United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

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Swiss Agency for Development and Cooperation SDC

Groundwater Resources Governance in Transboundary Aquifers

Kalahari-Karoo/Stampriet Aquifer

DRAFT MISSION REPORT

FIRST FOLLOW UP TECHNICAL MISSION ON PROJECT IMPLEMENTATION

Gaborone (Botswana), Windhoek (Namibia), Pretoria (South Africa)

05-15 August 2014

TABLE OF CONTENTS

ANNEXES

LIST OF ABBREVIATIONS

CFP	Country Focal Point
CGS	Council for Geoscience
DWA	Department of Water Affairs
DWS	Department of Water and Sanitation
DGS	Department of Geological Survey
GGRETA	Groundwater Resources Governance in Transboundary Aquifers
IGRAC	International Groundwater Resources Assessment Centre (UNESCO category 2 centre)
IWMI	International Water Management Institute
JICA	Japan International Cooperation Agency
MCCB	Multi Country Consultative Body
NSA	Namibia Statistics Agency
NTTG	National Technical Transboundary Aquifer Group
PccP	From Potential Conflict to Cooperation Potential
RPC	Regional Project Coordinator
SADC	Southern African Development Community
SDC	Swiss Agency for Development and Cooperation
TBA	Transboundary Aquifer
UNESCO-IHP	United Nations Educational, Scientific and Cultural Organization International Hydrological Programme
WAB	Water Apportionment Board
WRC	Water Research Commission
WUC	Water Utilities Corporation

1. Introduction

The Governments of South Africa, Botswana, and Namibia, jointly with the UNESCO International Hydrological Programme (UNESCO-IHP) and the International Groundwater Resources Assessment Centre (IGRAC) are engaged on the assessment of the transboundary Stampriet Aquifer within the framework of the "Groundwater Resources Governance in Transboundary Aquifers" (GGRETA), funded by the Swiss Agency for Development and Cooperation (SDC). GGRETA project aims at improving knowledge on the recognition and vulnerability of the Stampriet transboundary aquifer (Botswana, Namibia and South Africa), developing shared aquifer management tools, and initiating the development of Multi Country Consultative Body (MCCB) to agree on priority areas for action to improve the management of the Stampriet transboundary aquifer.

UNESCO-IHP experts (Mr Ross and Mr Carvalho Resende) undertook a mission to Botswana, Namibia and South Africa between 5-15 August 2014. During the mission, they were accompanied by Prof Kirchner (Regional Project Coordinator). The aim of the mission was to:

- Review data collected and processed since the Second Technical Regional Meeting (May 2014) by the three National Technical Transboundary Groups (NTTGs) engaged in the project,
- To discuss harmonization and analysis of data across the three countries,
- To carry out consultations with government authorities.

The agenda of the First Follow up Technical Mission is given in Annex 1.

2. Objectives and Structure of the First Follow up Technical Mission on Project Implementation

2.1. Objectives of the Mission

Main objectives of the First Follow up Technical Mission on Project Implementation are as follows:

- To present the up-to-date project methodology to NTTGs.
- To review and analyze the results obtained in the second phase of data collection of hydrogeological, socioeconomic and environmental, and legal and institutional parameters and variables.
- To provide guidance to the NTTGs on the next phase of data collection.
- Obtain an agreement on the priorities and schedule of data collection and processing activities based on the project methodology.
- To follow-up and discuss the upcoming data collection and harmonization activities.
- To update government representatives about project progress.
- To obtain guidance from government representatives about next activities and project meetings.
- To prepare the next Regional meeting

2.2. Structure of the Mission

The mission was organized in political and technical meetings in each of the three countries involved in the project. Political meetings aimed at updating government representatives from the relevant countries' groundwater institutions (e.g. Departments of Water Affairs) about project progress and carry out consultation with government representatives for upcoming project activities. Technical meetings aimed at reviewing and discussing data technical aspects with the NTTGs involved in the project in accordance to the project methodology. A field visit to the Namibian portion of the Stampriet aquifer including visits to production and monitoring boreholes and irrigation farms was also undertaken. The agenda of the mission is attached in Annex 1.

3. Summary of Main Actions, Conclusions and Decisions of the First Follow up Technical Mission on Project Implementation

Main actions, conclusions and decisions taken during the First Follow up Technical Mission on Project Implementation are as follows:

- NTTGs have a clear understanding of the project methodology and planning.
- UNESCO-IHP provided guidance to the NTTGs on the next phase of data collection in accordance to the project methodology.
- Review of hydrogeological, socioeconomic and environmental, and legal and institutional parameters and variables delivered in accordance to the project methodology.
- UNESCO-IHP updated government representatives about the project progress.
- UNESCO-IHP obtained guidance from government representatives about next activities and project meetings.
- Agreement on project milestones for end of data collection and start of data harmonization.
- Agreement on reporting templates for deliverables.
- Confirmation of the next Regional Technical meeting in South Africa in end-October 2014 and the following Regional Technical meeting in Botswana (tentatively scheduled in April 2015).

4. Detailed Report of the First Follow up Technical Mission on Project Implementation

4.1. Botswana (6-9 August 2014)

4.1.1. Political meetings (7 August 2014)

Two political meetings were held on 7 August 2014. During the morning Mr Ross, Mr Carvalho Resende and Prof Kirchner had an appointment at the Department of Water Affairs (DWA) in Gaborone to update government representatives about project progress and obtain their guidance

about next activities and project meetings. Upon suggestion of representatives of the DWA, the following meeting took place in the afternoon and consisted on a visit to the Department of Geological Survey (DGS) in Lobatse aiming at obtaining full support of the DGS to facilitate the collection of key hydrogeological and environmental data.

