



**Swiss Agency for Development
and Cooperation SDC**

Groundwater Resources Governance in

Transboundary Aquifers

Kalahari-Karoo/Stampriet Aquifer

REPORT

FIRST REGIONAL MEETING

UN House, Windhoek, Namibia

22-24 October 2013



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LIST OF ABBREVIATIONS

BGR	German Federal Institute for Geosciences and Natural Resources
CFP	Country Focal Point
DPSIR	Drivers – Pressure – State – Impact - Response
GEF	Global Environment Facility
GIZ	German Development Cooperation
IGRAC	UNESCO category 2 International centre on Groundwater Resources Assessment
RBO	River Basin Organization
IMS	Information Management System
ISARM	UNESCO Programme on Shared Aquifer Resources Management
IWMI	International Water Management Institute
IWRM	Integrated Water Resources Management
LME	Large Marine Ecosystem
MCCB	Multi Country Consultative Body
NTTG	National Technical Transboundary Group
ORASECOM	Orange-Senqu River Commission
PC	Project Coordinator
SADC	Southern Africa Development Community
SC	Steering Committee
SDC	Swiss Agency for Development and Cooperation
TBA	Transboundary Aquifer
TOR	Terms of Reference
TWAP	Transboundary Waters Assessment Programme
UNESCO-IHP	United Nations Educational, Scientific and Cultural Organization International Hydrological Programme

1. Introduction

The Swiss Agency for Development and Cooperation (SDC) has entrusted UNESCO IHP with the execution of the global project “Groundwater Resources Governance in Transboundary Aquifers”. The project aims to conduct a detailed assessment of the characteristics, current state and management of transboundary aquifers in three case study areas and to lay the foundations for a multi-country consultative body. The three aquifers - case studies selected for this project are:

- Kalahari-Karoo/Stampriet Aquifer in Botswana, Namibia, South Africa.
- Pretashkent Aquifer in Kazakhstan and Uzbekistan,
- Esquipulas-Ocotepeque-Citalá (Trifinio) Aquifer in Honduras, El Salvador and Guatemala

The proposal to choose the Kalahari-Karoo/Stampriet Aquifer as one of the case studies (in further text: the Stampriet Project) in this project goes back to an initiative of the aquifer sharing countries: in the framework of the UNESCO International Shared Aquifer Resources Management (ISARM) SADC programme, representatives of Botswana, Namibia and South Africa proposed to initiate activities aimed at improving the knowledge about the Kalahari-Karoo/Stampriet transboundary aquifer and facilitate its joint management.

The First Regional Meeting of the Stampriet Project was held in Windhoek, Namibia, in the premises of UN House, on 22-24 October 2013. It was organized by the UNESCO IHP programme Secretariat with the support of the UNESCO category two International Centre for Groundwater Resources Assessment Centre (IGRAC) and the UNESCO office in Windhoek. The Agenda of the Workshop is attached as **Annex 1** to this report. Representatives and stakeholders from the three project countries as well as national regional and international donor and scientific institutions attended the workshop. The List of Participants is attached as **Annex 2** to this report. The main objectives of the workshop were to:

- Start the formal cooperation amongst the three countries sharing the Stampriet aquifer and update all parties on the progress of the project’s implementation;
- Ensure that are familiar with the objectives, activities, budget, deliverables and approach to the implementation of the project and that all parties agree on the actions to be taken and on the workplan to follow;
- Present the roles, functions, and responsibilities of project stakeholders, project’s Country Focal Points (CFPs) and other project partners;
- Present a preliminary estimate of the current state of data availability and ownership, required harmonization, and formatting;
- Discuss the assessment methodology and provide ideas for its adaptation to local conditions, including potential identification of additional, aquifer specific, indicators and potential field works (limited);
- Present, discuss, amend if needed, and adopt the project's overall workplan; and
- Agree on next steps and project milestones.

2. Project Objectives and Outcomes

The main goal of the Stampriet Project is to improve the scientific knowledge base on the shared aquifer and to facilitate transboundary cooperation towards its joint management. It is expected that the project will lead to enhanced water security, enhanced transboundary cooperation in groundwater management, and improved environmental sustainability in the aquifer's region. The project aims to reinforce the capacity of Member States in managing groundwater resources, strengthen cooperation among countries sharing the aquifer; and develop a long-term strategy for the monitoring and governance of the Kalahari-Karoo/Stampriet Aquifer. The expected outcomes of the project are:

- Improved knowledge on the Kalahari-Karoo/Stampriet Aquifer including recognition of its vulnerability;
- Developed shared aquifer's management tools;
- Countries sharing the Kalahari-Karoo/Stampriet Aquifer cooperate for the sustainable management of the joint water resource;
- Countries agree to take steps to deal with its transboundary implications through the political commitment to define and implement national and regional priority actions for the protection and equitable utilization of the aquifers.

3. Project Implementation Strategy

The project implementation strategy is based on the UNESCO ISARM guidelines and their multidisciplinary approach to transboundary aquifers governance and management, addressing scientific, socio-economic, legal, institutional, and environmental aspects. The Stampriet Project will be implemented in 2 components:

- **Component 1:** Building recognition of the shared nature of the resource, and mutual trust through an indicator based assessment based on joint fact finding and science based diagnostics. This component will focus on the assessment of the hydrogeological, environmental, socio-economic conditions, governance, legal and institutional frameworks, including the identification of issues of transboundary concern. The outputs of this component will be: (1) Indicator-based assessment & diagnostic analysis; and (2) Information Management System (IMS)
- **Component 2:** Reaching consensus on transboundary governance mechanisms for groundwater management. The focus of this component will be on improved groundwater governance, aimed at establishing cooperation mechanisms for transboundary groundwater management at the aquifer level and at the agreement on priorities for country actions to address the identified issues of transboundary concern.

Public participation including all relevant stakeholders will be carried out throughout the project implementation. Within the implementation of Component 1, a consultation process among countries will be initiated to reach an agreement on the priority issues. The implementation of Component 2 will give time to the full array of local and national stakeholders to familiarize with and take ownership of the project's objectives leading to improved groundwater governance in the Kalahari-Karoo/Stampriet Aquifer.

4. Project Execution Arrangements

The Stampriet Project will be executed by UNESCO-IHP in cooperation with IGRAC. All activities will be carried out in close coordination with governmental authorities including the UNESCO IHP national committees in the three countries (Botswana, Namibia, South Africa) and regional partners. Existing organisations at the regional level (SADC and ORASECOM) have been involved in the process from the very beginning and are expected to play an important role throughout the project implementation, e.g. by identifying synergies with other relevant initiatives in the region. In each project country one governmental lead partner has been identified as a Country Focal Point (CFP) to facilitate and coordinate actions within the respective country, namely:

- Namibia: Department of Water Affairs and Forestry of the Ministry of Agriculture, Water and Forestry;
- Botswana: Department of Water Affairs of the Ministry of Minerals, Energy and Water Resources;
- South Africa: Department of Water Affairs of the Ministry of Water and Environmental Affairs

At the meeting it was agreed that a Project Coordinator will be contracted to lead the activities of the Stampriet Project in all three countries. He/she will guide and assist National Experts, i.e. members of the National Technical TBA Groups (NTTGs) in executing their tasks. NTTGs will be formed in each project country and will consist of one expert on hydrogeology, one expert on environment and socio-economics, and one expert on legal and institutional frameworks. Although the project is aquifer (regionally) based, the data collection will primarily take place at the country level. The aggregation and harmonization of the collected data to the transboundary level will be one of the tasks of the Project Coordinator to organize in close cooperation with the National Experts.

The Steering Committee (SC) of the Stampriet Project will consist of: representatives from governmental lead partners from each of the three countries (Country Focal Points), UNESCO-IHP (project executing agency); IGRAC (UNESCO International Groundwater Centre); and SADC. Additional relevant parties, such as ORASECOM, will be invited to cooperate.

