Queiroz in 1955 and because it is the variability of rainfall that is an important factor linked in flooding. The preliminary results indicate that rainfall is low along the coast but that variability from one year of rainfall to another is high along the coast of Angola (and significantly lower inland). Variability increases from north to south along the coast. It is interesting to note that there are places a few kilometres inland where rainfall is significantly higher than along the coast but where variability is also high. This suggests that occasional very heavy rainfall a short distance inland may be linked to episodes of flooding in the coastal river basins.

A preliminary analysis has been carried out of the patterns of year to year variation of rainfall.

3.1.3. Obtaining of Satellite-based Measures of Cloud Cover and Precipitation for Recent Years

Satellite-based estimates of decadal, monthly and annual rainfall per 8x8 kilometre cell for the whole country have been obtained, covering the years 1996 - 2012. This is being used to create a database of monthly, seasonal and annual rainfall totals for the same 50 locations that have been chosen for historic rainfall data (as in section 1.2). A preliminary analysis of the data indicates that there may be particular difficulties in using satellite-based measures for estimating rainfall in coastal areas of Angola. This may be because this method infers rainfall measures from cloud cover and cloud temperatures: the coast of Angola has almost continuous cloud cover throughout the year but very low rainfall. These difficulties are being investigated.

3.1.4. Rainfall Means and Variability Mapping from Satellite-based Measures of Cloud Cover and Precipitation

The same indicators are being calculated from these data as from historic rainfall data and analysis of annual variations will proceed when fit of satellite-based measures with historic data has been checked.

3.1.5. Collection of Written Records of Notable Water and other Climate Related Activities

Information has been extracted from paper documents held by Development Workshop from the post-Independence period (newspapers, emergency bulletins, food security bulletins). These cover the period from the mid-1980s to recent years, and have qualitative information about droughts and floods in Angola. More recent information from local newspapers, held as scanned information, has also been extracted. This can be used to pinpoint significant events and, although these newspapers and bulletins do not provide exact information about these events (often being vague about the exact location or importance of an event) they provide a starting point for investigation through other methods.

3.1.6. Collection of Oral Histories from Key Informants of Notable Water and other Climate Related Activities

Field trips to Cabinda and Benguela-Lobito were made in February and March 2013. The location of areas of environmental risk was identified, in the cities and in the surrounding areas and along the rivers that affect those cities. Key informants were interviewed about the nature of the risks in these areas.

A case study of the flooding in Cacuaco (Luanda) in January 2007 has been carried out using oral histories and is being written up. (There was a very heavy rain storm in Luanda in late January 2007, which caused serious disruption. Some houses in Cacuaco were washed away and there were changes to the course of a river and the coast.) This is based on interviews with local residents who witnessed the flooding. Images from Google Earth before and after the flooding are also being examined to cross-check information. Case studies of this type show that local people have clearer information than is contained in press reports or official reports, and that this can assist analysis of the factors contributing to environmental risks.

3.1.7. Creation of a Database of Notable Water and other Climate Related Activities

A database template has been prepared. Information that has been collected is being inputted into a database of each year. The database shows the type of event (flooding, drought, river or flood erosion, sea erosion from high seas), the date, the location and the source of information. This is on-going as more information becomes available.

3.1.8. Correlations of Events from Annual Variations and Notable Events to ENSO and Fluctuations in the Benguela Current.

A working paper is being prepared to outline the hypotheses and existing information.

A literature review has shown that most areas of Angola are unlikely to be affected by ENSO, though it is possible that the south-east of Angola (which is distant from the coastal areas) may have come into the area affected by ENSO. Analysis of the rainfall patterns from satellite-based data for recent years (and from the local newspapers, emergency bulletins, food security bulletins) should show whether this is the case.

A literature review has shown that the years of high sea temperatures (and high rainfall) along the coast of Angola are different from years of high sea temperatures (and high rainfall) along the coast of Namibia. A preliminary analysis of the historic rainfall records for coastal areas of Angola shows that there is a clear pattern of high rainfall and low rainfall years for coastal areas of Angola (and that this pattern does not apply in inland areas of the country). The analysis confirms the pattern in previous literature (from the 1980s) about coastal rainfall patterns in Angola and confirms that the pattern in Angola is different from the pattern in Namibia (though in recent years that have been some years in which high rainfall in coastal Angola coincided with high rainfall in coastal Namibia).

A more thorough analysis will be possible when there is more information in the database of notable events and from satellite-based measures of cloud cover and precipitation for recent years.

3.1.9. Obtaining of Existing Data on Vegetation, Geology and Flows of Relevant River Basins

The National Institute of Water Resources has a database that contains good quality digitalised records of river flows from the 1960–1975 period, and is making it available for use in this project.

During the field trips to Cabinda and Benguela-Lobito in February and March 2013 observations were made of the vegetation and soils of relevant river basins. Maps of soil and vegetation for Cabinda and Luanda are available, and maps for Benguela/Lobito are being sought.

3.2. Production and Dissemination of Information about Settlement Patterns, Population Densities and Water Resource Management Relative to Policy, Socioeconomic and Climatic Dynamics

3.2.1. Obtaining of Satellite Images of Relevant Research Areas

Satellite images of all the relevant urban areas have been obtained or commissioned. An order has been placed for a 2013 update of the images for Luanda, to be taken at the beginning of the dry season in May or June when there is less risk of cloud cover, and this will be available later in the year; however the images presently available are suitable for beginning household surveys. For Cabinda and Benguela/Lobito, images from 2012 have been purchased.

3.2.2. Delimitation and Housing Typology Mapping from Satellite Images

It was planned that satellite images, coupled with information from on-site observations and interviews with key informants would be used to delimit zones of the relevant research areas with similar dates of construction and social characteristics to determine their housing and neighbourhood typologies. This is being updated for Luanda. In the case of the other cities, satellite images are now available and field visits have been made; the delimitation of zones in these areas using remote sensing techniques is now well advanced.

Mapping of rooftops on the satellite images to make a count of the number of structures in each delimited zone (to be then used in conjunction with data on number of people per structure to calculate population numbers and densities of an area) is another major activity that was planned in this regard. Rooftops on the satellite images have been identified and marked. Counting of rooftops per area will commence as soon as the delimitation of zones has been completed. This will allow us to determine housing densities in each settlement typology and assist us to produce quantifiable assessments of the geographical information.

3.2.3. Household Surveys on Relevant Variables

A questionnaire for the household surveys has been designed and tested. A decision has been taken to use hand-held electronic devices (Android tablets) for administering the household surveys; this will reduce paper use and speed up considerably the process of transferring survey data to a database. This will then also allow more rapid checking of the quality of the data through examination of the database while it is under construction. The pre-loading of the questionnaire skip-pattern into the questionnaire on the devices simplifies the task of the interviewers in finding their way through the questionnaire in the field.

The hand-held devices have been acquired and they have been loaded with the program that allows loading of the questionnaire and transfer of the data to the database after data collection

(and subsequent download to XL, SPSS or Stata for data analysis). A server has been prepared for holding the databases. A consultant was hired for training in these processes and Development Workshop staff can now to carry them out on their own. The use of hand-held devices with the questionnaire has been tested in the field, checking the logic and the skip pattern as well as the ease of use of the tablets and the questionnaire. Preparations are being made for starting fieldwork in Luanda and Cabinda in the near future. The division of the urban areas into a typology of housing types is being used as the sample frame and points at which interviews should be carried out are being defined. Instructions for the processes to be followed are being prepared.