The meeting at the DWA was chaired by Mr Phofuetsile (Deputy Director - DWA) and Mr Setloboko (Head of Groundwater Division - DWA). The Botswana project's Country Focal Point (CFP), Mr Kenabatho also participated in the meeting. The meeting started with a brief introduction by Mr Ross on the aim of the follow up mission. He emphasized the importance of the mission as an enabler to keep the momentum obtained at the Second Regional Technical Meeting, to overview ongoing activities, and challenges found on the ground by the NTTG. The representatives from the Government of Botswana at the DWA confirmed their government's commitment to the project and their willingness to give all necessary support to the NTTG. They also stressed that the importance of the project is to compile information that is currently scattered due to the restructuration of the water resources sector in Botswana and contribute to the quantification of the country's water resources. For instance, the latest map of Botswana's groundwater resources was produced in 1987, and the project provides an opportunity to update that work.

After the presentation of the mission's objectives by UNESCO-IHP experts, DWA representatives gave a detailed overview of Botswana portion of the Stampriet aquifer, and the challenges in the data collection process resulting from the restructuration of the water-related governmental bodies responsibilities in Botswana, specifically the groundwater resources management

Water consumption from the Stampriet aquifer is divided between settlements in the northern (e.g. Sladeshill, Kang) and southern Kalahari (around Hukuntsi). There is little irrigation in the region. The water in the shallow aquifer is saline, and only usable for agriculture (sometimes) but water in the deeper aquifer (250-350 m) can be used for human consumption. Some people have received land development permits and invested but water is unsuitable or unavailable.

The Ministry of Minerals, Energy and Water Resources (MMEWR) covers water, mines, energy and geological survey. Each of these sectors is covered by a Department. Following the restructuring of the MMEWR in the 2010s, the DWA retained the leading role in monitoring and managing water resources for all other ministerial and parastatal bodies. Water allocations are assessed by the Water Apportionment Board, and water delivery functions together with bore monitoring records have been transferred to a new water utility, the Water Utilities Corporation (WUC). DWA representatives stressed that one of the major challenges of the data collection process is to gather the data that has been scattered through the different Departments of the MMEWR since the restructuration. Most of Botswana portion of the Stampriet aquifer hydrogeological and environmental data can be found at the library of the DGS. DWA representatives set up a meeting with their counterpart at the DGS, Mr Ngwisanyi (Director), aiming at providing an update of ongoing activities and obtaining full support of the DGS to facilitate the collection of key hydrogeological and environmental data.

Another major challenge in the data collection process is obtaining reliable information of private boreholes as they are not under supervision of the DWA. Such challenge comes from a loophole for domestic water use in the Water Act of 1968. The Government has the ownership of groundwater and provides land rights for exploitation. Privately owned boreholes at large developments are subject to permits and regulations but smaller privately owned boreholes are not, and there is no requirement for metering.

Mr Phofuetsile also stated that the DWA is understaffed and with little institutional memory because of a substantial loss of trained hydrogeologist in the MMEWR, mostly to mining. It is an ongoing challenge for the MMEWR to make the case for recruitment. Possible arguments include, increasing groundwater consumption and approving outsourced work.

Finally, the morning meeting at the DWA finished with its representatives expressing the importance of communication within the NTTG, and the full commitment of the Government of Botswana to moving forward towards the implementation of a Multi Country Consultative Body (MCCB) to improve the management of the Stampriet transboundary aquifer by offering the assistance of DWA's legal experts. DWA representatives also stressed that it would be preferable to have the next regional meeting in South Africa, planned in October 2014, because of Botswana general election at that time; and that internal meetings where the NTTG could brief ministry staff would be desirable and could be arranged by the CFP, Mr Kenabatho.

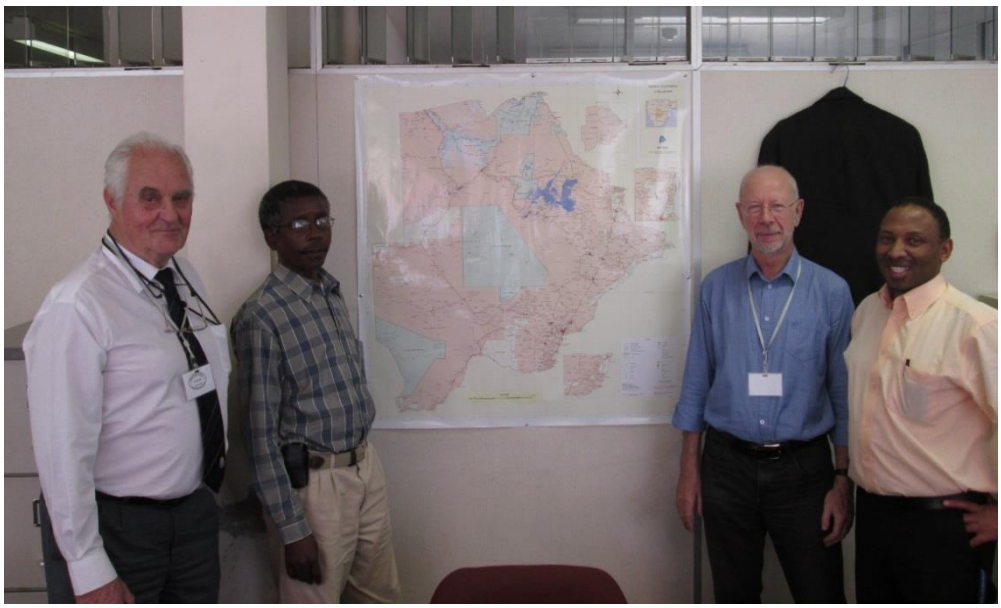

Figure 1 – Political meeting at the Department of Water Affairs (DWA) in Botswana - From left to right: Prof Kirchner (Regional Project Coordinator), Mr Phofuetsile (Deputy Director – DWA), Mr Ross (UNESCO-IHP) and Mr Setloboko (Head of Groundwater Division - DWA)

The afternoon meeting at the DGS in Lobatse was chaired by Mr Kenabatho. The purpose of the meeting was to provide an overview of the GGRETA project, introduce UNESCO-IHP experts to the Director of the DGS, Mr Ngwisanyi, and obtain full support of the DGS to facilitate the collection of key hydrogeological and environmental data. Mr Ross gave an overview of the project design and details of project activities expected in 2014. He explained the project execution arrangements and emphasized the importance of hydrogeological and environmental data available at the library of the DGS was emphasized. Mr Ngwisanyi expressed his full support to the project and prompted to facilitate the collection of all relevant data. Mr Ngwisanyi also added that the collection of reliable information of private boreholes is a major challenge in Botswana.

