

REPORT SNO 3954-98

**Sustainable Development  
of Groundwater Sources  
under the Community  
Water Supply and  
Sanitation Programme in  
South Africa - Programme  
Proposal**

Pre-Appraisal Report

**Main Office**

P.O. Box 173, Kjelsås  
N-0411 Oslo  
Norway  
Phone (47) 22 18 51 00  
Telefax (47) 22 18 52 00  
Internet: www.niva.no

**Regional Office, Sørlandet**

Televeien 1  
N-4890 Grimstad  
Norway  
Phone (47) 37 29 50 55  
Telefax (47) 37 04 45 13

**Regional Office, Østlandet**

Sandvikaveien 41  
N-2312 Ottestad  
Norway  
Phone (47) 62 57 64 00  
Telefax (47) 62 57 66 53

**Regional Office, Vestlandet**

Nordnesboder 5  
N-5008 Bergen  
Norway  
Phone (47) 55 30 22 50  
Telefax (47) 55 30 22 51

**Akvaplan-NIVA A/S**

N-9005 Tromsø  
Norway  
Phone (47) 77 68 52 80  
Telefax (47) 77 68 05 09

<b>Title</b> Sustainable Development of Groundwater Sources under the Community Water Supply and Sanitation Programme in South Africa - Programme Proposal Pre-Appraisal Report	<b>Serial No.</b> 3954-98	<b>Date</b> 1998.11.23
	<b>Report No. Sub-No.</b> O-98173	<b>Pages Price</b> 22
<b>Author(s)</b> Damhaug, Torbjørn Gleditsch, Mona (NORAD)	<b>Topic group</b> 41	<b>Distribution</b>
	<b>Geographical area</b> South Africa	<b>Printed</b> NIVA

<b>Client(s)</b> Norwegian Agency for Development Cooperation (NORAD)	<b>Client ref.</b> 98/02096
--	--------------------------------

<b>Abstract</b> Department of Water Affairs and Forestry in South Africa has approached NORAD with a Programme proposal for support to the urgently needed upgrading of the geohydrological services in the country. The importance of groundwater as a resource is increasing because of the current focus on community water supply and sanitation under the Reconstruction and Development Programme. The pre-appraisal mission observed that the status of geohydrological monitoring and information services is in a fragile and inadequate state because of inadequate resource allocations and loss of trained personnel during the last few years. As a conclusion, the mission recommends that NORAD support the proposed Programme. The mission has identified key issues of concern related to the content of the Programme and its interactions with other relevant activities that have to be addressed. It is recommended that the Department organise an objective oriented workshop to strengthen the project design in co-operation with key actors, target group representatives and other stakeholders.
--

<b>4 keywords, Norwegian</b> 1. Hydrogeologi 2. Sør Afrika 3. Programforslag 4. Prosjektvurdering	<b>4 keywords, English</b> 1. Geohydrology 2. South Africa 3. Programme Proposal 4. Pre-appraisal
---	---

  
Torbjørn Damhaug  
Project manager

ISBN 82-577-3547-7

  
Bente M. Wathne  
Head of research department

The Community Water Supply and Sanitation  
Programme

**Sustainable Development of Groundwater Resources**

Pre-Appraisal Report

## Preface

An immense gap in the delivery of basic water and sanitation services in the rural areas of South Africa has built up over the years. The recent political changes have resulted in a new Water Act, and the government has launched a Community Water Supply and Sanitation Programme comprising fast moving investment programmes in the rural water supply and sanitation sector in all provinces. Groundwater is to date the most under-utilised water resource for community water supply in South Africa. Therefore, sound and efficient groundwater management is one of the main concerns in extending the water supply and sanitation services in rural areas. In response to this challenge, the Department of Water Affairs and Forestry (DWAF) has submitted to the Royal Norwegian Embassy in Pretoria a Programme request aimed at enhancing the capacity of the department to promote and regulate sustainable use of groundwater resources for rural water supply and sanitation development. This proposal has been evaluated with a view to fund by a team consisting of Mona Gleditsch, NORAD and Torbjørn Damhaug, NIVA. The assessments have been made in close consultation with DWAF and its partner institutions. The team would like to express its thanks to all officials and individuals met and contacted for their kind support and valuable contributions rendered during the team's preparations in Norway and stay in South Africa. The Pre-appraisal report contains the views of the team, which do not necessarily correspond to those of the governments of Norway and South Africa or those of the institutions mentioned herein.