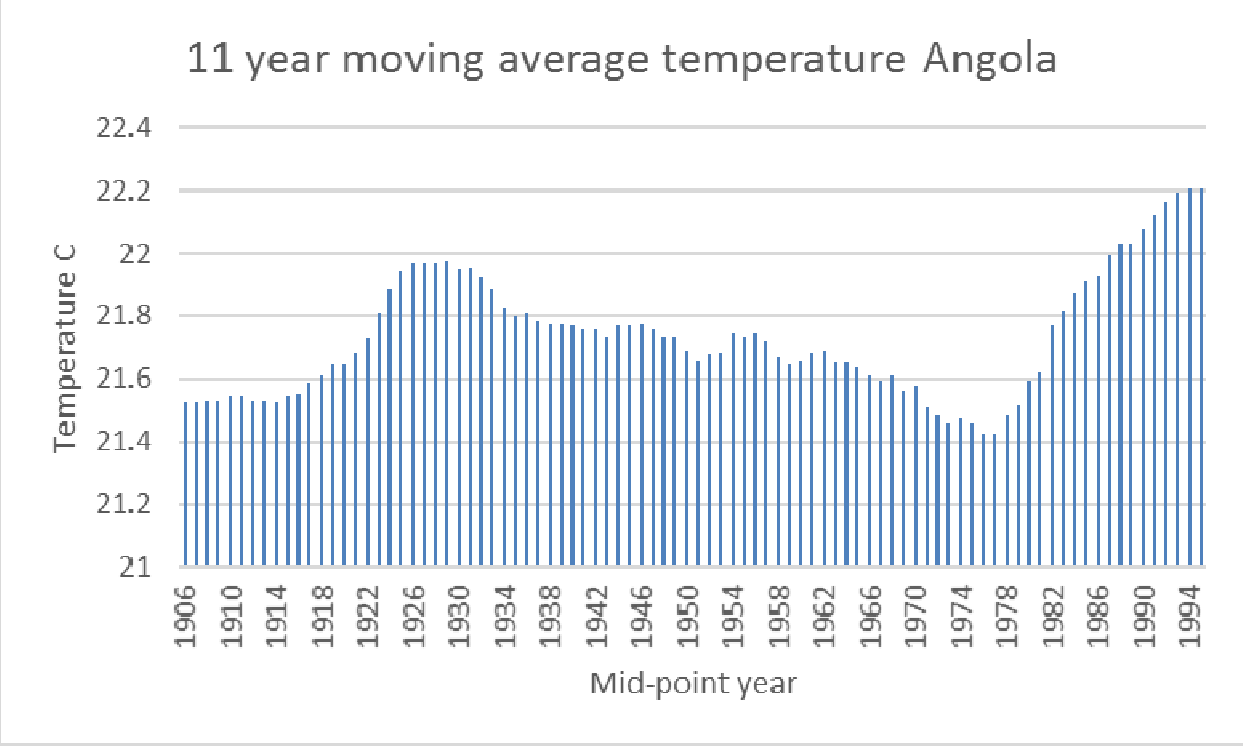
3.2.4. Household and Key Informant Surveys on Water and Associated Social Services

This survey was meant to provide information on the number of people per household, social indicators, land values, water access, use and prices. During preliminary field visits to Cabinda and Benguela/Lobito in February and March 2013 information was collected about primary water systems in those cities and the areas that they serve. A number of meetings were held with key informants were held in both regions to set out platforms for in-depth key informant interviews and household surveys on these variables in the next reporting periods.

In Luanda the collection of this information using household surveys and key informant interviews is underway. There is hope that some data from the first round of this survey will analysed by the end of the next reporting period (six months). A good amount of key informant interview data in this regard is also being compiled from which significant outputs will be produced

Temperature

The initial design of this research project did not focus much on temperature, although it is clear that temperature is directly related to cloud cover and rainfall. To give a general picture, the graph below shows the variation of annual average temperature for the whole of Angola as drawn from the World Bank's climate change portal. As indicated in several sections of this interim technical report, many meteorological stations have not been functional for more than 30 years. How these averages were arrived at is not stated. It can only be speculated that these may have resulted from the few that were functional over the respective years.



Source: *the World Bank climate change portal*

4. PROJECT IMPLEMENTATION AND MANAGEMENT

4.0. Progress Summary

The scope of the project remains unchanged and good progress has been made in the first six-month period. There has been no change in the approach or methodology, and examination of the available rainfall and hydrological data confirms the validity of the methodology of using field surveys, key informant interviews and oral histories to complement the patchy "hard data".

There is no reason to expect that the project will not be completed on time. In the first six-month period relations have been established with relevant institutions. Existing rainfall and data have been collected, databases are being created and the data are being examined. Preparing have been made for field-work in the next six-month period and field-work is ready to begin in Luanda and Cabinda. As yet there are no research findings or outputs, though preliminary analysis of the available data suggests how hypotheses might be refined.

In the next six-month period the main activities will be field-work in Luanda and Cabinda. Preparations will be made for field-work in Benguela and Lobito. Analysis of rainfall data will continue. It may be that the expected outputs from the field-work in Luanda in the second six-month period will be slightly delayed but there are expected to be outputs from the field-work in Cabinda and from analysis of rainfall data.

4.1. South-South Exchanges and Visiting Scholar Programme

A relationship has been developed with the Climate Systems Analysis Group at the University of Cape Town, and some Development Workshop staff will be attending the winter school in July 2013 (http://www.csag.uct.ac.za/winterschool/). CSAG are interested in daily meteorological data for any station in Angola for a recent 10 year continuous period as an input to modelling, and Development Workshop is seeking this data. This is not yet available centrally from INAMET (the Angolan meteorological service) and is being sought at individual stations. Development Workshop has obtained data from Chianga Agricultural Station near Huambo (Huambo Province, central highlands of Angola) and has made it available to CSAG, who are evaluating the data and transforming it into a standard format and will advise the team on future data collection and formatting.

4.2. Consolidation of Relationships with Relevant Government and Civil Society Institutions

A good relationship has been developed with the Ministry of the Environment (Ministério do Ambiente), and in particular with the National Environment Directorate (Direcção Nacional do Ambiente) and the climate change staff in that Directorate.

A good relationship has also been developed with the National Water Department (Direcção Nacional de Águas- DNA), which is responsible for domestic and industrial water supply throughout the country, and with the National Institute of Water Resources (Instituto Nacional de Recursos Hídricos), which is responsible for river basins and their management and use throughout the country.

In Cabinda meetings have been held and relationships established with Provincial Directorates for Water (Direção Provincial das Águas); Territorial Administration, Urbanism and Environment

(Direção Provincial de Ordenamento do Território, Urbanismo e Ambiente); Provincial Office for the Meteorological Institute (Gabinete provincial do INAMET); and the Provincial Division for the Fire Department (Comando Provinvcial da Proteção Civil) as well as with various civil society organizations that deal with issues of interest to the project. In Benguela contacts have been made with similar institutions but relations are yet to be built, although conversations on disaster and other data sharing with the Rapid Response Team of the Fire Department are quite advanced.

4.3. Relevant Media Scan and Information Mapping for Correlations

Information in the local media on environmental issues is being extracted and archived. A preliminary analysis of data is being done to capture information on records of sea surges, which shows which places are vulnerable to the effects of high tides and high waves (and when): this will be important for mapping of risks from higher sea levels at a later stage in the project. Information has also been extracted on incidents of flooding and erosion in urban areas. Results of this preliminary media scan analysis will be shared in the next reporting period.

We are studying which mapped information will be required and how this will be overlaid when later stages of the project are reached. Variables likely to be overlaid: measures of environmental risk (inundation, slope etc), socio-economic vulnerability (typology and poverty levels) and population density. A settlement typology matrix has been developed and is being projected using remote sensing, and on-the-ground truthing. Typologies are being developed for Luanda and Cabinda and first level mapping has begun for Benguela.