Figure 2 – Meeting at the Department of Geological Survey (DGS) in Botswana – From left to right: Mr Kenabatho (Botswana Country Focal Point, Mr Ross (UNESCO-IHP), Mr Lentswe (Botswana hydrogeology Expert), Prof Kirchner (Regional Project Coordinator)

4.1.2. Technical meeting (8 August 2014)

The technical meeting was held at the University of Botswana and was attended by the Botswana NTTG, CFP, UNESCO-IHP experts and the RPC. The aim of the meeting was to review the data that has already been collected by the NTTG, and discuss the next phase of data collection and harmonization. The meeting was largely devoted to review the priority set of variables and parameters of the GGRETA methodology agreed at the Second Regional Technical meeting in May 2014. Hydrogeological data was discussed first, followed by socioeconomic and environmental, and legal and institutional data. The presentations were followed by a discussion of main actions, challenges, conclusions and decisions for the final phase of data collection and initial phase of data harmonization.

- *Hydrogeological data:*

Mr Lentswe (Hydrogeology Expert – Botswana) presented a georeferenced map of the Botswana portion of the Stampriet aquifer and listed the Government Departments that he visited to collect data:

- Department of Meteorological Services (climate data)
- Department of Surveys and Mapping (landuse)
- Department of Crop Production (soil types with description manuals)
- Department of Water Affairs (hydrogeology, copies of borehole certificates, reports)

He stressed that he has faced difficulties to follow the priority set of variables and parameters initially agreed because of modifications to the project supporting letter requested by Government

Departments. The following metadata has been captured in accordance with the project methodology:

- A.1 Temperature
- A.2 Precipitation
- A.3 Evapo-transpiration
- A.5 Topography and elevation
- A.6 Surface water networks
- B.1 Hydrogeology map
- C.2 Aquifer lithology

- *Socioeconomic and environmental data:*

Ms Mosetlhi (Socioeconomic and environmental Expert – Botswana) presented the data that she was able to collect and highlighted that she had been able to secure more parameters and variables of the GGRETA methodology than what was initially agreed at the Second Regional Technical meeting in May 2014 (i.e. D1, D2, E1 and E2). Nevertheless, she stressed that the state in which archives are kept, the shift in rural water supply management from DWA to WUC, and the fact that the aquifer is located in a remote and less researched area (i.e. Kgalagadi District) are major challenges in data collection. Additionally, she highlighted that data or literature relating to ground and surface water abstraction or use levels is the most difficult to obtain and most likely would require to be estimated using techniques to be decided with the RPC and Management Unit. Finally, she listed the Government Departments and consultancy firms that she visited to collect data:

- Department of Water Affairs (DWA)
- Department of Waste Management & Pollution Control (DWM&PC)
- Department of Geological Survey (DGS)
- Ministry of Local Government (Development Planning and Rural Development)
- Statistics Botswana (SB)
- Water Utilities Corporation (WUC)
- Consultancy firms (Geoflux, Water Resources Consultants, Geoscience Consulting Services and individual resource persons)

- *Legal and institutional data:*

Mr Itumeleng (Legal and institutional Expert – Botswana) started his presentation with Bostwana relevant legal and institutional statutes that are relevant to the project, which are listed as follows:

- Water Act (Cap 34:01)
- Agrochemicals Act (Cap 35:09)
- Town & Country Planning Act (32:09)
- Waterworks Act (Cap 34:03)
- Borehole Act (Cap 34:03)
- Water Utilities Corporation Act (Cap 72:09)
- Environmental Impact Assessment Act (Cap 65:07)
- Mines, Quarries, Works and Machinery Act (Cap 44:02)

Mr Itumeleng stressed that from the Legislation identified, it is clear that the provisions made for surface water, freshwater resources apply to groundwater. The 1968 Water Act covers abstraction and use, abatement and control of water pollution. Control of water pollution is also covered by the

Agrochemicals Act. The Town & Country Planning Act makes provision for the orderly and progressive development of land in both urban and rural areas and to preserve and improve the amenities thereof; for the grant of permission to develop land and for other powers of control over the use of land; and for purposes ancillary to or connected with the matters aforesaid. The Waterworks Act is meant to encourage and protect public water supply systems. The Borehole Act specifies that before a borehole, of a depth of 15 meters and beyond is sunk, one must provide the Director of DGS with such intention to. The form provided for by the Director must be completed by recording the progress of the work which shall include measurements of the strata passed through and of the levels at which water is struck and subsequently rests. Groundwater is herein protected by the provisions herein.

Mr Itumeleng then presented the legal status of groundwater ownership. According to the 1968 water Act, the State owns all water resources. The State has delegated water user and development rights to various stakeholders such as the Water Utilities Corporation (WUC), District Councils (DCs), self-providers (including livestock owners, arable farmers and mining companies that operate outside villages and settlements). The Water Utilities Corporation (WUC) has the duty to provide safe drinking water to urban and rural areas in so-called water work areas. WUC has a monopoly in these areas; others are, for example, not allowed to drill boreholes in these areas. The WUC has to break even, i.e. charge the full resource costs to end users. The District Councils (DCs) operate and maintain the water supply systems in all other rural villages, usually through the Water and Sanitation Division. Self-providers apply for surface or groundwater rights to the Water Apportionment Board (WAB). The WAB grant such rights with an abstraction ceiling and the duty to return as much water as possible of the original quality. Details of boreholes (e.g. yields, depth, water quality etc.) are recorded in the National Borehole Registry.