The project started in mid-2013, and its completion is expected in December 2015. The donor has indicated the possibility for a follow-up phase in 2016-2017.

5. Summary of Main Decisions and Recommendations of the First Regional Meeting

Main conclusions and decisions taken during the First Regional Meeting included the following:

- 5a. The project implementation plan was supported by the three aquifer sharing countries and partners.
- 5b. The project methodology prepared by UNESCO and IGRAC including the parameters, variables and 20 indicators which have been proposed, have been approved and will be used in the project. Some indicators may have to be fine-tuned, and an additional indicator may need to be defined. Indicators will not be prioritised. If not enough data

exist to develop an indicator in a certain part of the aquifer that will constitute an important data gap; the indicator will still be calculated for other parts of the aquifer. The methodology will need fine tuning based on the suggestions made during the meeting (See below in detailed report of Day 2 - Session 2). One of the first tasks of the Stampriet Project Coordinator will be to fine-tune and finalise the methodology for the project.

- 5c. Existing data and information on Kalahari-Karoo/Stampriet Aquifer are extensive and can be considered as a solid basis for the implementation of the project. However the data and information will have to be collected from multiple sources (different departments and/or data bases). Some data gaps have been identified. Also, harmonization of data from different sources and countries will be a major challenge.
- 5d. Due to the heterogeneity of the Kalahari-Karoo/Stampriet Aquifer (in terms of hydrogeology and socio-economics, in particular), sub regions within the aquifer will have to be defined.
- 5e. The proposed design and functionality of the Information Management System (IMS) that will be developed by IGRAC was well received. The IMS will by no means be a replacement of existing national databases (with raw data). The IMS intends to be a repository for interpreted (and harmonized) data aiming to be a tool in support of the governance of the shared groundwater resources. Where relevant, and possible, dynamic links will be established with existing databases at national level to exchange information. Countries will retain full ownership of the data. It was stated that for the purpose of the project and for reasons of sustainability, IGRAC is prepared to host the IMS during the project's implementation. The move of the database to the region after the project's completion has to be planned.
- 5f. Capacity building activities will be focused on the needs of the project. Given the limited budget for training, it was decided to focus the capacity building on in-team capacity building. In practice, it means that National Experts (members of the NTTGs) can be trained on-the-job in the course of the project. It was also suggested to make use of the wealth of knowledge, experience and skills of senior experts in countries for capacity building purposes.
- 5g. The project team will prepare the Stakeholder Analysis, while the communication strategy will be implemented using the local communication experts and media;
- 5h. The Stampriet Project Coordinator will be hosted by Namibia at the Southern African Science Service Centre for Climate Change and Adaptive Land Use (SASSCAL).
- 5i. The Stampriet Project Coordinator post will be advertised by UNESCO IHP.
- 5j. The Project Team (composed of three NTTGs) will be established after UNESCO IHP will prepare the Terms of Reference for the national experts. Each country will propose three candidates for each position after which UNESCO-IHP will select the members of the project team.

6. Detailed Report of the First Regional Meeting *

Day 1 (Tuesday, 22 October 2013)

Session 1: Opening Session

Opening addresses

The opening ceremony of the Workshop was chaired by Mr. Abraham Nehemia, Under-Secretary of the Department of Water Affairs of the Ministry of Agriculture, Water and Rural Development of Namibia. He invited, first, Mr. Damir Dijakovic, who spoke on behalf of Ms. Cecile Barbieri, Head of UNESCO Office in Windhoek. Mr. Dijakovic stressed the importance of water in the Southern Africa Region, and the role UNESCO IHP is playing in assisting countries to improve water resources management. He also thanked the Swiss Agency for Development and Cooperation for its financial support to this project. He expressed hope that this workshop will contribute to better understanding of the importance of the Kalahari-Karoo/Stampriet groundwater resource in a region that is critically dependent on it.

In his speech, Hon. John Mutorwa, Minister of Agriculture, Water and Rural Development of Namibia mentioned his particular affinity for UNESCO, originating from the days when he was a teacher. He applauded UNESCO IHP endeavours to assist countries and their people to rationally manage their water resources, in particular the groundwater ones. He expressed Namibia's full support for this project, which is being implemented at a moment when Namibia is adopting Water Resources Management Act. The Act, as well as this project, will certainly contribute to a better cognizance of Namibia's rights for but also its obligations towards management of shared water resources. Hon. Minister Mutorwa stressed the fact that water must be considered as precious resource, particularly in times of drought, which Namibia is experiencing for some time now. Having this in mind, he presented a view that water research, which his country is supporting very much, will be efficient only if its results are being used to solve practical problems, as well as hope that this project will be a positive example of linking science with practice. Expressing his country's high appreciation for what this project is doing, Hon. Mutorwa officially opened the workshop. The full text of Hon. Minister Mutorwa's speech is given as **Annex 4** to this report.

Introduction to the overall Project "Groundwater Resources Governance in Transboundary Aquifers" and to the Kalahari-Karoo/Stampriet Case Study

Three introductory presentations on the Stampriet Project's context and two presentations describing other complementary initiatives in the region were made. Mr. Holger Treidel (UNESCO-IHP) gave an overview of the history and achievements of the UNESCO's water family and the International Hydrological Programme (IHP) in particular, which is the only global intergovernmental scientific programme on water resources in the UN system. UNESCO Division of Water Section on Groundwater Resources is acting as secretariat of the UNESCO IHP Council and is responsible for several initiatives and projects, of which ISARM is one of the flagship programmes. ISARM is building the transboundary aquifers inventory of TBAs and formulating guidelines for management of groundwater resources shared between two or more States. More than 400 transboundary aquifers were identified around the world. Mr. Treidel closed his presentation describing the link existing between the Stampriet

* All PowerPoint presentations will be made available at a later stage through the project website (under construction).

project and the Transboundary Waters Assessment Programme (TWAP) component on Groundwater executed by UNESCO and financed by the GEF. In this framework UNESCO is conducting an indicator-based global assessment of transboundary Aquifers, UNESCO Oceanographic Commission is executing the component on Large Marine Ecosystems and Open Oceans while other agencies are responsible for the transboundary Rivers and Lakes assessments. The UNESCO global transboundary aquifers assessment is largely based on ISARM data, that were carried out in cooperation with partners at national, regional and global level. The TWAP Groundwater Component, executed by UNESCO IHP is closely linked with this project as both projects are sharing a common methodology prepared by UNESCO IGRAC (indicator based assessment).

Mr. Ivica Trumbic (UNESCO-IHP) presented the “Groundwater Resources Governance in Transboundary Aquifers” project, executed by UNESCO-IHP and financially supported by the Swiss Agency for Development and Cooperation. This project is the umbrella project of the Stampriet Project. Its goals are to: (1) enhance cooperation on water security, (2) reduce transboundary and water-use conflicts, and (3) improve overall environmental sustainability in TBA regions. It is expected that the project will: (1) reinforce the capacity of Member States in managing groundwater resources, (2) strengthen cooperation among countries sharing the aquifer, (3) develop a long term strategy for the monitoring and governance of the transboundary aquifer, and (4) assist countries to define and implement national and regional priority actions for the protection and equitable utilization of the aquifers. Its operational objectives are to: (1) improve the knowledge and recognition of the importance and vulnerability of transboundary groundwater resources, (2) strengthen cross-border dialogue and cooperation, (3) develop shared management tools, and (4) facilitate governance reforms focused on improving livelihoods, economic development and environmental sustainability. Mr. Trumbic mentioned that three case studies were selected: Kalahari-Karoo/Stampriet Aquifer, shared by Botswana, Namibia, and South Africa; Esquipulas-Ocotepeque-Citalá (Trifinio) Aquifer, shared by El Salvador, Guatemala, and Honduras; and Pretashkent Aquifer, shared by Kazakhstan and Uzbekistan. The overall project will have 2 components: (1) building recognition of the shared nature of the resource, and mutual trust through joint fact finding and science based diagnostics; and (2) reaching consensus on transboundary governance mechanisms. Finally, Mr. Trumbic said that Kalahari-Karoo/Stampriet was selected because of the long history of cooperation on transboundary waters in the region, and a specific request of these countries to conduct an in-depth assessment of the Kalahari-Karoo/Stampriet Aquifer.