4.4. Financial Mobilisation

In the initial budget design it was foreseen that Development Workshop would need to mobilise a further US$ 200,000 in order to carry out the project as planned. It has become evident in the first reporting period of the project that this ambitious research project will require more financial resources than anticipated. The weak existing climatic data and the actual scale of the accelerating growth of Angolan coastal cities means that the project team needs to re-assess budget requirements. DW is therefore seeking a further $500,000 for the project. The Angolan Ministries of Environment and Water & Energy have committed to assist us in mobilizing additional resources for the project. Together with the Government and UNDP a submission is being prepared to the Global Environment Facility (GEF) and Climate Adaptation Fund. Explorations are also underway with several potential bilateral and corporate donors. The commitment from IDRC to support the project provides potential project financers with confidence in the quality and pertinence of the proposal and has opened doors for future support.

4.5. Budget Forecast Variance

All variances on expenditures from budget forecasts were deemed necessary and they will be balanced out in the subsequent reporting periods.

5. PROJECT OUTPUTS AND DISSEMINATION

A consultant was hired to train the core research team on designing electronic data collection instruments using the Open Data Kit (ODK) application which can be loaded on Android smart

phones and tablets for field data collection. These will in turn train the rest of the research and field data collection teams on the same. Three interns have been recruited and are part of the research team. They are participating in various project activities including rooftop counting for population modelling to constitute the sample frame in Bueguela, mapping of water and drainage channels and conducting primary interviews with people living in relevant research areas in Luanda and Cabinda whose results will be presented in the next report.

Achievement of Milestones

***Satellite images, rainfall data, vegetation, geology and hydrology data obtained*:**

Satellite images- Images for Cabinda and Benguela/Lobito have been obtained. Up-to-date Luanda images (2013) have been ordered and will be available shortly.

Rainfall data – historic data has been obtained for 50 stations and parameters calculated, though this may be updated as new data come in

Satellite data - The data available for Angola is from 1996 to 2012. This has been accessed. Downloading to a database is in progress and the data are being checked.

Vegetation and geology data for the Luanda and Cabinda areas has been obtained. More detailed data for Benguela and Lobito river basins is being obtained.

Hydrology data for 1960 to 1975 is available from the Institute of Water Resources.

***Relations with partner institutions outside Angola established*:**

A relationship has been developed with the Climate Systems Analysis Group at the University of Cape Town

***Relationships with national government and local government institutions established*:** A good relationship has been developed with the Ministry of the Environment (National Environment Directorate), National Water Department (Direcção Nacional de Águas- DNA), National Institute of Water Resources (Instituto Nacional de Recursos Hídricos). Good relations have been established with the relevant local institutions in Cabinda.

***Scanning the public, independent and community media being put in place*:**

Information in the local media on environmental issues is being extracted and copied, with a view to future analysis

***Zones of the urban area defined and delimited. Structures in each zone counted and mapping of current area and urban growth completed for Luanda*:**

Up-to-date images will be available later in 2013. Older images have been used to define and delimit zones for more than 95% of the city area. The definition of the new areas of the city will be completed as soon as new images become available. Meanwhile defining the urban areas of Cabinda, Benguela and Lobito is being carried out as recent images are available and growth of these cities appears to be slower.

	Months 1 – 6	Months 7 - 12	Months 13- 18	Months 19 - 24	Months 25- 30	Months 31 – 36
Preparation. Obtaining satellite images. Obtaining rainfall data Obtaining river flow and vegetation data	**XXXXXX**					
Rainfall and river-flow activities (specific objective 1)		XXXXXX	XXXXXX	XXXXXX		
Activities in Luanda (in specific objectives 2 and 3)	**XX**	XXXXXX				
Activities in Cabinda (in specific objectives 2 and 3)	**XX**	XXXX	XXXXXX	XX		
Activities in Benguela and Lobito (in specific objectives 2 and 3)	**XX**		XXXXXX	XXXXXX		
Finalisation of outputs and dissemination					XXXXXX	XXXXXX
End of project Evaluation					XX	XX

6. IMPACT

Influenced by the activities of this study, the National Directorate of Environment of Angola's Ministry of Environment is involving more para-statal and Non-state partners in the planning and implementation of environmental and climate related projects. DW is being consulted on planning for adaptation and resilience in Angola's Cuvelai Basin in Cunene province. The National Institute of Water Resources expressed concerns that there are low levels of data sharing habits and hoped that cooperation between the project and the institute will raise these levels increase the participation of University students in water related field research projects an enhance research partnerships with the various Universities in the country. Progress on this will be communicated in the next reports.

7. RECOMMENDATIONS

There are no recommendations to make in this report, in agreement with the statements in 4.0 above.

Appendix 1: Interim Technical Report Guidelines
(for CCW-supported projects)

As set out in its Prospectus, the goal of IDRC's Climate Change and Water (CCW) program is to support applied, policy relevant research to help people adapt to the water-related impacts of climate change. We are therefore interested to know how specific project results improve access to water for communities, increase adaptive capacity, and reduce risks to build resilience in the face of climate variability and change. We are also interested in how CCW-funded projects are using climate change adaptation research methods and engaging the end-users of research.

To complement the general research findings and results described in your Interim Technical Report, the following Annex asks targeted questions related to CCW's specific areas of interest. The questions may not all be applicable to your research project. Please answer, directly in this Word template, only those questions that are relevant to the project topic and objectives. Answers should reflect all project results to date and include concrete numbers or examples where possible.

Thank you for taking the time to complete these questions.

Questions for CCW-supported project teams:

Water quality, water availability, adaptive capacity, and risk

1. Within the scope of your project activities, have there been improvements in the quality and/or availability of water, especially for vulnerable communities? Have risks associated with climate change (e.g. flooding, drought, sea-level rise, storms, etc.) been reduced? If so, please describe how.

We just ended our first six-month reporting period in which we are not as yet able to assess and/or measure any improvements in the quality and/or availability of water or risks associated with climate change.

2. Has the project put in place strategies for building adaptive capacity of people and institutions? If so, please describe the strategies. (*Note: Building adaptive capacity implies that the project is improving the ability of people (through access to resources, such as financial, human, social and natural capital) to modify practices to cope with and manage the negative impacts of climate change.)*

This will be done after an assessment is made of the risks associated with climate change and other socioeconomic factors and will be reflected, earliest, in the third interim report.

3. Has the project identified barriers that are impeding the uptake of existing technologies and strategies for improving water resources management? If so, please describe these barriers.

The only barrier identified so far in this regard is the low reliability of internet connectivity leading to difficulties of programming and loading applications on mobile PDAs at times from researcher point of view. From the point of view of the target communities, oscillating internet

connectivity makes it difficult to view areas in which they live or others of their interest and/or concern on programs like Google earth and/or Google maps among other internet based research and technology products.

Climate change adaptation research methods

4. Are researchers involved in the project applying relevant social research methods (e.g. economic analysis, social vulnerability assessment, gender analysis, etc.) to improve water management in the context of climate change? Which methods are proving to be particularly valuable?

Insofar as data collection is concerned, a variety of social research methods are being used including social and environmental risk vulnerability assessment, economic analysis, gender analysis, population density estimate correlations, historical documented and oral discourse analysis, among others. However, it is not plausible to state which methods are proving to be particularly valuable until substantial data analysis is done.

5. Have researchers involved in this project been trained to use methods to conduct economic analysis? How are they applying these methods?

Economic analytical methods are integrated in the professional training of most of the researchers. However, a number of in-house training sessions have been conducted to enhance capacity building in, and promote, the uptake of technology in research and policy influencing. This is ongoing.

Engagement of research users and policy influence

6. How are researchers working with policy makers in the project? How has this changed since the start of the project (i.e. more or less interaction with policy makers)?

Currently there is some interaction between researchers and policy makers. The latter also show a lot of interest and willingness to collaborate and participate in the research and corresponding technology uptake including transfer of skills and data sharing among project researchers and relevant and interested public and private entities.

7. Have project team members improved their ability to communicate research results to diverse audiences? How?

Communication of research results is yet to happen after some satisfactory level of analysis of the data so far collected is reached.