Finally, Mr Itumeleng stressed that the SADC Tribunal has not been operational which hinders enforcement action by the competent law enforcement.

- *Main actions, conclusions and decisions*

Main actions, conclusions and decisions of the technical meeting are listed below:

- Botswana NTTG has clear understanding of the project methodology and planning.
- Clarification of contractual deliverables.
- Agreement on reporting templates that will be made available by UNESCO-IHP.
- Second deliverable set of parameters and variables to end of August will include:
    - A. Physiography and Climate
    - B. Aquifer geometry
    - C.1.1. Natural recharge
    - C.6. Total groundwater volume including percentage extractable and percentage usable (water quality)
    - C.7. Groundwater depletion
    - D. Environmental aspects
    - E. Socio-economic aspects
    - F. Legal and Institutional aspects (Questions 1 to 40)
- Second deliverable set to mid-October which includes data collected for all parameters and variables in accordance to the project methodology. This deliverable should also include

processed data to be presented in the Regional Technical Meeting to be held in end-October 2014. Further instruction on processed data deliverables will be given by UNESCO-IHP upon submission of NTTG first deliverable.

4.2. Namibia (9-13 August 2014)

4.2.1. Political meeting (11 August 2014)

The political meeting at the DWA with Mr Nehemia (Under-Secretary) on 11 August 2014 was chaired by Namibia project's CFP, Ms Ileka. The aim of the meeting was to update government representatives about project progress and obtain their guidance about next activities and project meetings.

The meeting started with a brief introduction by Mr Ross on the aim of the follow up mission. He emphasized the importance of the mission as an enabler to keep the momentum obtained at the Second Regional Technical Meeting, to overview ongoing activities, and challenges found on the ground by the NTTG. Mr Nehemia expressed his full support to the project and highly appreciated the project's gender component and training courses on international law and water diplomacy that will be provided by Mr Burchi (Senior Legal Specialist – International Association for Water Law), and UNESCO's From Potential Conflict to Cooperation Potential (PccP) programme, respectively. He believes that such training courses are extremely important because one of the main outcomes of the project should be to provide guidance on amending Legislation to adapt to the transboundary context. He also expressed his will of having the three countries NTTGs presenting preliminary analyses of parameters and variables challenges and trends in the next Regional Technical Meeting to be held in end-October 2014.

After the presentation of the mission's objectives by UNESCO-IHP experts, Mr Nehemia gave a detailed overview of water-related Legislation in Namibia. Namibia's legislative framework for water management is established by the Water Act No. 54 of 1956. Namibia's legislative framework for water management is established by the Water Act No. 54 of 1956. The purpose of the Water Act is to control the use and conservation of water for domestic, agricultural, urban and industrial purposes. However, Namibia has enacted several important water reforms since independence in 1990, and its institutions and laws are currently in transition to a new and comprehensive Water Act. Once in force, the Water Resources Management Act of 2013 will repeal and replace the entirety of the Water Act and its many successive amendments.

The Water Resources Management Act 2013, classifies water resources as national assets, and provides a modern legal framework for managing water resources based on the principles of integrated water resources management. Unlike the Water Act, the Water Resources Management Act 2013 encourages self-regulation of water use through market based incentives as a substitute for excessive regulation. At the moment, DWA is responsible for all water resource regulatory and rural water supply activities in Namibia. Responsibility for bulk water supply is vested in NamWater, proposed in 1995, informally established in 1996 and awaiting formal incorporation by the National Legislature. NamWater is charged with producing and delivering bulk water on a commercial basis. According to Mr Nehemia, the Water Resources Management Act 2013 should probably be enforced by the end of the year.

4.2.2. Technical meeting (11 August 2014)

The technical meeting was held at the Department of Water Affairs (DWA) and was attended by the Namibia NTTG, CFP, UNESCO-IHP experts and the RPC. The aim of the meeting was to review the data that has already been collected by the NTTG, and discuss the next phase of data collection and harmonization. Likewise in Botswana, the meeting was largely devoted to review the priority set of variables and parameters of the GGRETA methodology agreed at the Second Regional Technical meeting in May 2014. Hydrogeological data was discussed first, followed by socioeconomic and environmental, and legal and institutional data. The presentations were followed by a discussion of main actions, challenges, conclusions and decisions for the final phase of data collection and initial phase of data harmonization.

- *Hydrogeological data:*

Ms Joel and Ms Mulokoshi gave an overview of the Namibian portion of the Stampriet aquifer geometry and hydrogeological aspects. They stated that the Stampriet transboundary aquifer system contains eleven different geological groups/formations/sub-formations. With regards to the next phase of the assessment which consists of processing data, they stated that some variables such as the depth to top and vertical thickness of the aquifer formation are challenging because most of the boreholes completion reports do not have the geological descriptions and may have incorrect coordinates. Additionally, they presented the parameters that will be used to estimate the value of water stored in the groundwater aquifers of Stampriet: volume of the aquifer (including spatial extent and thickness), water levels in the aquifer to give the saturated thickness of the aquifer, type of aquifer (e.g. confined, unconfined), porosity (for unconfined aquifers); or the specific yield values (for confined aquifers).

- *Socioeconomic and environmental data:*

Mr Muroua (Socioeconomic and environmental Expert – Namibia) presented the data that he was able to collect and highlighted that he had been able to secure more parameters and variables of the GGRETA methodology than what was initially agreed at the Second Regional Technical meeting in May 2014 (i.e. D1, D2, E1 and E2). He stressed that his focus on metadata was to facilitate the finding of actual data in electronic format. The data he collected are all electronic reports, posters, maps, images, tables, figures and shapefiles.