The final introductory presentation was given by Mr. Treidel, who described the activities and execution arrangements of the Stampriet Project. He presented in greater detail the activities in each component of the project. Component 1 will have 2 outputs and following activities: elaboration of aquifer specific methodology, data and information collection and processing, assessment, proposal for Harmonized Monitoring Network, Information Management System (IMS) design, development and testing, data harmonization, processing and input, and training and technical capacity building. The Component 2 will also have 2 outputs, which will be carried out through the following activities: review existing institutions and mechanisms and their mandates, analysis of elements for technical and organizational synergy, definition of the operational manual, and training on International Law related to TBAs. It is envisaged that financial support will be sought for Phase 2 (post 2015) of the project with the aim of establishing full cooperation mechanisms among countries sharing the aquifers and facilitating priority actions and policy reforms envisaged in Phase 1 of the project. Closing his presentation, Mr. Treidel presented briefly the project execution arrangements, which will consist of the Steering Committee and the

Project Team (Stampriet Project Coordinator and National Experts from each country on Hydrogeology, Environment and Socio-Economics, and Legal and Institutional Frameworks). The National Teams will be fully supported by: UNESCO-IHP and UNESCO Windhoek Office, and IGRAC. The total budget for the Stampriet project is USD 506,000 (Component 1 - USD 460,000; Component 2 - USD 46,000). The tentative budget breakdown by items was presented:

- Collection and harmonization of data, data management system, stakeholder analysis, transboundary mapping, diagnostic report and assessment , contracts with National Experts and Stampriet Project Coordinator: 260.000
- Data collection and field campaigns: USD 70,000;
- Meetings and Capacity building: USD 150,000;
- Communication: USD 25,000.

The Project Document that was provided in advance to all invited participants and approved by national institutions contained more detailed information and all details were discussed during the workshop.

Speaking on behalf of IWMI, Ms. Karen Villholth gave a presentation on the activities of her institution in the region. After a brief introduction on the context of groundwater resources management, which is largely determined by the fact that it is a highly invisible resource, she stressed that this project comes at the right time for the groundwater resources management in this region. While currently there are no tensions revolving around the issue of groundwater resources in the Kalahari-Karoo/Stampriet Aquifer region, this project is largely aiming at preventing possible tensions in the future. Ms. Villholth acknowledged the achievements of ISARM, under which the mapping of TBAs in Africa started in 2004. It serves as the basis for management of groundwater resources today. Further, Ms. Villholth presented the activities of IWMI and other partners active in the region (BGR, CapNet/AGW-Net, IGRAC): needs assessment for groundwater management in African countries, including report on 9 RBOs; the stakeholders' workshop which outlined specific capacity building activities; training manual and training course on integrating groundwater in African RBOs where ORASECOM has been targeted as the first one where this will be implemented; and, most recently, the detailed look into the Ramotswa Aquifer that is expected to result, among other, in a very detailed aquifer characterization. She concluded that aquifer mapping in Africa is in an advanced stage, thanks to ISARM, while one of the immediate tasks will be to assess how the Draft Articles annexed to the "Law of Transboundary Aquifers"* will support inclusion of TBAs in the cross border agreements, which may have direct relevance for this project.

Mr. Martin Quinger (BGR) presented the project "Advanced Groundwater Management in Namibia. The New National Groundwater Database GROWAS II". This is the project supported by German Development Cooperation (GIZ) and German Federal Institute for Geosciences and Natural Resources (BGR). Although the study area of the project is in the North of Namibia, Mr. Quinger reckons that there are quite a few instances where synergy between the two projects can be achieved. The history of groundwater data management in Namibia dates back to the late seventies. Since then, a number of projects to improve data management have been implemented. The GROWAS II project is being implemented for two years now. It has improved significantly the groundwater database in Namibia, increasing its user-friendliness, adapting it to Namibian requirements, achieving

* UNGA resolution A/RES/63/124.

high quality management standards and respecting the regional conformity of data. As a next step, an Information Management System for groundwater will be developed in Namibia. It will be fed by local networks being part of Directorate of Water Resources Management, Non-governmental water authorities (such as NamWater) and water resources related authorities. The objective is to create a Decision Support System for decision makers. Mr. Quinger finished his presentation by mentioning other products that could spin-off from this project such as Vulnerability Assessment Studies (to be used by land use planners), recommendations for National Guidelines, Drought Monitoring Framework, etc. Mr. Quinger explained that the data will be cost free but the decision on the terms of use will be decided by the relevant ministry; that the data base software will be an open source one; and that a backup system will be in place in order to avoid loss of data, as it has happened repeatedly in the past. Finally, the existence of a Groundwater Related Information Metadatabase (GRIM) was mentioned, containing approximately 150 documents on the Kalahari-Karoo/Stampriet Aquifer, which will be very instrumental to the project.

It was considered that one of UNESCO IHP objectives is to support coordination of water related activities and programmes existing at national and regional level. Therefore UNESCO IHP is looking for the close cooperation with all possible activities in the country. The cooperation between existing projects was welcomed by all participants.

Selection of national Experts

In the discussion that followed, a question was raised how the experts in national teams will be selected. It was explained that UNESCO official procedures will be followed, meaning that in every country the government lead partner (Country Focal Point) will be requested to propose the CV of 3 experts for each position and UNESCO will make a selection based on their CVs.

Data Collection

In conclusion it was stressed that the budget to fill data gaps through field campaigns is limited and that the project has to make its best to collect and compile all possible relevant existing data and information.

Session 2: Technical Workshop to Adopt Workplan and Methodology

Session 2 in the afternoon of Day 1 was chaired by Mr. L. Z. Maswuma, the Director of Hydrological Services of the Department of Water Affairs of South Africa.

Mr. Geert-Jan Nijsten (IGRAC) gave a presentation on Data Collection and Transboundary Harmonization, and Aquifer Characterization. Aquifer Assessment is a process which can be divided in three steps: consideration of all available facts about the aquifer, a judgment or opinion of the situation of the aquifer (based on indicators), and of what is likely to happen in the future (projections). The notion of 'all available facts' includes a number of 'static' parameters describing the aquifer and a number of time dependent variable describing state, drivers, pressures etc. In the methodology these variables have been grouped along the idea of the DPSIR Framework. Mr. Nijsten, then, presented in more detail the nature of the time dependent variables. The second step is building the structure of indicators, which are a way of expressing complex systems in simplified manner. The Stampriet project

envisages that assessment is being done through 20 indicators in 6 categories. These indicator groups were presented in more detail. Mr. Nijsten concluded his presentation by briefly explaining the third assessment step, which is the creation of indicative projections for the year 2030 and 2050. For these projections, only a limited set of 4 indicators will be used: annual amount of renewable groundwater resources per capita, human dependency on groundwater, population density, and groundwater development stress. They will be calculated by the University of Frankfurt using the (global) WaterGAP model.

This session was continued with the presentation on the current state of information management in the three countries sharing the Kalahari-Karoo/Stampriet Aquifer. Mr. O. T. Obakeng, Director of the Department of Water Affairs of the Ministry of Minerals, Energy and Water Resources of Botswana, gave an introduction on the current situation in his country. In Botswana the Kalahari-Karoo/Stampriet Aquifer falls in two administrative districts: Gantsi District and Kgalagadi District. The area is characterized by limited topographic variations, with vegetated sand dunes, dry river valleys and pans being the main geomorphologic units. He also gave a brief overview of main existing data sources and organizations where these sources are located, stating that a lot of data are available, but they are available from different departments and offices. Mr. Obakeng then invited Mr. Theto Setobloko, from the same department, to present in more detail the available geological and hydrogeological data. Mr. Setobloko presented several typical examples of the available maps and data on water quality indicating that data monitoring is carried out on a monthly basis. Most of the data can be extracted online.