8. Have any policy options been identified through the research? How have these policy options been validated and communicated to potential users or what plans are in place?

Given the fact that the research project is still at its initial stage, policy options are yet to be identified. As such it is immaterial to discuss their validation and communication to potential users at this stage.

Appendix 2: DRAFT HOUSEHOLD SURVEY QUESTIONNAIRE

CLIMATE CHANGE, FLOODING AND WATER SUPPLY

LUANDA, CABINDA, BENGUELA AND LOBITO

2013

29 de Dezembro 2012

A INFORMAÇÃO PRELIMINAR

A1 CIDADE

1 Luanda

2 Cabinda

3 Benguela

4 Lobito

A2 COORDENADAS DA CASA DO ENTREVISTADO

Long .....

Lat .....

A3 TIPO DE HABITAÇÃO .....

A4

NUMERO DO QUESTIONÁRIO				

A5

CÓDIGO DO INQUIRIDOR			

A6 MUNICÍPIO ……..

A7 COMUNA ……..

A8 BAIRRO ……..

A9 NO. DE PESSOAS NO AGREGADO

A10	NO. DE DIVISÕES DA CASA		
A11	O CHÃO DA HABITAÇÃO E DE ……. ?	1	Madeira ou taco
		2	Mármore
		3	Granulite
		4	Cimento
		5	Tijolo
		6	Adobe
		7	Terra batida
		8	Outros
A12	O MATERIAL DE CONSTRUÇÃO DA CASA É ..?	1	Tijolos
		2	Blocos
		3	Adobes
		4	Pau-a-pique
		5	Capim
		6	Chapa
		7	Madeira
		8	Outro
A13	QUE TIPO DE COMBUSTIVEL	1	Electricidade
	UTILIZA PRINCIPALMENTE PARA COZINHAR?	2	Gás
		3	Petróleo

		4	Carvão
		5	Lenha
		6	Bosta animal
		7	Restos de cultivo agric
		8	Outros
		9	Não cozinha
A14	OUTRO TIPO DE COMBUSTIVEL QUE UTILIZA PARA COZINHAR?	1	Electricidade
		2	Gás
		3	Petróleo
		4	Carvão
		5	Lenha
		6	Bosta animal
		7	Restos de cultivo agric
		8	Outros
		9	Não cozinha
A15	NO AGREGADO FAMILIAR TEM UMA VENTOINHA?	1	Sim
		2	Não
A16	NO AGREGADO FAMILIAR TEM UM TELEFONE (FIXO OU MÓVEL)?	1	Sim
		2	Não
A17	NO AGREGADO FAMILIAR TEM UM RÁDIO?	1	Sim
		2	Não
A18	NO AGREGADO FAMILIAR TEM UM TELEVISOR?	1	Sim
		2	Não

A19	NO AGREGADO FAMILIAR TEM UMA BICICLETA?	1	Sim
		2	Não
A20	NO AGREGADO FAMILIAR TEM UMA MOTORIZADA?	1	Sim
		2	Não
A21	NO AGREGADO FAMILIAR TEM UMA VIATURA?	1	Sim
		2	Não

……..……..

A22	QUANDO FOI A ULTIMA VEZ QUE	1	Hoje ou ontem
	UM MEMBRO DO AGREGADO FAMILIAR	2	Durante os últimos 7 dias
	LEU UM JORNAL?	3	Durante o último mês
		4	Durante o último ano
		5	Anteriormente
		6	Nunca

B ÁGUA GERAL

B1 PARA BEBER, O AGREGADO USA PRINCIPALMENTE ÁGUA DE

1 Torneira na residência ligada à rede

2 Torneira no prédio ou do vizinho

3 Tanque do vizinho

4 Chafariz public

5 Furo com bomba

6 Cacimba protegida

7 Cacimba desprotegida

8 Nascente protegida

9 Nascente desprotegida

10 Água de chuva, chimpacas

11 Charco, rio, riacho, lagoa

12 Cisterna de água

13 Agua mineral em garrafa

14 Outro ……..

B2 A AGUA E TRATADA DE ALGUEMA FORMA PARA FICAR MAIS SEGURA PARA BEBER ?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA B4

B3 QUE TIPO DE TRATAMENTO DA AGUA USA HABITUALMENTE ?

1 Fervura

2 Adicionar lixivia/cloro

3 Passar através dum tecido

4 Filtro de água (cerâmica, areia, compósito)

5 Disinfecção solar

6 Deixar pousar/repousar

7 Outro ……..

B4 PARA OS OUTROS USOS (COZINHAR, HIGIENE ETC) O AGREGADO USA PRINCIPALMENTE AGUA DE

1 Torneira na residência ligada à rede

2 Torneira no prédio ou do vizinho

3 Tanque do vizinho

4 Chafariz public

5 Furo com bomba

6 Cacimba protegida

7 Cacimba desprotegida

8 Nascente protegida

9 Nascente desprotegida

10 Água de chuva, chimpacas

11 Charco, rio, riacho, lagoa

12 Cisterna de água

13 Agua mineral em garrafa

14 Outro

……

B5 QUANTO O AGREGADO PAGOU NO MÊS PASSADA PELA COMPRA DE AGUA ? [ ] AKZ

C	Torneira na residência ligada à rede

C1 A CASA TEM LIGAÇÃO À REDE PÚBLICA DE ÁGUA? 1 Sim
2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA D1

C2 SE TIVER LIGAÇÃO, HAVIA ÁGUA NA TORNEIRA NO MÊS PASSADO? 1 Sim
2 Não

C3 QUAL É A FREQUÊNCIA DE FORNECIMENTO DE ÁGUA CANALIZADA EM CASA 1 nunca
2 poucas vezes
3 algumas vezes
4 muitas vezes
5 sempre

C4 A TORNEIRA NA RESIDÊNCIA É A FONTE PRINCIPAL DE ÁGUA? 1 Sim
2 Não

C5 O AGREGADO UTILIZA OUTRAS FONTES DE ÁGUA? 1 Sim
2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA C8

C6 QUANDO UTILIZA OUTRAS FONTES DE ÁGUA? 1 Quando falta água da torneira
2 Porque água da torneira é cara
3 Outro

.....

C7 PARA QUAIS FINS UTILIZAM OUTRAS FONTES DE ÁGUA?

.....

C8 QUAL É O PREÇO DE ÁGUA CANALIZADA POR METRO CÚBICO? [ ] Kwanzas

C9 SE TIVER LIGAÇÃO, QUAL É O CONSUMO NORMAL MENSAL? [ ] metros cúbicos

.

C10 SE TIVER LIGAÇÃO, NORMALMENTE QUANTO É A FACTURA MENSAL? [ ] Kwanzas

C11 ACHA O PREÇO JUSTO?
1 Sim
2 Não

C12 QUAL É A QUALIDADE DA ÁGUA CANALIZADA?
1 péssima
2 medíocre
3 suficiente
4 boa
5 excelente

C13 QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE DA ÁGUA CANALIZADA EM CASA?
1 Cheiro
2 Cor
3 Sabor
4 Outro

(especificar).....

D	Torneira no prédio ou do vizinho

D1	ÀS VEZES USA A TORNEIRA NO PRÉDIO	1	Sim
	OU DO VIZINHO PARA TER ACESSO À ÁGUA?	2	Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA E1

D2	A TORNEIRA NO PRÉDIO OU DO VIZINHO	1	Sim
	É A FONTE PRINCIPAL DE ÁGUA?	2	Não

D3 EM QUE CIRCUMSTÂNCIA USA A TORNEIRA NO PRÉDIO OU DO VIZINHO?

1	Quando não há outras fontes de água
2	Quando o preço é alto nas outras fontes de água
3	Quando o agregado precisa de muita água
4	Só para certos fins
5	Sempre
6	Outro

D4 O QUE É O FIM PRINCIPAL PARA QUAL USA A ÁGUA DA TORNEIRA NO PRÉDIO OU DO VIZINHO?