He also listed the Government Departments he visited to collect data:

- Department of Hydrology
- Ministry of Mines and Energy
- Ministry of Environment and Tourism
- NamWater
- Namibia Statistics Agency (NSA)

He added that he contacted local authorities and municipalities to also secure data. All of the above including Government Departments required the project supporting letter for them to process his requests.

- Legal and institutional data:

Ms Kyniaga (Legal and institutional Expert – Namibia) started her presentation by saying that Namibia is a signatory to a number of international agreements, such as, the Helsinki Rules on Shared Watercourses, the UN Convention, and the SADC Protocols on Shared Watercourses. She then listed relevant legal and institutional statutes, which are listed as follows:

- ORASECOM Agreement 2000 (related to transboundary legal and institutional framework)
- SADC Protocol on Shared Water Courses 2000 (related to transboundary legal and institutional framework)
- Convention on the Law of Non-Navigational Uses of International Waters 1997 (related to transboundary legal and institutional framework)
- Water Act 1956 and its amendments (related to domestic legal and institutional framework)
- Environmental Management Act 2007 and its Regulations (related to pollution control and domestic legal and institutional framework)
- National Water Policy (White Paper) 2000 (related to ownership of groundwater)
- Water Resources Management Act 2013 (related to domestic legal and institutional framework, ownership of groundwater and groundwater resources abstraction and use)

Ms Kyniaga also stressed that ownership of groundwater is vested in the State. Certain users have responsibilities to develop and manage water resources (e.g. NamWater, some local authorities, freehold farmers) through a permit system. She added that her analysis has focused more on the 2013 Water Resources Management Act as compared to the 1956 Act because the 2013 Act will be enforced as soon as the Regulations are finalized and adopted.

- Main actions, conclusions and decisions

Main actions, conclusions and decisions of the technical meeting are listed below:

- Namibia NTTG has clear understanding of the project methodology and planning.
- Clarification of contractual deliverables.
- Agreement on reporting templates that will be made available by UNESCO-IHP.
- Second deliverable set of parameters and variables to end of August will include:
    - A. Physiography and Climate
    - B. Aquifer geometry
    - C.1.1. Natural recharge
    - C.6. Total groundwater volume including percentage extractable and percentage usable (water quality)
    - C.7. Groundwater depletion
    - D. Environmental aspects
    - E. Socio-economic aspects
    - F. Legal and Institutional aspects (Questions 1 to 40)

- Second deliverable set to mid-October which includes data collected for all parameters and variables in accordance to the project methodology. This deliverable should also include processed data to be presented in the Regional Technical Meeting to be held in end-October 2014. Further instruction on processed data deliverables will be given by UNESCO-IHP upon submission of NTTG first deliverable.

Figure 3 – Technical Meeting at the Department of Water Affairs (DWA) in Namibia – From top left to top right: Mr Ross (UNESCO-IHP), Ms Joel (Hydrogeology Expert), Mr Muroua (Socioeconomic and environmental Expert), Ms Kyniaga (Legal and institutional Expert), Prof Kirchner (Regional Project Coordinator), Mr Carvalho Resende (UNESCO-IHP); From bottom left to right: Ms (Hydrogeology Expert), Ms Ileka (Country Focal Point)

4.2.3. Visit to the GGRETA project office

UNESCO-IHP experts visited the GGRETA project office. Initially planned to be hosted by Namibia at the Southern African Science Service Centre for Climate Change and Adaptive Land Use (SASSCAL), the GGRETA project office is now hosted by the Department of Water Affairs within the premises of the Ministry of Agriculture, Water & Forestry. The office has two rooms (one for the RPC and the other for the NTTG), computer, internet and phone facilities. Pictures of the GGRETA project office are shown in Figure 4 and Figure 5.

Figure 4 – GGRETA Regional Project Coordinator office located at the Department of Water Affairs within the Ministry of Agriculture, Water & Forestry.

Figure 5 – GGRETA project National Technical Transboundary Aquifer Group (NTTG) office located at the Department of Water Affairs within the Ministry of Agriculture, Water & Forestry.

4.2.4. Field visit to Namibian portion of the Stampriet aquifer

UNESCO-IHP experts made a field trip to the Namibian portion of the Stampriet aquifer including visits to production and monitoring boreholes and irrigation farms. The field trip was organized by the DWA under the supervision of Mr Beukes (Hydrologist). Ms Joel and Ms Mulokoshi also participated in the field trip.

- *The Stampriet Transboundary Aquifer System*

The Stampriet Transboundary Aquifer System covers a total area over the 3 countries of approximately 140,000 km2 (71,000 km2 within Namibia), with a shared international boundary length in excess of 1,000 km. According to Prof Kirchner (RPC), the system is made up of eleven different geological groups/formations/sub-formations. If one adds the recent alluvial deposits of the Auob and Nossob Rivers there are altogether twelve. There are probably hundreds of individual aquifers in the Stampriet TBA, the majority of them in the Kalahari Formation. These Kalahari aquifers may have different water levels and quality, and may be connected to each other. Some aquifers may only exist in part of the basin (e.g. the Kalkrand Basalt with its largely unsuitable water contributing only little high salinity water to the downstream Prince Albert Formation aquifers). There are also small perched fresh water aquifer lenses in an otherwise saline surrounding that are of high importance locally. The current population within the project area is in the order of 42 000 people and the water usage within the project area is of approximately 25Mm3 per annum.