Ms. Aina N. Iloka, from the Department of Water Affairs of Namibia, gave a presentation on the current state of information management in Namibia, on behalf of Mr. Nehemia who was unable to attend the session. The Kalahari-Karoo/Stampriet Aquifer is the biggest aquifer in Namibia, consisting of two river catchment areas: Auob and Nossob, roughly of the same size and both belonging to the Orange-Senqu Basin. Ms. Iloka continued by describing several important aspects of the aquifer, namely the geomorphology, meteorology-hydrology, hydrogeological classification, and water quality. Closing the presentation, she acknowledged Japan International Cooperation agency (JICA) and Prof. Kirchner for providing data for her presentation.

The South African perspective on Kalahari-Karoo/Stampriet Aquifer was presented by Ms. N. Motebe, from the Department of Water Affairs. She elaborated extensively on the policy, legal and institutional aspects of groundwater management. Data are collected by several institutions: National Groundwater Archives, Water Management System of the Department of Water Affairs and other university and scientific institutions and several parastatal bodies. Ms. Motebe stressed the importance of harmonization of data expressed through the following: the need to “talk the same language” in all three countries of the Kalahari-Karoo/Stampriet Aquifer when it comes to data on groundwater resources; the fact that they have the baseline data already gathered and want to maximize their utilization; and the need to raise the profile of high impact areas affected either by climate change or by over-abstraction. She concluded her presentation by mentioning that a lot of effort was made since 2000, largely thanks to ISARM, to fill the data gaps; that there is a desire to adapt to the existing groundwater governance arrangements, which means that existing institutions need to be more active; that they would like to benefit from dissemination of best practices in groundwater management, including raising the awareness on impacts of climate change and resulting vulnerability of groundwater resources; and increasing the role of women in IWRM.

Harmonization of data across the borders

Harmonization of data between countries remains a challenge that will have to be addressed by the project. In the discussion that followed, the participants brought up a number of important issues, the most important being: the availability and quality of data, the crucial issue of the harmonization of data, incentive for countries to establish the groundwater governance system, and the need to communicate properly the project's findings. It is essential to achieve good coordination to agree on the spatial characteristic and the delineation of the aquifer. Thus, in Botswana part of the delineation is only known by approximation. It is also important to define aquifer storage and water extraction rates. Extraction rates were mentioned as a potentially very important data gap. It was also argued that imperfect, incomplete or even lack of data should however never be used as an excuse to not take action. It is important, because only harmonized data can significantly improve management of the groundwater resource at the transboundary level. Regarding incentives, participants agreed that appropriate funding is a necessary pre-condition for groundwater resources management.

Communication

Finally attention was given to the issue of communication. Participants agreed that there are three levels of communication: highly technical, aimed at experts working in the field; information for decision-makers (i.e. interpreted data presented in a simplified form); and information communicated to the wider audience, such as farmers and other stakeholders. If, for example, farmers get a better understanding of how the groundwater system functions and if they get involved in its management, they are more likely to accept changes. In this context, an example was given of the need to explain in normal language what something like 'depletion' means to a farmer, so they can take appropriate action. Good communication strategy can be very helpful to establish trust amongst stakeholders and this includes confidence in each other's data in particular if consider downstream-upstream relations.

Day 2 (Wednesday, 23 October 2013)

Session 2: Technical Workshop to Adopt Workplan and Methodology (Contd.)

The second part of Session 2 was chaired by Mr. Obakeng, Director of Water Affairs, Ministry of Minerals, Energy and Water Resources of Botswana).

Mr. Nijsten (IGRAC) gave a presentation that focused on three major issues: harmonization of data; visualization, i.e. making "the invisible visible"; and development of indicators. Illustrating with several examples, he stressed that data harmonization is one of the biggest challenges of the project, as data are, to a large extent, available while their format differs among countries; it essentially means developing a "common language" for data presentation. One of the tasks, for example, will be to agree on units for each variable even though they may be reported in different units in the national databases. Harmonisation also includes: agreeing on the name of the aquifer and geological formations; agreeing on a conceptual model; and, finally, agreeing on classifications. In terms of visualization, maps, cross sections, conceptual models, diagrams, etc. will have to follow the common rules of presentation, but they also have to emerge from a very clear and common concept. The objective is to communicate to decision makers a clear message on the current state and

trends of the groundwater resources in the aquifer. All the above will also serve to develop indicators. Mr. Nijsten presented the full list of 20 proposed indicators, divided in three sub-groups (hydrogeology, socio-economics, and legal and institutional). He finished by stressing the important point of the spatial unit for which the indicators will be developed. Mr. Nijsten proposed that the Kalahari-Karoo/Stampriet Aquifer area be divided, for example in administrative units, but this issue will have to be discussed as soon as the national project groups (NTTG) start their work.

The ensuing discussion revolved around the three issues mentioned in Mr. Nijsten's presentation. In this respect, the need for clear messages to be sent to various target groups was reiterated. Messages need to build on scientific results, but have to be formulated in a way that is understandable to the target group (non-scientists). Some participants suggested that it would be useful to divide the aquifer area in sub-units based on, for example, land use as that will differentiate the intensity of use between rural and urban uses, etc. A proposal was also made to first build a conceptual model based on DPSIR and then decide which thematic maps are needed. The final decision will be taken by the project team (Project Coordinator and NTTGs). Large part of the discussion focused on indicators. There was a lengthy debate about feasibility of some of the indicators, considering that there will probably be data gaps, and whether indicators should be prioritised. The final conclusions of the discussion were:

- The indicators are considered very useful and well thought out, and they will be adopted in the Stampriet Project.
- One or two of the indicators might need some fine-tuning to adapt them to the Stampriet conditions, such as ecosystem dependency on groundwater. The example was given of the Kalahari-Gemsbok National Park where there is a specific dependency of wildlife on groundwater as wildlife is provided with water through boreholes. The proposed indicator on ecosystem dependency on groundwater doesn't cover this important use of groundwater. It was also suggested it would be useful to define an additional / alternative indicator describing bore hole yield in relation to population. And it was suggested to translate some of the indicators into economic values to show that groundwater resources are an economic asset.
- Definitions of all indicators need to be very clear and unambiguous.
- Indicators will not be prioritised. If it is not possible to apply an indicator to the aquifer or any of its parts (for example, national segment of the aquifer) that will not be a reason to drop the indicator. It will simply mean that an important data gap has been identified.

Mr. Phera Ramoeli (SADC) presented an overview of the SADC transboundary water management with an emphasis on river basin management. SADC region has 15 Transboundary River Basins between the 12 continental member states, 20 currently identified Transboundary Aquifers. Aquifers generally are not well understood or defined. After exposing the institutional structure of SADC in water sector, Mr. Ramoeli went on describing the background to the SADC Water Programme. He also presented the existing legal, policy and strategic instruments in the SADC region, including Protocol on Shared Watercourses, Regional Water Policy and Strategy, Regional Strategic Action Plan on Integrated Water Resources Management and Development and other. The Regional Protocol on Shared Watercourses is of special importance. Its revised version came into force in 2003. The main objective of the Protocol is to foster closer cooperation for judicious, sustainable and coordinated management, protection and utilization of shared watercourses

and advance the SADC agenda of regional integration and poverty alleviation. Mr. Ramoeli continued with a description of the SADC Groundwater Management Programme, which was developed with the support of UNEP and consists of 10 specific activities. He also elaborated on major challenges and expected outcomes. Mr. Ramoeli further presented current activities in the SADC groundwater programme, namely: the Groundwater Management Programme (Phase 2); SADC Hydrogeological Map; SADC Regional Monitoring Network; Regional Groundwater Statistics; Guidelines for Groundwater Development; and Groundwater Management Institute. In his concluding remarks, Mr. Ramoeli mentioned that water resources in SADC region should be considered as an opportunity for cooperation and peace rather than cause for conflict.