1	Todos os efeitos
2	Beber
3	Limpeza da casa
4	Tomar banho
5	Outros

.....

.....

D5 QUANTO TEMPO LEVA DE CASA PARÀ

A TORNEIRA DO PRÉDIO OU DO VIZINHO? ☐ minutos

D6 QUANTO TEMPO FICA NA

FILA A ESPERA PARA ACARRETAR AGUA

NA TORNEIRA DO PRÉDIO OU DO VIZINHO? ☐ minutos

D7 QUAL É O PREÇO NORMAL DE UM BALDE/BIDON DE 20 LITROS

NA TORNEIRA DO PRÉDIO OU DO VIZINHO? ☐ Kwanzas

D8 ACHA O PREÇO JUSTO?

1 Sim

2 Não

D9 A CERTAS ALTURAS EM QUE O PREÇO NA TORNEIRA NO PRÉDIO OU DO VIZINHO É MAIS ALTO?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA D13

D10 QUANDO É QUE O PREÇO É MAIS ALTO?

1 Quando não há água canalizada

2 Na época chuvosa

3 Na época seca

4 Outras alturas

.....

D11 QUAL É O PREÇO MAIS ALTO DE UM BALDE/BIDON DE 20 LITROS

QUE JÁ PAGOU NA TORNEIRA NO PRÉDIO OU DO VIZINHO?

[ ] Kwanzas

D12 ACHA O PREÇO JUSTO?
1 Sim
2 Não

D13 QUANTOS BALDES DE ÁGUA DE 20 LITROS
ACARRETA DA TORNEIRA DO VIZINHO POR DIA?

[ ] Baldes

D14 QUAL É A FREQUÊNCIA DE FORNECIMENTO
DA ÁGUA NA TORNEIRA DO VIZINHO?
1 nunca
2 poucas vezes
3 algumas vezes
4 muitas vezes
5 sempre

D15 QUAL É A QUALIDADE DE ÁGUA
NA TORNEIRA DO VIZINHO
1 péssima
2 medíocre
3 suficiente
4 boa
5 excelente

D16 QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE
DE ÁGUA NA TORNEIRA DO VIZINHO?
1 Cheiro
2 Cor
3 Sabor
4 Outro

…….. (especificar)

D17 A QUEM PERTENCE A TORNEIRA? 1 Empresa de Águas

2 Uma empresa

3 A Coordenação do bairro

4 Um vizinho

5 Outro

E	**Tanque do vizinho**

E1 ÀS VEZES USA O TANQUE DO VIZINHO PARA TER ACESSO À ÁGUA?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA F1

E2 O TANQUE DO VIZINHO É A FONTE PRINCIPAL DE ÁGUA?

1 Sim

2 Não

E3 EM QUE CIRCUMSTÂNCIA USA USA O TANQUE DO VIZINHO?

1 Quando não há outras fontes de água

2 Quando o preço é alto nas outras fontes de água

3 Quando o agregado precisa de muita água

4 Só para certos fins

5 Sempre

6 Outro

E4 O QUE É O FIM PRINCIPAL PARA QUAL USA A ÁGUA DO TANQUE DO VIZINHO?

1 Todos os efeitos

2 Beber

3 Limpeza da casa

4 Tomar banho

5 Outros

.....

……

E5 QUANTO TEMPO LEVA DA CASA AO TANQUE DO VIZINHO?

☐ minutos

E6 QUANTO TEMPO FICA NA FILA A ESPERA PARA ACARRETAR AGUA NO TANQUE DO VIZINHO?

☐ minutos

E7 QUAL É O PREÇO DE UM BALDE/BIDON DE 20 LITROS NO TANQUE DO VIZINHO?

☐ Kwanzas

E8 ACHA O PREÇO JUSTO?

1 Sim

2 Não

E9 A CERTAS ALTURAS O PREÇO NO TANQUE DO VIZINHO É MAIS ALTO?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA E13

E10 QUANDO É QUE O PREÇO É MAIS ALTO?

1 Quando não há água canalizada

2 Na época chuvosa

3 Na época seca

4 Outras alturas

.....

E11 QUAL É O PREÇO ALTO DE UM BALDE/BIDON DE 20 LITROS NO TANQUE DO VIZINHO?

☐ Kwanzas

E12	ACHA O PREÇO JUSTO?	1	Sim
		2	Não
E13	QUANTOS BALDES DE ÁGUA DE 20 LITROS ACARRETA DO TANQUE DO VIZINHO POR DIA?	☐	Baldes
E14	QUAL É A FREQUÊNCIA DE FORNECIMENTO DA ÁGUA NO TANQUE DO VIZINHO?	1	nunca
		2	poucas vezes
		3	algumas vezes
		4	muitas vezes
		5	sempre
E15	QUAL É A QUALIDADE DE ÁGUA NO TANQUE DO VIZINHO	1	péssima
		2	medíocre
		3	suficiente
		4	boa
		5	excelente
E16	QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE DE ÁGUA NO TANQUE DO VIZINHO?	1	Cheiro
		2	Cor
		3	Sabor
		4	Outro
……..			(especificar)

F Chafariz público

F1 ÀS VEZES USA UM CHAFARIZ PÚBLICO PARA TER ACESSO À ÁGUA?

1 Sim

2 Não

►SE RESPONDER "NÃO", PASSA PARA A PERGUNTA G1

F2 O CHAFARIZ PÚBLICO É A FONTE PRINCIPAL DE ÁGUA? 1 Sim

2 Não

F3 EM QUE CIRCUMSTÂNCIA USA USA O CHAFARIZ PÚBLICO?

1 Quando não há outras fontes de água

2 Quando o preço é alto nas outras fontes de água

3 Quando o agregado precisa de muita água

4 Só para certos fins

5 Sempre

6 Outro

F4 O QUE É O FIM PRINCIPAL PARA QUAL USA A ÁGUA DO CHAFARIZ PÚBLICO ?

1 Todos os efeitos

2 Beber

3 Limpeza da casa

4 Tomar banho

5 Outros

.....
.....

F5 QUANTO TEMPO LEVA DO CHAFARIZ PARA CASA? ☐ Minutos

F6 A QUE HORAS ABRE O CHAFARIZ? ..... horas

F7 A QUE HORAS EBCERRA O CHAFARIZ? …… horas

F8 GERALMENTE QUANTO TEMPO ESPERA NA BICHA? ☐ Minutos

F9 QUANTO PAGA POR UM BALDE DE 20 LITROS? ☐ Kwanzas

F10 ACHA O PREÇO JUSTO? 1 Sim
2 Não

F11 A CERTAS ALTURAS O PREÇO 1 Sim
NO CHAFARIZ É MAIS ALTO? 2 Não

►SE RESPONDER "NÃO", PASSA PARA A PERGUNTA F15

F12 QUANDO É QUE O PREÇO É MAIS ALTO?

1 Quando não há água canalizada
2 Na época chuvosa
3 Na época seca
4 Outras alturas

.....

F13 O QUE É O PREÇO DUM BALDE DE 20 LITROS
QUANDO O PREÇO É MAIS ALTO? ☐ Kwanzas

F14 ACHA O PREÇO JUSTO? 1 Sim
2 Não

F15 QUANTOS BALDES DE 20 LITROS O AGREGADO ☐

CARTA DO CHAFARIZ POR DIA?