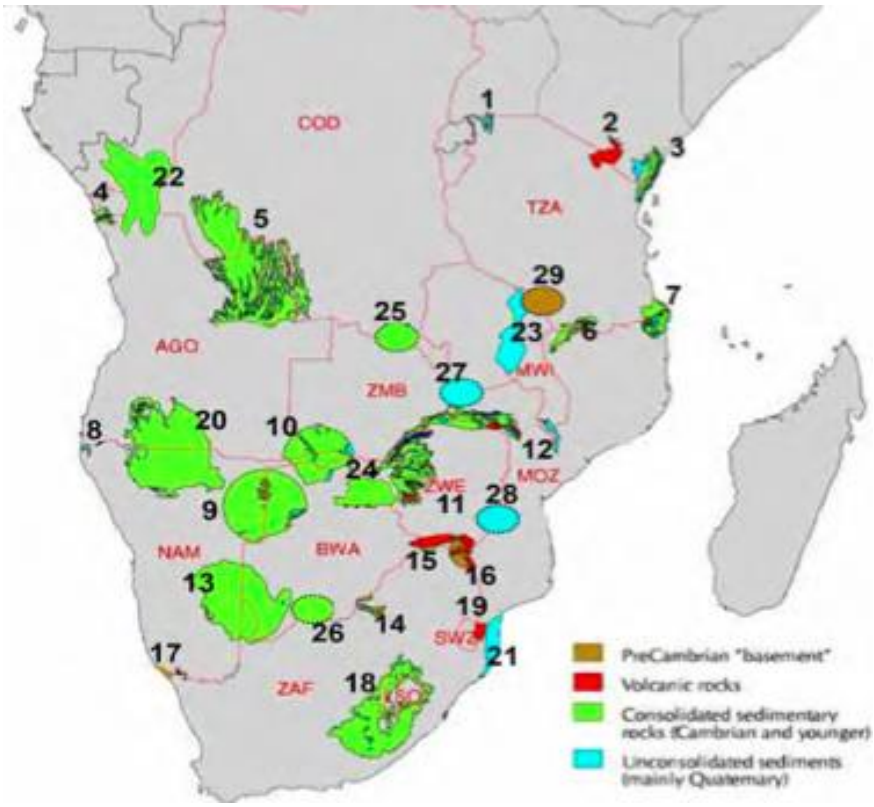

Figure 6 - Transboundary Aquifers of SADC region (Kalahari-Karoo / Stampriet Aquifer is No. 13)

- *Field trip to the Namibian portion of the Stampriet aquifer*

The field trip to the Namibian portion of the Stampriet aquifer had 6 stops (Figure 7).

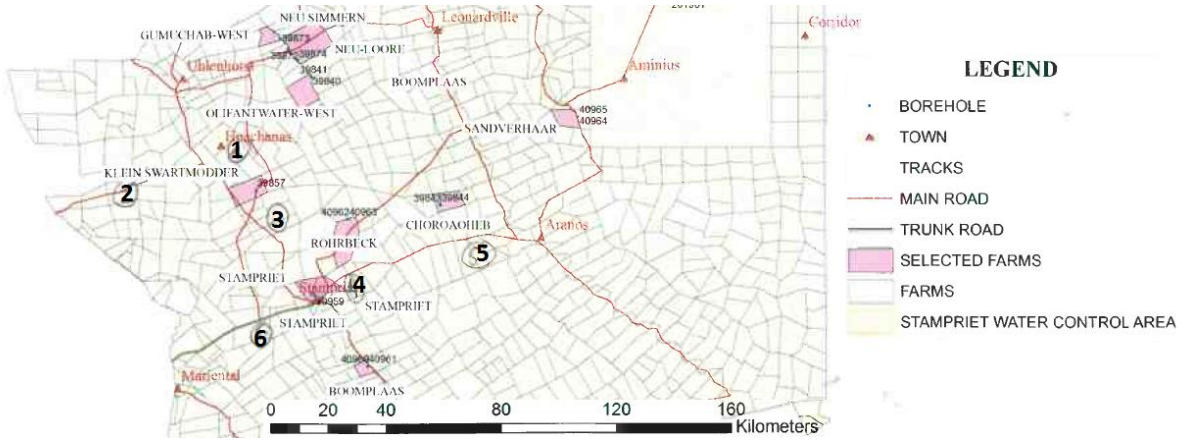

Figure 7 – Program of the field trip to the Namibian portion of the Stampriet aquifer facilitated by the Namibia Department of Water Affairs to UNESCO-IHP experts

The field trip started with a stop to a spring in the recharge area near Hoachanas (Figure 8). Mr Beukes stressed that the moisture found in the spring means that water is not far from the surface. Settlements around the spring are shown in Figure 9. The field trip followed to visiting a monitoring borehole drilled in Klein Swartmodder farm during the JICA study of the Stampriet Artesian Basin completed in 2002 (Figure 10). The participants moved from the JICA borehole to a 1ha mixed irrigation-livestock farm (Figure 11). Production and open boreholes were also visited (Figure 12 and Figure 13). The field trip finished with a visit to a 15ha farm using drip irrigation for horticulture (Figure 14).

Figure 8 – Spring in the recharge area near Hoachanas (Stop 1 of the field trip to the Namibian portion of the Stampriet aquifer)

Figure 9 – Settlements in the recharge area near Hoachanas (Stop 1 of the field trip to the Namibian portion of the Stampriet aquifer)

Figure 10 - Borehole drilled in Klein Swartmodder farm during the JICA study of the Stampriet Artesian Basin completed in 2002 (Stop 2 of the field trip to the Namibian portion of the Stampriet aquifer)

Figure 11 – 1ha mixed irrigation-livestock farm (Stop 3 of the field trip to the Namibian portion of the Stampriet aquifer)

Figure 12 – Production borehole (Stop 4 of the field trip to the Namibian portion of the Stampriet aquifer)

Figure 13 – Open borehole (Stop 5 of the field trip to the Namibian portion of the Stampriet aquifer)

Figure 14 – 15ha horticulture drip-irrigation farm (Stop 6 of the field trip to the Namibian portion of the Stampriet aquifer)

4.3. South Africa (13-15 August 2014)

Political and Technical meetings in South Africa were held at the Water Research Commission (WRC) on 14 and 15 August, respectively. The organization of the political and technical meetings with the Department of Water and Sanitation (DWS), the Council for Geoscience (CGS) and the WRC in South Africa was slightly different to the one of Botswana and Namibia due to an internal restructuration of the NTTG. In South Africa data collection and processing is being delivered in the context of a service agreement with the CGS. Data collection and processing activities were less advanced than in the

other two countries because the service agreement came into force relatively recently. However, South Africa representatives made a commitment during the political and technical meetings discussions to accelerate data collection and processing activities to align them with the other case study countries as South Africa has strong national data bases and data availability.