In the second presentation of this session Mr. Nijsten (IGRAC) presented the proposed Groundwater Information Management System called the Global Groundwater Information System (GGIS), which he described as an information management system for interpreted data and documents to support transboundary aquifers management. As such, it is very different from the existing national databases containing raw monitoring data. The project's Information Management System (IMS) will display indicators, parameters, thematic maps, background maps, documents and meta information. It will be open to the public and allow making overlays with different types of information, be a query tool and show metadata and map features. National Experts will be able to upload information about the national segments of the TBAs in their territory. Information uploaded into the system will include maps and documents. It will remain to be seen if uploading of maps (with scale and projection issues) can be made user-friendly enough so it can be done without having to involve the administrator (IGRAC). The system will not be designed only for the Stampriet Project. It will also be used for two other case studies in this project (Trifinio and Pretashkent). Also, the system will be part of a large IMS hosted by IGRAC, which contains all kinds of (global) groundwater information from projects and their databases such as GGMN, TWAP. Sub-sets of data (like those from the Stampriet Project) will be available through clearly distinct modules. Mr. Nijsten concluded his presentation by explaining the roles of main GGIS actors: IGRAC/UNESCO, the Project Coordinators and the National Experts. IGRAC will develop and maintain the Information Management System and create all necessary protocols to coordinate and facilitate data collection, processing, harmonization and input. Moreover, the data base will be hosted by IGRAC, so it will also have the function of an independent repository of information during the project time frame and beyond. The main task of the regional coordinators is to assist National experts in all the steps to transform raw data into information useful for the project and compatible with the Information Management System. National Experts will collect data and information based on the methodology and following the protocols and guidance of the Project Coordinators and IGRAC/UNESCO.

In the discussion that followed several questions were raised, namely:

- What would be the long term sustainability of the system, i.e. how the system will work after the life of the project? IGRAC will develop, host and maintain the system throughout the duration of the project (until the end of 2015). It could be possible that IGRAC could maintain the system after 2015, but under a different set of conditions which will need to be discussed in due course. Some participants stated that for the sustainability of the system it is actually very good if IGRAC hosts the system. It also prevents diverging of the system. Others argued that in the long run it would be better if the future home base of the system will be in the region, while IGRAC can still offer its services. As potential homes for this kind of system

ORASECOM, SADC and the Groundwater Research Institute were mentioned. IGRAC will include in the technical requirements that attention should be given during the project execution to create the local conditions for the data base be transferred to the region after the project. Also relevant is the question who will continue to feed the system. That should be done by authorised national experts who are appointed by the project's Country Focal Points. It is important to note that, wherever the system will be located, ownership of the data will stay with the Kalahari-Karoo/Stampriet Aquifer countries.

- Does the system already exist and if yes, is it available online only? It was answered that the system is being developed and that is not yet operational. It will be an on-line system only, but if the off-line option is requested such development could be considered too. This however poses a lot of difficulties in terms of version management (diversion of system) and is therefore not IGRAC's recommendation. Also, the request was made to provide a back-up system in order to avoid the situation when data are lost, as it happened several times in the past. It was suggested that the formats for data input should become available as soon as possible and not only once the system will be developed. Otherwise, the need for conversions might lead to delays.
- Which local information is available to feed the system? Countries have confirmed the local availability of data. But a lot of time and effort of the Project Team will have to go into harmonisation, interpretation and conceptualisation.

Session 3: Capacity Building and Modification to the Workplan

This session was chaired by Mr. G.J. Nijsten (IGRAC).

Mr. Ivica Trumbic (UNESCO IHP) presented an outline of the capacity building activities in the Stampriet Project. He stressed that capacity building usually takes place at 3 levels: individual, organizational/institutional, and societal. He said that the capacity building in this project should affect, albeit to a different degree, all three mentioned levels. The project's workplan has capacity building both explicitly mentioned in some of its activities, such as Training on International Law related to TBA, and integrated in most of other activities. Closing his presentation, Mr. Trumbic invited participants to express their views on the key capacities required in this project.

In the discussion that followed, several participants stressed the need to make assessment of capacities in institutions and, based on that, devise the capacity building programme. For this purpose, it was proposed that a questionnaire to respective institutions and organisations could be sent. It was also mentioned that this assessment should be carried out at several levels, ranging from the technical level, to the level where individual water users will be encompassed, as they could greatly contribute to data gathering, for example. In this respect, the IWMI representative talked about a capacity building needs assessment for RBOs, which IWMI has carried out several years ago. The assessment concluded that the capacity building needs are huge, and particular gap was uncovered in understanding the nature of "transboundary" in water management, both at the level of decision makers and technical experts, and among farmers. While the request for capacity building needs assessment is considered legitimate, several warnings were issued. First, the needs assessment is something that primarily each government should do and then the project may try to respond to it, depending on available resources. It was decided that, given the

rather limited capacity building budget, it will have to take place at the project level and will focus on the needs of the project. It will be tailored to bringing in specific skills that are needed for the implementation of the project. It was mentioned that there should be some "internal" capacity building, i.e. training between the members of the national teams. Also, some participants proposed that efforts should be made to use the knowledge, experience and skills of senior experts in countries for capacity building purposes.

Mr. Ivica Trumbic gave a presentation on communication and awareness raising activities of the project. The Communications and Public Awareness Component is an integral part of the project, which will contribute to the successful achievement of the project's overarching goals and objectives. The overall goals of this component are to provide communication support to all groups and actors involved in the project implementation and to provide for appropriate visibility of the project's activities and messages and/or calls for action aiming at improving management of Kalahari-Karoo/Stampriet aquifer. Mr. Trumbic went on explaining the internal and external components of the communications strategy, the former aimed at securing the flow of information between project team members, the latter aimed at effectively communicating the project to the "outside world". Concluding his presentation, Mr. Trumbic invited participants to give comments and proposals for the improvement of the communications strategy.

In the discussion that followed, the participants proposed that a stakeholder analysis be made with a view to identifying communications target groups for which specially tailored messages will be prepared. This should be one of the first tasks of the project team once it will be established. It was also proposed that some of the project outputs be translated into local languages, but caution was expressed that there are many languages in all three countries (11 in Namibia only), and that the translated products should be limited in number and size (folders, leaflets, briefs only). It was also mentioned that the communications budget is not large but that it will be enough to translate key messages in local languages and to distribute them. Dedicated staff in the Departments of Water Affairs of the three project countries may also be able to support translation and communication. A proposal was made that implementation of communication activities be divided in three phases: at the beginning of the project, when the local and national TV and newspapers could be used to transmit the basic information on the project; during the project, when communication activities could be channelled to the local level keeping the local people informed by using, for example, the farmers associations and local tribal structures; and at the end of the project's implementation when the results should be presented. Because communications expertise is a special one, the project management is considering engaging an expert to assist in developing and implementing the communications strategy. Finally, it was suggested that communication specialists from countries of the region should also be involved in this endeavour.

Day 3 (Thursday, 24 October 2013)

Session 3: Capacity Building and Modifications of the Workplan (Contd.)

Mr. Abraham Nehemia undertook the chairmanship of this session,

Mr. Ivica Trumbic presented the revised timeline of the project's implementation and a list of milestones to be met. After his presentation, several remarks were made by the participants. The most important one was that an Inception Report (including a detailed

workplan, finalised methodology and objectives of the monitoring network) will be prepared by the project team as soon as it will be established. It was stressed that the outputs of this meeting will serve as an important input to the Inception Report. The Inception Report will be adopted before the end of March 2014. The final adopted Timeline is attached as **Annex 5** to this report, while the amended List of Milestones is attached as **Annex 6** to this report.