Baldes

F16	QUAL É A FREQUÊNCIA DE FORNECIMENTO DA ÁGUA NO CHAFARIZ?	1	nunca
		2	poucas vezes
		3	algumas vezes
		4	muitas vezes
		5	sempre
F17	QUAL É A QUALIDADE DE ÁGUA NO CHAFARIZ?	1	péssima
		2	medíocre
		3	suficiente
		4	boa
		5	excelente
F18	QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE DE ÁGUA NO CHAFARIZ?	1	Cheiro
		2	Cor
		3	Sabor
		4	Outro (especificar)

……

F19	QUEM TEM A RESPONSABILIDADE DE GESTÃO E MANUTENÇÃO DO CHAFARIZ?	1	Um indivíduo do bairro
		2	Um indivíd. fora do bairro
		3	Uma empresa privada
		4	Uma ONG
		5	Empresa de água
		6	Administração local
		7	Comité comunitário (ACA, GAS etc)
		8	Outro (especificar)

F20 QUAL É A QUALIDADE DE GESTÃO E MANUTENÇÃO DO CHAFARIZ

1 Boa
2 Razoável
3 Mau
4 Muito mau

F21 QUAIS SÃO OS PROBLEMAS COM A GESTÃO E A MANUTENÇÃO DO CHAFARIZ?

……

G Furo com manivela

G1 ÀS VEZES USA UM FURO COM MANIVELA PARA TER ACESSO À ÁGUA?

1 Sim
2 Não

►SE RESPONDER "NÃO", ► PASSA PARA A PERGUNTA H1

G2 O FURO É A FONTE PRINCIPAL DE ÁGUA?

1 Sim
2 Não

G3 QUANDO USA O FURO?

1 Quando não há outras fontes de água
2 Quando o preço é alto nas outras fontes de água
3 Quando o agregado precisa de muita água
4 Só para certos fins
5 Sempre
6 Outro

G4 O QUE É O FIM PRINCIPAL PARA QUAL USA A ÁGUA DO FURO?

1 Todos os efeitos
2 Beber

3 Limpeza da casa

4 Tomar banho

5 Outros

.....

G5 QUANTO TEMPO LEVA DE CASA PARA O FURO? ☐ Minutos

G6 GERALMENTE QUANTO TEMPO ESPERA NA FILA? ☐ Minutos

G7 QUAL É O PREÇO DUM BALDE/BIDÃO DE 20 LITROS ☐

Kwanzas

G8 ACHA O PREÇO JUSTO? 1 Sim

2 Não

G9 A CERTAS ALTURAS O PREÇO 1 Sim

NO FURO É MAIS ALTO? 2 Não

►SE RESPONDER "NÃO", PASSA PARA A PERGUNTA G13

G10 QUANDO É QUE O PREÇO É MAIS ALTO?

1 Quando não há água canalizada

2 Na época chuvosa

3 Na época seca

4 Outras alturas

.....

G11 O QUE É O PREÇO DUM BALDE DE 20 LITROS

QUANDO O PREÇO É MAIS ALTO? ☐

Kwanzas

G12	ACHA O PREÇO JUSTO?	1	Sim
		2	Não

G13 QUANTOS BALDES DE 20 LITROS O AGREGADO CARTA DO FURO POR DIA?

☐ Baldes

G14	QUAL É A FREQUÊNCIA DE FORNECIMENTO	1	nunca
	DA ÁGUA NO FURO?	2	poucas vezes
		3	algumas vezes
		4	muitas vezes
		5	sempre

G15	QUAL É A QUALIDADE DE ÁGUA	1	péssima
	NO FURO?	2	medíocre
		3	suficiente
		4	boa
		5	excelente

G16	QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE	1	Cheiro
	DE ÁGUA NO FURO?	2	Cor
		3	Sabor
		4	Outro (especificar)

……

G17	QUEM TEM A RESPONSABILIDADE DE	1	Um indivíduo do bairro
	GESTÃO E MANUTENÇÃO DO FURO ?	2	Um indivíd. fora do bairro

		3	Uma empresa privada
		4	Uma ONG
		5	Empresa de água
		6	Administração local
		7	Comité comunitário (ACA, GAS etc)
		8	Outro (especificar)
G18	QUAL É A QUALIDADE DE GESTÃO E MANUTENÇÃO DO FURO	1	Boa
		2	Razoável
		3	Mau
		4	Muito mau

G19 QUAIS SÃO OS PROBLEMAS COM A GESTÃO E A MANUTENÇÃO DO FURO?

…….

H	**Cacimba ou nascente**

H1	ÀS VEZES USA UMA CACIMBA OU NASCENTE PARA TER ACESSO À ÁGUA?	1	Sim
		2	Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA J1

H2 A CACIMBA OU NASCENTE É A FONTE PRINCIPAL DE ÁGUA?

1	Sim
2	Não

H3 SE NÃO, QUANDO USA A CACIMBA OU NASCENTE?

1 Quando não há outras fontes de água

2 Quando o preço é alto nas outras fontes de água

3 Quando o agregado precisa de muita água

4 Só para certos fins

5 Sempre

6 Outro

H4 O QUE É O FIM PRINCIPAL PARA QUAL USA A ÁGUA DA CACIMBA OU NASCENTE?

1 Todos os efeitos

2 Beber

3 Limpeza da casa

4 Tomar banho

5 Outros

.....

.....

H5 A CACIMBA OU NASCENTE ESTÁ LOCALIZADA EM CASA ?

1 Sim

2 Não

►SE RESPONDER “SIM”, PASSA PARA A PERGUNTA H17

H6 A QUEM PERTENCE A CACIMBA OU NASCENTE?

1 Um indivíduo do bairro
2 Um indivíd. fora do bairro
3 Uma empresa privada
4 Uma ONG
5 Empresa de água
6 Administração local
7 Comité comunitário (ACA, GAS etc)
8 É a minha
9 Outro (especificar)

H7 QUAL É A QUALIDADE DE GESTÃO E MANUTENÇÃO?

1 Boa
2 Razoável
3 Mau
4 Muito mau

H8 QUAIS SÃO OS PROBLEMAS COM A GESTÃO E A MANUTENÇÃO DA CACIMBA OU NASCENTE?

……

H9 QUANTO TEMPO LEVA DA CASA A CACIMBA OU NASCENTE ? ☐ Minutos

H10 GERALMENTE QUANTO TEMPO ESPERA NA BICHA? ☐ Minutos

H11 QUANTO CUSTA UM BALDE DE 20 LITROS? ☐ Kwanzas

H12 ACHA O PREÇO JUSTO? 1 Sim

		2	Não
H13	A CERTAS ALTURAS O PREÇO	1	Sim
	NA CACIMBA OU NASCENTE É MAIS ALTO?	2	Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA H17

H14 QUANDO É QUE O PREÇO É MAIS ALTO?

1 Quando não há água canalizada

2 Na época chuvosa

3 Na época seca

4 Outras alturas

.....

H15 O QUE É O PREÇO DUM BALDE DE 20 LITROS QUANDO O PREÇO É MAIS ALTO? ☐ Kwanzas

H16 ACHA O PREÇO JUSTO? 1 Sim

2 Não

H17 QUANTOS BALDES DE 20 LITROS O AGREGADO CARTA DA CACIMBA OU NASCENTE POR DIA? ☐ Baldes

H18	QUAL É A FREQUÊNCIA DE FORNECIMENTO	1	nunca
	DA ÁGUA NA CACIMBA OU NASCENTE?	2	poucas vezes
		3	algumas vezes
		4	muitas vezes
		5	sempre

H19 QUAL É A QUALIDADE DE ÁGUA DA CACIMBA OU NASCENTE?

1 péssima

2 medíocre

3 suficiente

4 boa

5 excelente

H20 QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE DE ÁGUA DA CACIMBA OU NASCENTE?