4.3.1. Political meeting (14 August 2014)

The main objective of the political meeting was to obtain guidance from South African governmental representatives about upcoming activities and project meetings including clarification on roles and responsibilities of the DWS, CGS and WRC, and the hosting of the next Regional Technical meeting.

The DWS recalled its full support to the project and stressed that it will have a coordination role and will liaise with CGS and WRC. The DWS also stated that the official nomination of a new South Africa CFP and legal expert is currently under consideration. Until formal nomination of the South Africa CFP, Mr Ramogale Sekwele (Scientific Manager at DWS) will be the interim CFP.

It was agreed that data collection will be done by CGS supported by other institutions with expertise on groundwater (WRC, DWS Regional office in Kimberley). The CGS confirmed that data collection process would be finished for the technical meeting in October 2014, and the WRC engaged to assist activities as peer reviewers. Representatives from the WRC emphasized that the Stampriet case study will serve as bedrock to other aquifer assessments that have similar issues.

DWS confirmed that South Africa is willing to host the Regional Workshop in October 2014. The meeting should take place at the premises of the WRC. The Director-General (Acting) of DWS will send a formal letter to Ms Blanca Jimenez Cisneros and other country stakeholders confirming its willingness to host the next Regional Technical meeting in end-October 2014. The political meeting finished with UNESCO-IHP providing a briefed planned workflow of the technical meeting of 15 August 2014. After the political meeting, had a meeting with a members of the UN WWAP UNESCO Working Group on gender sensitive water monitoring, assessment and reporting, Barbara Van Koppen (Principal Researcher Poverty, Gender, and Water) at the International Water Management Institute (IWMI) to address the gender component of the project (Figure 16).

Figure 15 – Political Meeting at the Water Research Commission in South Africa

4.3.2. Technical meeting

The main objective of the technical meeting was to identify the availability of hydrogeological, socioeconomic and environmental, and legal and institutional data with the South African NTTG who will implement the project. The technical meeting started with UNESCO-IHP experts presenting the up-to-date methodology of the GGRETA project. Following their presentation, South African NTTG and jointly with South African NTTG identified the availability of hydrogeological, socioeconomic and environmental, and legal and institutional parameters and variables to be collected set out in the methodology for the GGRETA project. The participants than agreed on the priorities and schedule of data collection and processing activities based on the project methodology.

- *Main actions, conclusions and decisions*

Main actions, conclusions and decisions of the technical meeting are listed below:

- South Africa NTTG has clear understanding of the project methodology and planning.
- Clarification of contractual deliverables.
- Agreement on reporting templates that will be made available by UNESCO-IHP.
- Second deliverable set of parameters and variables to end of September will include:
    - A. Physiography and Climate
    - B. Aquifer geometry
    - C.1.1. Natural recharge
    - C.6. Total groundwater volume including percentage extractable and percentage usable (water quality)
    - C.7. Groundwater depletion
    - D. Environmental aspects
    - E. Socio-economic aspects
    - F. Legal and Institutional aspects (Questions 1 to 40)
- Second deliverable set to mid-October which includes data collected for all parameters and variables in accordance to the project methodology. This deliverable should also include processed data to be presented in the Regional Technical Meeting to be held in end-October 2014. Further instruction on processed data deliverables will be given by UNESCO-IHP upon submission of NTTG first deliverable.

Figure 16 - Meeting with Barbara Van Koppen (Principal Researcher Poverty, Gender, and Water) at the International Water Management Institute (IWMI) to address the gender component of the project.

5. General Comments

The mission was very successful in gaining support of governments of South Africa, Botswana, and Namibia for the project. The key partners were informed about the objectives and structure of the project, which found broad agreement and special interest was shown for the GGRETA project gender component and capacity development in international law and water diplomacy. The mission was also an opportunity to meet a large number of regional experts who might participate in the upcoming phases of the project.

During the mission, NTTGs started discussing on data processing and harmonization. For instance, questions such as the percentage of the population depending on the aquifer, and transboundary aspects of the aquifer were raised. Although the Stampriet Transboundary Aquifer System is made up of eleven different geological groups/formations/sub-formationss, the only real "transboundary" aquifers are the confined Nossob; Mukorob; and Auob aquifers. It is recommended that the investigation be restricted to the area of the Prince Albert Formation aquifers which are the only "transboundary" aquifers and the study area be delineated accordingly. Any transboundary monitoring and management of aquifer should be restricted to these. To what degree other aquifers that may or may not be present in individual areas contribute to the total water use; or their groundwater potential needs to be decided on. The non-transboundary aquifers should, however be treated separately.