Mr. Jurgen Kirchner (Namibia) presented the Namibian perspective on the Transboundary Stampriet Artesian Aquifer. There is a long term investigation going on this aquifer, resulting in a large number of valuable documents and knowledge, referring to the geology, water quality, distribution of boreholes, groundwater levels and flows, water levels, existing recorder network, and other subject interesting for this project. Mr. Kirchner went on describing the constraints, which include management and administrative problems, as well as proposed actions to improve the situation, such as establishing flow patterns and defining recharge area in the Transnossob region, drill boreholes to fill the knowledge gaps, investigate leakages and establish abstraction potential for the whole of Stampriet Artesian Basin, etc.

The last presentation of the meeting was by Mr. Holger Treidel (UNESCO IHP) who summarised the conclusions and recommendations of the meeting as follows:

- a. The project methodology and implementation plan was supported by the three aquifer-sharing countries. One of the first tasks of the Project Coordinator will be to finalise the methodology.
- b. Existing data and information on Kalahari-Karoo/Stampriet Aquifer are extensive and should create a solid basis for the implementation of the project. Data and information will have to be collected from multiple sources (different departments and/or data bases). Some data gaps have been identified. Also, harmonization of data from different sources and countries will be a major challenge.
- c. Due to the heterogeneity of the Kalahari-Karoo/Stampriet aquifer (in terms of hydrogeology and socio-economics, in particular), sub regions within the aquifer will have to be defined.
- d. The parameters, variables and indicators which have been proposed have in general terms been approved of and will be adopted in the project. A few of the indicators might need some fine-tuning and maybe an additional indicator will need to be defined. Indicators will not be prioritised. If an indicator cannot be applied to a part of the aquifer this will mean that an important data gap has been identified.
- e. The proposed design and functionality of the Information Management System (IMS) that will be developed by IGRAC was well received. The IMS will by no means be a replacement of existing national databases (with raw data). The IMS intends to be a repository for interpreted (and harmonized) data aiming to be a tool in support of the governance of the shared groundwater resources. Where relevant, and possible, dynamic links will be established with existing databases at national level to exchange information. Countries will retain full ownership of the data. It was stated that for the purpose of the project and for reasons of sustainability, IGRAC is prepared to host the IMS during the project's implementation. During the project execution it will consider the most adequate framework to move the database to the region after the project's completion.
- f. Capacity building activities will be focused on the needs of the project. Given the limited budget for training, it was decided to focus the capacity building on in-team capacity building. In practice, it means that National Experts (members of the NTTGs) can be trained on-the-job in the course of the project. It was also suggested

to make use of the wealth of knowledge, experience and skills of senior experts in countries for capacity building purposes.

- g. The project team will prepare the Stakeholder Analysis, while the communication strategy will be implemented using the local communication experts and media;
- h. The three countries agreed that the Project Coordinator will be placed in Namibia hosted by the Ministry of Water Resources of Namibia at the Southern African Science Service Centre for Climate Change and Adaptive Land Use (SASSCAL)
- i. The Regional Coordinator should be selected as soon as possible (post will be advertised by UNESCO IHP);
- j. The Project Team (composed of NTTGs in each country plus project coordinator) will be established after UNESCO IHP will prepare the TORs, and each country will propose three candidates for each position after which UNESCO-IHP will select the members of the project team.

The meeting was closed by Mr. Abraham Nehemia at 12:00 hours. Mr. Nehemia thanked all participants for their strong commitment to the Stampriet Project.

Annex 1

Agenda of the Meeting

DAY ONE
Tuesday, 22 October, 2013

Session 1 • OPENING SESSION

Chair: *Mr. Abraham Nehemia* (Under-Secretary - Department of Water Affairs of the Ministry of Agriculture, Water and Rural Development, Namibia)

- 09:30- 10:00 Opening addresses
- Honourable John Mutorwa, Minister of Agriculture, Water and Rural Development, Namibia
 - Mr. Damir Djakovic, UNESCO Windhoek
- 10:00 - 10:30 Overview of UNESCO IHP: Importance of groundwater resources and activities in the region (*Holger Treidel*, UNESCO IHP)
- 10:30 - 11:00 Introduction to the overall project: background, history, objectives, structure and progress (*Ivica Trumbic*, UNESCO IHP)
- 11:00 - 11:30 *Coffee break*
- 11:30 - 12:00 Presentation of the Stampriet Kalahari/Karoo Component of the Project: Activities and Execution arrangements for the implementation of the project, including role of regional organisations in the implementation of the project (*Holger Treidel*, UNESCO IHP)
- 12:00 - 13:00 Presentation of other initiatives on TBA assessment and management in the region
- *Phera Ramoeli*, SADC
 - *Karen G. Villholth*, IWMI
 - *Martin Quinger*, BGR
- 13:00 - 13:30 Discussion
- 13:30 - 15:00 *Lunch break*

Session 2 • TECHNICAL WORKSHOP TO ADAPT WORKPLAN AND METHODOLOGY

Chair: *Mr. L.Z. Maswuma* (Director of Hydrological Services of the Department of Water Affairs (DWA), South Africa)

- 15:00 - 15:30 Transboundary Aquifer Assessment - First phase (*Geert Jan Nijsten, IGRAC*):
- Data collection and transboundary harmonization
 - Aquifer characterization
- 15:30 -16:30 Current state of information management: Each national representative will present available information and data relevant for the preparation of the project's main outputs:
- *Mr. O.T Obakeng, Botswana*
 - *Mr. Abraham Nehemia, Namibia*
 - *Mr. L.Z. Maswuma, South Africa*
- 16:30 - 16:45 *Coffee break*
- 16:45 - 18:00 Discussion:
- What information and knowledge gaps currently inhibit sustainable development and governance of groundwater resources in the Stampriet aquifer? Are there any gaps, which can be filled by a (limited) field campaign?
 - What other gaps (e.g. methodological, institutional, policy-related, etc) are impeding or obstructing sustainable development and governance of groundwater resources in the Stampriet aquifer?
 - From the mentioned gaps, what do you think should be a priority to tackle?

DAY TWO
Wednesday, 23 October, 2013

Session 2 • TECHNICAL WORKSHOP TO ADAPT WORKPLAN AND METHODOLOGY (Contd.)

Chair: *Mr. O.T Obakeng* (Director of Water Affairs-Botswana, Ministry of Minerals, Energy and Water Resources)

- 09:00 - 09:30 Transboundary Aquifer Assessment - Second phase: *Make the invisible visible (Geert Jan Nijsten, IGRAC)*
- Data analyses and conceptual model, Indicators,
 - Thematic maps, etc.
- 09:30 - 11:00 Discussion:
- Reflection on the proposed indicators. Would you like to propose additional/complementary indicators to be applied to the local circumstance in the Stampriet aquifer? If so: Which ones?
 - What thematic maps are considered useful (and feasible) to construct to support groundwater governance?

- Does the proposed approach cover the most relevant information needs to support groundwater governance in the Stampriet aquifer? If not what would you like to add / alter?

11:00 - 11:30 *Coffee break*

11:30 - 12:00 Groundwater Information Management System (*Geert Jan Nijsten, IGRAC*):

- Global Groundwater Information System (over-all project level)
- Global Groundwater Information System at Aquifer level

12:00 - 13:00 Discussion:

- Evaluate the functionalities of the Global Groundwater Information System.
- Which local information systems do you think will be of relevance for the project? What is the potential to link initiatives?
- What are the requirements of an Information Management System in order to truly support and facilitate multi-country governance of the Stampriet aquifer?