1 Cheiro

2 Cor

3 Sabor

4 Outro (especificar)

……

J	Charco, rio, riacho, lagoa

J1	ÀS VEZES USA UM CHARCO, RIO, RIACHO OU LAGOA PARA TER ACESSO À ÁGUA?	1 2	Sim Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA K1

J2	COMO TIRA A ÁGUA DO RIO, RIACHO, LAGOA OU CHARCO?	1 2 3 4	Balde Motobomba Bomba manual Outro tipo bomba

►SE RESPONDER “DIRECTAMENTE”, PASSA PARA A PERGUNTA J4

J3	A QUEM PERTENCE A BOMBA?	1 2 3 4 5 6 7 8	Um indivíduo do bairro Um indivíd. fora do bairro Uma empresa privada Uma ONG Empresa de água Administração local Comité comunitário (ACA, GAS etc) Outro (especificar)

J4	O RIO, RIACHO OU LAGOA É A FONTE PRINCIPAL DE ÁGUA?	1 2	Sim Não

J5 QUANDO USA RIO, RIACHO OU LAGOA?

1 Quando não há outras fontes de água

2 Quando o preço é alto nas outras fontes de água

3 Quando o agregado precisa de muita água

4 Só para certos fins

5 Sempre

6 Outro

J6 O QUE É O FIM PRINCIPAL PARA QUAL USA A ÁGUA DO RIO, RIACHO OU LAGOA?

1 Todos os efeitos

2 Beber

3 Limpeza da casa

4 Tomar banho

5 Outros

.....

.....

J7 QUANTO TEMPO LEVA DA CASA AO RIO, RIACHO OU LAGOA? ☐ Minutos

J8 GERALMENTE QUANTO TEMPO ESPERA NA BICHA? ☐ Minutos

J9 PAGA PARA CARTAR ÁGUA NESTE SÍTIO? 1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA J16

J10 SE PAGAR, QUAL É O PREÇO DE UM BALDE DE 20 LITROS NO RIO, LAGO OU RIACHO? ☐ Kwanzas

J11 ACHA O PREÇO JUSTO?

1 Sim

2 Não

J12 A CERTAS ALTURAS O PREÇO NO RIO, RIACHO OU LAGOA É MAIS ALTO?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA J16

J13 QUANDO É QUE O PREÇO É MAIS ALTO?

1 Quando não há água canalizada

2 Na época chuvosa

3 Na época seca

4 Outras alturas

.....

J14 O QUE É O PREÇO DUM BALDE DE 20 LITROS QUANDO O PREÇO É MAIS ALTO? ☐ Kwanzas

J15 ACHA O PREÇO JUSTO?

1 Sim

2 Não

J16 QUANTOS BALDES DE 20 LITROS O AGREGADO CARTA DO RIO, RIACHO OU LAGOA? ☐ Baldes

J17 QUAL É A FREQUÊNCIA DE FORNECIMENTO DA ÁGUA NO RIO, RIACHO OU LAGOA?

1 nunca

2 poucas vezes

3 algumas vezes

	4	muitas vezes
	5	sempre

J18 QUAL É A QUALIDADE DE ÁGUA DO RIO, RIACHO OU LAGOA?

1	péssima
2	medíocre
3	suficiente
4	boa
5	excelente

J19 QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE DE ÁGUA DO RIO, RIACHO OU LAGOA?

1	Cheiro
2	Cor
3	Sabor
4	Outro (especificar)

……

K Cisterna de água privada

K1 ÀS VEZES USA UMA CISTERNA PRIVADA PARA TER ACESSO À ÁGUA?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA L1

K2 A SUA CASA TEM TANQUE DE ÁGUA?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA K5

K3 QUAL A CAPACIDADE DO SEU TANQUE? [ ] mil litros

K4 COM QUE FREQUÊNCIA ENCHE O TANQUE?

1 Semanalmente

2 Quinzenalmente

3 Mensalmente

4 Bimensalmente

5 Menos frequente

K5 COMPRA A ÁGUA SEMPRE DO MESMO CAMIÃO CISTERNA?

1 Sim

2 Não

K6 O CAMIONISTA MORA NESTE BAIRRO?

1 Sim

2 Não

K7 COMO CONTACTA COM O CAMIONISTA QUANDO PRECISA DE ÁGUA ?

1 Telefone

2 Ficamos a espera na rua até passar

3 Vamos ao sítio onde ficam os camiões

4 Vamos à casa do camionista

5 Outro

K8 QUANTO CUSTA PARA ENCHER O TANQUE? ☐ Kwanzas

K9 ACHA O PREÇO JUSTO? 1 Sim

2 Não

K10 A CERTAS ALTURAS EM QUE O PREÇO É MAIS ALTO?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA K14

K11 SE SIM, QUANDO É QUE O PREÇO É MAIS ALTO?

1 Quando não há água canalizada

2 Na época chuvosa

3 Na época seca

4 Outras alturas

.....

K12 O QUE É O PREÇO DUM BALDE DE 20 LITROS QUANDO O PREÇO É MAIS ALTO? ☐ Kwanzas

K13 ACHA O PREÇO JUSTO? 1 Sim

2 Não

K14	QUANTOS BALDES DE 20 LITROS TIRA DO TANQUE POR DIA PARA O USO DO AGREGADO FAMILIAR?	☐	Baldes

K15	QUAL É A DISPONIBILIDADE DA ÁGUA DO CAMIÃO CISTERNA ?	1	nunca
		2	poucas vezes
		3	algumas vezes
		4	muitas vezes
		5	sempre

K16	QUAL É A QUALIDADE DE ÁGUA DO CAMIÃO CISTERNA ?	1	péssima
		2	medíocre
		3	suficiente
		4	boa
		5	excelente

K17	QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE DE AGUA DO CAMIÃO CISTERNA?	1	Cheiro
		2	Cor
		3	Sabor
		4	Outro (especificar)

……

L Cisterna de água pública

L1 ÀS VEZES USA UMA CISTERNA PRIVADA PARA TER ACESSO À ÁGUA?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA M1

L2 COMO AS FAMÍLIAS SABEM QUE VAI CHEGAR O CAMIÃO CISTERNA?

……..

L3 QUANDO COMECOU A PASSAR O CAMIÃO CISTERNA PÚBLICO?

1 Desde Setembro 2012

2 Entre Setembro 2011 e Agosto 2012

3 Entre Setembro 2010 e Agosto 2011

4 Entre Setembro 2009 e Agosto 2010

5 Entre 2005 e 2009

6 Entre 2000 e 2004

7 Antes de 2000

L4 QUANTOS LITROS DE DE ÁGUA QUE FORNECE A CADA AGREGADO FAMILIAR CADA VEZ QUE PASSA? ☐ Litros

L5 PAGA PARA RECEBER ÁGUA? 1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA L12

L6 SE PAGAR, QUAL É O PREÇO DE UM BALDE DE 20 LITROS ? ☐ Kwanzas

L7 ACHA O PREÇO JUSTO?
1 Sim
2 Não

L8 A CERTAS ALTURAS O PREÇO É MAIS ALTO?
1 Sim
2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA L12

L9 QUANDO É QUE O PREÇO É MAIS ALTO?
1 Quando não há água canalizada
2 Na época chuvosa
3 Na época seca
4 Outras alturas

.....

L10 O QUE É O PREÇO DUM BALDE DE 20 LITROS QUANDO O PREÇO É MAIS ALTO? ☐ Kwanzas

L11 ACHA O PREÇO JUSTO?
1 Sim
2 Não

L12 QUAL É A DISPONIBILIDADE DA ÁGUA DO CAMIÃO CISTERNA ?
1 nunca
2 poucas vezes
3 algumas vezes
4 muitas vezes
5 sempre

L13	QUAL É A QUALIDADE DE ÁGUA DO CAMIÃO CISTERNA ?	1	péssima
		2	medíocre
		3	suficiente
		4	boa
		5	excelente

L14	QUAL É O PROBLEMA PRINCIPAL COM A QUALIDADE DE AGUA DO CAMIÃO CISTERNA?	1	Cheiro
		2	Cor
		3	Sabor
		4	Outro (especificar)

……

M SANEAMENTO

M1 ONDE HABITUALMENTE OS MEMBROS FAZEM SUAS NECESSIDADES

1	Sistema de esgotos (pia, sanita)
2	Fossa Séptica e Poço roto
3	Latrina Seca ou com descarga manual
4	Vala negra/aberta
5	Poço roto somente
6	Directamente no rio ou no lago
7	Balde
8	Capim/ ar livre
9	Outro ……

M2 ONDE SE ENCONTRA ESTE SANITARIO?