Annex 1

Agenda of the First Follow up Technical Mission

DAY 1 • Tuesday, 5 August 2014

18:15	**Departure from Paris**

DAY 2 • Wednesday, 6 August 2014 – Gaborone, Botswana

15:10	**Arrival in Gaborone, Bostwana**
17:00 – 19:00	**Working meeting with Prof. Kirchner (Regional Coordinator)**
	Discuss the results obtained in the second phase of data collection in Botswana and prepare follow up meeting with Botswana specialists

DAY 3 • Thursday, 7 August 2014 – Gaborone and Lobatse, Botswana

Objectives

- **To update government representatives from Botswana about project progress**
- **To obtain guidance from government representatives about next activities and project meetings**
- **To access reference materials archived at The Department of Geological Survey, Lobatse**

10:00-12:00	**Official meetings with:** - **Mr. Phofuetsile (Deputy Director of the Department of Water Affairs) TBC** - **Mr Setloboko (Head of Groundwater Division of the Department of Water Affairs)**
13:00-16:00	**Official meeting with:** - **Mr. Ngwisanyi (Director of the Department of Geological Survey)**
	Access reference materials archived at The Department of Geological Survey, Lobatse

DAY 4 • Friday, 8 August 2014 – Gaborone, Botswana

Objectives

- **To follow-up and discuss the results obtained in the second phase of data collection**
- **To provide guidance to the Botswana specialists on the next phase of data collection**
- **To follow-up and discuss the upcoming data collection and harmonization activities**

9:00-12:30	**Working meeting with Botswana national coordinator and specialists**
	Follow-up and discuss the results obtained in the second phase of data collection in accordance with the GGRETA project methodology with Botswana national coordinator and specialists
12:30-13:30	*Lunch*
13:30-16:00	**Working meeting with Botswana national coordinator and specialists**
	Provide guidance to Botswana specialists on the next phase of data collection in accordance with the GGRETA project methodology
16:00-16:15	*Coffee break*
16:15-18:00	**Working meeting with Botswana national coordinator and specialists**
	Follow-up objectives, methodology and organization of the upcoming data collection and harmonization activities with Botswana national coordinator and specialists

DAY 5 • Saturday, 9 August May 2014 – Gaborone, Botswana and Windhoek, Namibia

9:25	**Departure from Gaborone, Bostwana**
17:00	**Arrival in Windhoek, Namibia**

DAY 6 • Sunday, 10 August May 2014 – Stampriet Aquifer area, Namibia

14:00 – 18:00	**Working meeting with Prof. Kirchner (Regional Coordinator)**
	Discuss the results obtained in the second phase of data collection in Namibia and prepare follow up meeting with Namibia specialists

DAY 7 • Monday, 11 August 2014 – Windhoek, Namibia

Objectives

- **To follow-up and discuss the results obtained in the second phase of data collection**
- **To provide guidance to the Namibia specialists in the next phase of data collection**
- **To follow-up objectives, methodology and organization of the upcoming data collection and harmonization activities**
- **To update government representatives from Namibia about project progress**
- **To obtain guidance from government representatives about next activities and project meetings**

9:00-12:30	**Working meeting with Namibia national coordinator and specialists**
	Follow-up and discuss the results obtained in the second phase of data collection in accordance with the GGRETA project methodology with Namibia national coordinator and specialists
12:30-13:30	*Lunch*
13:30-16:00	**Working meeting with Namibia national coordinator and specialists**
	Provide guidance to Namibia specialists on the next phase of data collection in accordance with the GGRETA project methodology
16:00-16:15	*Coffee break*
16:15-17:00	**Working meeting with Namibia national coordinator and specialists**
	Follow-up objectives, methodology and organization of the upcoming data collection and harmonization activities with Namibia national coordinator and specialists
17:00-18:00	**Official meeting with Mr. Nehemia (Under-Secretary of the Department of Water Affairs)**

DAY 8 • Tuesday, 12 August May 2014 – Stampriet Aquifer area, Namibia

Objectives

- **Field visit to the Stampriet Aquifer in order to view features of the region, meet local communities and view possible areas/sites for field work if required to fill data gaps**

06:00	**Departure from Windhoek, Namibia**

DAY 9 • Wednesday, 13 August 2014 – Stampriet Aquifer area and Windhoek, Namibia

14:00	**Arrival in Windhoek, Namibia**
16:35	**Departure from Windhoek, Namibia**

DAY 10 • Thursday, 14 August 2014 – Pretoria, South Africa

Objectives

- **To update government representatives from South Africa about project progress**
- **To obtain guidance from government representatives about next activities and project meetings**
- **To discuss strategies for the collection of gender-disaggregated water indicators with members of the UN WWAP UNESCO Working Group on gender sensitive water monitoring, assessment and reporting**

10:00-13:00	**Official meeting with representatives of:** - **Department of Water and Sanitation** - **Department of International Relations and Cooperation** - **Department of Science and Technology** - **UNESCO IHP National Committee of South Africa** - **South Africa National Committee for UNESCO** - **Council for Geoscience**
	To update about progress and discussing next activities and project meetings
13:00-14:00	*Lunch*
16:00-18:00	**Working meeting with Ms. Barbara Van Koppen (Principal Researcher Poverty, Gender and Water, Southern Africa Regional Program - International Water Management Institute)**
	Discuss strategies for the collection of gender-disaggregated water indicators

DAY 11 • Friday, 15 August 2014 – Pretoria, South Africa

Objectives

- **To follow-up and discuss the results obtained in the second phase of data collection**
- **To provide guidance to the South Africa specialists on the next phase of data collection**
- **To follow-up objectives, methodology and organization of the upcoming data collection and harmonization activities**

9:00-13:30	**Working meeting with representatives of the Department of Water and Sanitation, Water Research Commission , South Africa GGRETA project national coordinator and specialists**
	- Follow-up and discuss the availability of data in accordance with the

	GGRETA project methodology with the South Africa national coordinator and specialists - Provide guidance to South Africa specialists on the next phase of data collection in accordance with the GGRETA project methodology - Follow-up objectives, methodology and organization of the upcoming data collection and harmonization activities with South Africa national coordinator and specialists

Annex 2

List of participants of the Political Meeting in South Africa

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Annex 3

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