13:00 - 14:30 *Lunch break*

Session 3 • CAPACITY BUILDING AND MODIFICATIONS TO THE WORKPLAN

Chair: *Geert Jan Nijsten* (IGRAC - International Groundwater Centre)

14:30 - 15:00 Capacity building activities (technical and legal) (*Ivica Trumbic, UNESCO IHP*)

15:00 - 16:30 Discussion:

- Which are the key capacities required in a multi-country team to successfully manage transboundary groundwater resources?
- What capacities do you think need to be developed to improve groundwater governance of the Stampriet? Prioritize.
- Identify key actors in the development of the capacity building activities.

16:30 - 16:45 *Coffee break*

16:45 - 17:30 Communication and awareness raising activities (*Ivica Trumbic, UNESCO IHP*)

DAY THREE
Thursday, 24 October, 2013

Session 3 • CAPACITY BUILDING AND MODIFICATIONS TO THE WORKPLAN (Contd.)

Chair: *Mr. Abraham Nehemia* (Under-Secretary - Department of Water Affairs of the Ministry of Agriculture, Water and Rural Development, Namibia)

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|----------------------|--|
| 09:00 - 09:30 | Any other business |
| 09:30 - 11:00 | Modifications to the workplan (based on discussions during the meeting, including next steps and milestones) |
| <i>11:00 - 11:30</i> | <i>Coffee break</i> |
| 11:30 - 12:00 | Conclusions and recommendations of the meeting (<i>Holger Teidel, UNESCO IHP</i>) |
| 12:00 | Closure of the meeting |

Annex 2

List of participants

Name	Country	Organization	Position	Email
Mr. O. T. Obakeng	Botswana	Department of Water Affairs		oobakeng@gov.bw
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Mr. N. N. Lekgetho	Botswana	Department of Water Affairs Gantsi	Regional Well field Manager	nlekgetho@gov.bw
Mr. Piet Kenabatho	Botswana	University of Botswana		kenabatho@mopipi.ub.bw
Mr. John John Kempf	Botswana	Gantsi Farmers Association		Johnjohn.kempf@gmail.com
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Mr. Thato Seth Setloboko	Botswana	Department of Water Affairs		tssetloboko@gov.bw
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Mr. Petrus Uushona	Namibia			
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		Pretoria		
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Mr. Ivica Trumbic	Croatia	UNESCO IHP		ivica.trumbic@gmail.com
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Mr. Geert-Jan Nijsten	Netherlands	IGRAC		geert-ian.nijsten@un-igrac.org

Annex 3

Statement of Mr. Damir Dijakovic

Honourable John Mutorwa, Minister of Agriculture, Water & Forestry

Colleagues, Mr. Chairman

Ladies and Gentlemen,

It is my great pleasure to address you today at the Opening Session of the **UNESCO-SDC¹ Project on the Stampriet – Kalahari/Karoo Aquifer**.

Indeed, water is humanity's most important natural resource. Sustaining livelihoods and ecosystems, water resources play a central role in maintaining the global ecosystem balance and for providing socio-economic benefits.

As we all know, the Intergovernmental Hydrological Programme (IHP) is UNESCO's international scientific cooperative program in water research, water resource management, education, and capacity- building, and in fact the only broadly based science program of the UN system in this domain. The program is tailored to fit the needs of UNESCO's 195 Member States and is implemented in six-year phases, allowing it to adapt to the changing world.

The Intergovernmental Hydrological Programme has its foundations however dating almost 50 years back. It has its background in the International Hydrological Decade (IHD) when approved by the 13th session of the General Conference of UNESCO in November 1964. The program included a large number of scientific, technical, and practical problems and projects, such as training of hydrologists, and exchange of information and publications.

In this regard I would like to take this opportunity and express my gratitude to the Swiss Agency for Development and Cooperation (SDC) for their financial support and of course

¹ The Swiss Agency for Development and Cooperation (SDC)

to the Minister *Mutorwa* on his support as well as to the Department of Water Affairs (DWA) of Botswana, Namibia and South Africa for their technical backing to this project.

Securing the availability of water resources and improving access to freshwater is high on the agenda of planners, politicians, as well as the private sector. More than 98% of our planet's unfrozen freshwater is stored as groundwater in aquifers; it is estimated that groundwater provides about 50% of the current drinking water supplies on a global scale.

Many of the aquifers are transboundary in nature and thus shared by two or more countries. In recent decades groundwater has been used increasingly, and often unsustainably, around the world. In fact, groundwater resources are often merely abstracted rather than managed, without proper knowledge of their hydrogeological characteristics. The degradation of groundwater quality due to pollution caused by the human activities is also increasingly threatening groundwater resources and reducing the amount of readily useable water resources per capita.

In response to the above challenges and upon request of its Members States, UNESCO's International Hydrological Programme (IHP) was launched in 2002 as interlacing with the Internationally Shared Aquifer Resources Management (ISARM) global initiative.

ISARM has three specific aims :

- Provide support to Member States in conducting an inventory of transboundary aquifers globally by assessing their hydrogeological characteristics;
- Addressing the socio-economic, environmental, legal and institutional aspects;
and
- Provide guidance to Member States towards the sustainable management of shared groundwater resources.

Since 2002, ISARM has launched a number of global and regional initiatives which are designed to inventory, map, delineate and analyze transboundary aquifer systems and

to encourage riparian states to work cooperatively toward mutually beneficial and sustainable aquifer development.

So far, more than 400 transboundary aquifers have been identified by UNESCO IHP in coordination with Member States and IHP National Committees.

Ladies and gentlemen

This workshop is the kick-off meeting of a more detailed action that responds directly not only to appeals from UNESCO Member States but also from a more general call for solutions to prevent and reverse the worldwide water crisis in the face of global climate changes.

At the **sub-regional level** the "Groundwater Resources Governance in Transboundary Aquifers" project will focus its efforts in the execution of a more-in-depth assessment of the Kalahari-Karoo (Stampriet) Aquifer in Botswana, Namibia and South Africa.

The Kalahari basin occupies a vast area of unconsolidated Aeolian sand, tertiary to recent in age, which potentially forms a huge primary aquifer resource. However, pockets of saline groundwater in the Kalahari have been reported from the more arid areas in Botswana and Namibia, where this unit occurs extensively. Decision-makers in the sub-region are aware of the need to improve the protection and sustainable management of groundwater resources. Nevertheless, these decisions still need to be adequately reflected in policies and water resources management practices.

The main goal of the "Groundwater Resources Governance in Transboundary Aquifers" project is to enhance cooperation on water security, reduce transboundary and water-use conflicts, and improve overall environmental sustainability. The project aims to reinforce the capacity of Member States in managing groundwater resources; strengthen cooperation among stakeholders and countries sharing the aquifer; and develop a long term strategy for the monitoring and governance of the transboundary aquifer.

The project will also try to address some challenges:

- The general bias towards surface water resources in the sub-region;
- There appears to be legislation catering for groundwater in place, but it is often very old and without adequate harmonization across the region;
- Major changes in institutional development for water services delivery and Integrated Water Resources Management are taking place in SADC, but groundwater's unique role has not been adequately reflected in this new development and;
- A lack of macro planning for groundwater prevails, as most of the programmes are undertaken on an ad-hoc or crisis-response basis. This seems to be one of the most problematic areas in relation to groundwater development.

UNESCO-SDC² Project on the Stampriet – Kalahari/Karoo Aquifer fits absolutely in the United Nations International Year on Water Cooperation, 2013 ([Resolution A/RES/65/154](#)). Indeed, it is a Project for action, a chance to show how important the cooperation in the water sector is to the international water experts' community.

The project gather the major international networks and strategic partners in the field of water and more specifically of transboundary aquifers and groundwater resources management, including the International Association of Hydrogeologists (IAH), the World-wide Hydrogeological Mapping and Assessment Programme (WHYMAP), the ISARM Network, GRAPHIC, the International Geosciences Programme (IGCP) and UNESCO's Hydro free and Open-source software Platform of Experts (HOPE). The project will closely cooperate with organizations and institutions engaged with UNESCO such as the UNESCO international groundwater centre (IGRAC).