1	Na casa
2	No quintal
3	Fora do quintal

M3 DIVIDE ESTE SANITÁRIO COM OUTROS AGREGADOS ?

1	Sim
2	Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA M5

M4 QUANTOS OUTROS AGREGADOS USAM ESTE SANITÁRIO ? ☐

M5 EXISTE SISTEMA DE RECOLHA DE LIXO ONDE MORA?

1	Sim
2	Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA M7

M6 SE EXISTE UM SISTEMA DE RECOLHA DE LIXO, QUAL É A FREQUÊNCIA DE RECOLHA?

1 Diariamente

2 Algumas vezes por semana

3 Semanalmente

4 Quinzenalmente

5 Mensalmente

M7 QUE DESTINO DÁ AO LIXO DA CASA ?

1 Deixar num contentor

2 Deixar ao ar livre

3 Deixar no chão para recolha

4 Enterrar

5 Deixar numa Lixeira

6 Queimar

M8 EXISTE UM SISTEMA DE ESGOTOS ONDE MORA ?

1 Sim

2 Não

M9 QUAL É O DESTINO DAS AGUAS RESIDUAIS DA CASA

1 Nos esgotos

2 No quintal

3 Na rua

4 Numa vala

5 Outro

……

N MERCADO DE TERRA E HABITAÇÃO

N1 A CASA ONDE VIVE É

1 Própria
2 Arrendada
3 Da familia
4 Outro

N2 COMO CONSEGUIU A CASA OU O TALHÃO/TERRENO?

1 Ocupação de terreno vazio
2 Ocupação de casa vazia
3 Compra da casa
4 Compra de terreno
5 Herança
6 Cedência entre família
7 Cedência do Estado
8 Outra

.....

N3 PAGOU POR ESTA OCUPAÇÃO?

1 Sim
2 Não

N4 TEM ALGUMA PROVA DO DIREITO DE OCUPAÇÃO?

1 Sim
2 Não

N5 SENTE-SE SEGURO NA POSSE DO TALHÃO?

1 Não
2 Não sabe

3 Sim

P MEIO AMBIENTE

P1 A ESTRADA DE ACESSO A CASA E

1 Asfaltada

2 Terra planada

3 Terra com buracos

P2 DEPOIS DA CHUVA COMO E O ESTADO DA RUA DE ACESSO A CASA ?

1 Bom

2 Mau

3 Intransitável

►SE RESPONDER “BOM”, PASSA PARA A PERGUNTA P5

P3 QUANDO FOI A ULTIMA VEZ QUE A ESTRADA FICOU EM MAU ESTADO OU INTRANSITAVEL DEPOIS DA CHUVA ?

5 Desde Setembro 2012

6 Entre Setembro 2011 e Agosto 2012

7 Entre Setembro 2010 e Agosto 2011

8 Entre Setembro 2009 e Agosto 2010

5 Entre 2005 e 2009

6 Entre 2000 e 2004

7 Antes de 2000

P4 QUANTOS DIAS A ESTRADA FICOU EM MAU OU INTRANSITAVEL ESTADO NAQUELA ALTURA?

……..

P5 ESTA ÁREA ALGUMA VEZ FOI AFECTADA PELAS INUNDAÇÕES OU PELA EROSÃO?

1 Sim

2 Não

►SE RESPONDER “NÃO”, TERMINE A ENTREVISTA

P6 QUANDO FOI A ULTIMA VEZ QUE A ÁREA FOI AFECTADA PELAS INUNDAÇÕES OU PELA EROSÃO ?

1 Desde Setembro 2012

2 Entre Setembro 2011 e Agosto 2012

3 Entre Setembro 2010 e Agosto 2011

4 Entre Setembro 2009 e Agosto 2010

5 Entre 2005 e 2009

6 Entre 2000 e 2004

7 Antes de 2000

P7 NA ÁREA QUAIS CONSTRUÇÕES FORAM AFECTADAS?

1 Algumas construções da área foram afectadas?

2 A maior parte das construções da área foi afectada?

3 Todas as construções da área foram afectadas?

P8 A VOSSA CASA FOI AFECTADA? 1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA P16

P9 FOI NECESSARIO ABANDONAR A CASA DURANTE ALGUM TEMPO NAQUELA ALTURA ? 1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA P12

P10 SE SIM, , DURANTE QUANTOS DIAS ? ……

P11 AONDE FOI VIVER QUANDO FOI NECESSARIO ABANDONAR A CASA?

1 Com familiares

2 Com amigos

3 Num centro de acolhamento?

4 Em tendas fornecidas pelo Governo

5 Em tendas fornecidas por uma outra organização (ONG, igreja) ?

6 Outro (especificar) .....

P12 A CASA FICOU DANIFICADA ? 1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA P16

P13 SE SIM, QUAIS FORAM OS PIORES DANOS ?

1 Fendas nas paredes

2 As paredes caiaram

3 O tecto caiu

4 Outro (especificar)

.....

P14 RECEBEU ALGUM APOIO PARA A REPARAÇÃO DA VOSSA CASA DEPOIS DA INUNDAÇÃO?

1 Sim

2 Não

►SE RESPONDER “NÃO” PASSA PARA A PERGUNTA P16

P15 SE SIM, QUEM DEU O APOIO PRINCIPAL ?

1 Familiares

2 Amigos

3 Vizinhos

4 O Governo

5 Outras organizações

P16 A SAÚDE DE MEMBROS DO

AGREGADO FOI AFECTADA PELAS INUNDAÇÕES?

1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA P20

P17 QUAL FOI A DOENÇA PRINCIPAL? .....

P18 QUAL FOI A SEGUNDA DOENÇA (EM ORDEM DE IMPORTÂNCIA)?

.....

P 19 QUAL FOI A TERCEIRA DOENÇA (EM ORDEM DE IMPORTÂNCIA)?

.....

P20 O SISTEMA DE AGUA DA ÁREA FOI DANIFICADO?

1 Sim

2 Não

P21 O SISTEMA DE ESGOTOS DA ÁREA FOI DANIFICADO?

1 Sim

2 Não

P22 HOUVE OUTROS EFEITOS DAS INUNDAÇÕES? 1 Sim

2 Não

►SE RESPONDER “NÃO”, PASSA PARA A PERGUNTA P22

P23 QUAIS FORAM ESTES OUTROS EFEITOS ?

……

P24 O QUE CAUSOU A INUNDAÇÃO?

1 Acumulação de água das chuvas na rua

2 Água dum lago ou duma logoa

3 Água dum rio próximo

4 Água do mar

5 Erosão ou deslizamento da terra

6 Outro (especificar)

.....

P25 ISSO ACONTECEU RAPIDAMENTE?

1 As águas chegaram rapidamente

2 Ás águas subiram gradualmente

3 Outro (especificar)

.....

P 26 O GOVERNO IMPLEMENTOU MEDIDAS PARA REDUZIR O IMPACTO DAS INUNDAÇÕES?

1 Sim

2 Não

►SE RESPONDER “NÃO”, TERMINE A ENTREVISTA

P27 QUAL É A MEDIDA MAIS IMPORTANTE QUE IMPLEMENTOU?

.....

P 28 QUAL É A SEGUNDA MEDIDA QUE IMPLEMENTOU (EM TERMOS DE IMPORTÂNCIA)?

.....

P29 QUAL É A TERCEIRA MEDIDA QUE IMPLEMENTOU (EM TERMOS DE IMPORTÂNCIA)?

.....