Ladies and gentlemen,

² The Swiss Agency for Development and Cooperation (SDC)

It is my sincere hope that this conference will contribute to deepening our understanding of the multiple interactions involved in **the Stampriet – Kalahari/Karoo Aquifer**.

Indeed, a comprehensive understanding of the resources and its characteristics are the basis for informed decision making and planning, and must go hand in hand with appropriate legal and institutional frameworks to support integrated and sustainable approach to water resources management. This is particularly true and challenging in the case of transboundary aquifers. It requires that the cooperation and collaboration between the various authorities in charge of groundwater management extends beyond the national borders and needs to be based on a relation of trust and transparency

I wish you a very productive and results-oriented gathering.

Thank you very much for your kind attention.

Annex 4

Statement by Hon. John Mutorwa

STATEMENT BY JOHN MUTORWA, MP AND MINISTER OF AGRICULTURE, WATER AND FORESTRY (MAWF): REGIONAL INCEPTION MEETING, UNESCO-SDC PROJECT ON THE STAMPRIET – KALAHARI/KAROO ACQUIFER, UN HOUSE, WINDHOEK, NAMIBIA 22 OCTOBER 2013.

1. The kind invitations, extended to the Government of the Republic of Namibia (GRN), through the Ministry and Minister, responsible for Water Affairs; by and through UNESCO's Secretary of International Hydrological Programme, UNESCO's Director of the Division of Water Sciences and UNESCO's Windhoek Office, are deeply appreciated.
2. We thank UNESCO and the Organizers of the Workshop for having selected Windhoek, to discuss the project implementation of the regional "Groundwater Resources Governance in Transboundary Aquifers: Stampriet –Kalahari/Karoo Acquifer Case Study" project. The GRN fully supports the project and its noble objectives, of inter alia:
 - (a) To improve the scientific understanding of the Stampriet transboundary aquifer which is shared by Namibia, Botswana and South Africa;
 - (b) To improve capacity and education on groundwater;
 - (c) The facilitation of joint management of the precious life giving and life sustaining water resource.

3. I have decided to convey the GRN's message with regard to the precious and valuable commodity called Water, and its relevance to the Workshop's main theme, clearly and unambiguously, by making relevant quotations from some legal and policy documents:

3.1 ARTICLE 100 OF THE NAMIBIAN CONSTITUTION

"Land, water and natural resources below and above the surface of the land and in the continental shelf and within the territorial waters and the exclusive economic zone of Namibia, shall belong to the State, if they are NOT otherwise lawfully owned."

- 3.2 "This Act must be interpreted in a manner that is consistent with, and promotes, the following fundamental principles –

- (a) Equitable access for all people to safe drinking water is an essential basic human right to support a healthy productive life;
- (b) Access by all people to a sufficient quantity of safe water, within a reasonable distance from their place of abode to maintain life and productive activities;
- (c) Harmonization of human water needs with the water requirements of environmental ecosystems and the species that depend on them, while recognizing that the water resource quality for those ecosystems must be maintained; (read together with article 95 (d) of the Namibian Constitution);
- (d) Promotion of the sustainable development of water resources based on an integrated water resources management plan, which incorporates social, technical, economic and environmental issues;

- (e) Cognisance of Namibia's international rights and obligations in the utilization of internationally shared water resources and the disposal of waste or effluent," (quoted from Section 3 of: WATER RESOURCES MANAGEMENT BILL, already passed by the Namibian Parliament; and soon to be signed into law, by H.E. the President of the Republic of Namibia.

- 3.3 "The State Parties recognize the principle of the unity and coherence of each shared watercourse and in accordance with this principle, undertake to harmonise the water uses in the shared watercourse and to ensure that all necessary interventions are consistent with the sustainable development of all Watercourse States and observe the objectives of regional integration and harmonization of their socio-economic policies and plans," (ARTICLE 3.1 of the SADC REVISED PROTOCOL ON SHARED WATER COURSES).

- 3.4 "Namibia is the most arid African country, south of the Sahara, with a low and varied precipitation, from a maximum of ± 650 mm in the North east, to less than 50mm per year along the coast. It is estimated that only 2% of the rainfall ends up as surface run-off and a mere 1% becomes available to recharge ground water. The balance of 97% is lost through evaporation (83%) and evaporation transpiration (14%)", (from: INTEGRATED WATER RESOURCES MANAGEMENT PLAN FOR NAMIBIA, AUGUST 2010, page 2).

- 4. For those of us, Namibians and others, who are not so sure why our National Anthem is called: "Namibia, Land of the Brave?" the geography, geomorphology and hydrology of the country, are parts of the answer! Obviously, the other part of the answer is more of a political historical – military context, relevance and significance – factors that contributed to and culminated in Namibia's attainment of political freedom and genuine independence on 21 March 1990.

5. Currently, Namibia is, once again experiencing a devastating drought. The President of our Republic, on the basis of factual evidence presented to him and to the Government, the Cabinet, publicly and officially declared the existence of a DROUGHT EMERGENCY situation in the country, in May 2013. The devastating effects of such drought is intensely becoming more severe, particularly on livestock grazing and the availability of drinking water.
6. A specific direct message to the Namibian Water Scientists but also those who have been, who are and who shall continue to assist us in this vital sector of water. Research and investigations are very vitally important. All support, financial and otherwise must be redoubled. But, scientific research and investigations are NOT done for their own sake – the purpose is not only academic. Scientific results must be used to address and practically solve real problems, affecting human lives and the ecosystem. Government is urging the water scientists to move faster in making hydrological research results publicly known. I am particularly referring here to the recent underground water discovery in Ohangwena Region of Namibia. It is also true about the subject matter that brought us here – the Stampriet – Karoo – Kalahari Acquifer.
7. May I now execute that most singular duty, that you invited me to perform, and that is: to declare your very important workshop officially opened. I wish you constructive, engaging, focussed, fruitful and most importantly, successful deliberations.
8. Thank you very much!

**Annex 5
Project's Timeline**

Activity	2013		2014				2015			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Project initiation										
Project coordination										
Monitoring and evaluation										
Communication, public awareness										
Elaboration of aquifer specific methodology										
Assessment kick off workshop										
Data and information collection and processing										
1 st technical review meeting										
Assessment										
2 nd Technical review meeting										
Predictions/projections										
Proposal for harmonized monitoring network										
IMS design										
IMS development and testing										
Data harmonization, processing and input										
Training/Technical capacity building										
Multi country consultative body										
Training on international law related to TBA										
Final Regional Workshop										
Closure of the project										

* Yellow: Project management, monitoring and evaluation activities

Orange: Component 1 activities

Blue: Component 2 activities

Annex 6

Project's Milestones

MILESTONE	DESCRIPTION	DEADLINE
NTTGs (Working Team) operational	Project Coordinator's (PC) post announced; UNESCO selects; Project office established in Namibia National Experts proposed and UNESCO selects; NTTGs formed	end December 2013
Methodology (including objectives of monitoring network) approved and Inception Report prepared	Project Team led by PC finalises the methodology, SC approves TOR for Inception Report prepared; PC coordinates preparation of Inception Report; SC approves	end March 2014
Data for all indicators collected and harmonized	Project Team collects information; PC guides the process	end September 2014
IMS tested and operational	IGRAC develops and tests the IMS	end September 2014
IMS data input completed	NTTG experts upload information	March 2015
Assessment completed	PC, with support of IGRAC, completes the Assessment	end June 2015
Recommendations for future activities	Project Team prepares recommendations; SC approves	end August 2015
Key messages for stakeholders formulated	Project Team prepares messages	end September 2015
Proposal for Multi Country Consultative Body	Project Team prepares the proposal for MCCB; eventually, proposal for the next Phase of the project prepared	end September 2015