Oslo, November 23, 1998

Torbjørn Damhaug

---

**Abbreviations**

CGS	South African Council for Geoscience
CSIR	Council for Scientific and Industrial Research
CWSSP	Community Water Supply and Sanitation Programme
DWAF	Department of Water Affairs and Forestry
GIS	Geographical Information Systems
GW	Groundwater
ISD	Institutional and Social Development Directorate DWAF
IT	Information Technology
LFA	Logical Framework Approach
NGO	Non-Government Organisation
NGU	Geological Survey of Norway
NIVA	Norwegian Institute for Water Research
O&M	Operation and Maintenance
RDP	Reconstruction and Development Programme
WRC	Water Research Commission
WS&S	Water Supply and Sanitation
WSSCC	Water Supply and Sanitation Collaborative Council

# Contents

Executive Summary	7
<b>1. INTRODUCTION</b>	<b>9</b>
1.1 Background to the Programme	9
1.2 Objectives of the Pre-appraisal	9
<b>2. FINDINGS</b>	<b>10</b>
2.1 Water Sector Reform	10
2.2 Department of Water Affairs and Forestry	10
2.3 The Proposed Programme	11
2.3.1 Justification	11
2.3.2 Objectives, Scope and Design	12
2.3.3 Comments and Recommendations on each Project	12
2.3.4 Programme Organisation and Participating Institutions	15
2.3.5 Relevant Sector Programmes and Initiatives	15
2.3.6 Donor Funded Activities	16
<b>3. ASSESSMENT</b>	<b>17</b>
3.1 The Relevance of the Programme	17
3.1.1 Justification	17
3.1.2 Coherence with Norwegian Policy and Principles;	17
3.1.3 Justification in Relation to User's Needs and Priorities	17
3.1.4 The Potential for Using Norwegian Resources	17
3.2 Programme Design Aspects	18
3.2.1 General	18
3.2.2 The Connections between the Programme and other Ongoing Activities	18
3.2.3 Programme Organisation and Participating Institutions	18
3.3 Assessment of Sustainability	19
3.3.1 Institutional Sustainability	19
3.3.2 Financial Sustainability	20
<b>4. ISSUES AND PROCEDURES FOR DIALOGUE</b>	<b>21</b>
4.1 Areas of Concern that Need Further Consideration	21
4.1.1 Issues Related to the Content of the Programme	21
4.1.2 Aspects Related to Interactions, Project Organisation and Sustainability	21
4.2 Logical Framework Approach	22
4.3 Follow-up Procedure	22

---



# Executive Summary

Department of Water Affairs and Forestry (DWAF) Directorate of Geohydrology (as the implementing Authority) has approached NORAD with a Programme proposal for support to the urgently needed upgrading of the geohydrological services in the country. The rationale behind the proposed actions are pressing needs for relevant information and guidance support to a large rural population with rising expectations for water supply and sanitation services. The envisaged Programme includes projects on management systems, information systems, appropriate technology, awareness enhancement and capacity building, all related to groundwater development. The key actors will be Geological Survey of Norway (NGU) and South African Council for Geoscience (CGS) who will carry out some of the projects and has been suggested to act as project manager for DWAF.

The pre-appraisal mission observed that the status of geohydrological monitoring and information services in the South Africa is in a fragile and inadequate state because of inadequacy of geohydrological monitoring combined with insufficient resource allocations and loss of trained personnel during the last few years. The recent political changes in the country have resulted in a new Water Act and substantial efforts and resources being focused on the Reconstruction and Development Programme (RDP). The value and importance of groundwater as a resource is increasing because of the current focus on community water supply and sanitation under the RDP. The sustainable development and management of groundwater resources is crucial since groundwater in most cases is the only viable resources and will therefor play a major role in satisfying these water demands. As a conclusion, the mission recommends that NORAD support the proposed Programme.

In general, a great deal of thought has gone into the design and preparation of the proposal, and the Programme documents provide the necessary information for moving ahead with required dialogue towards a project agreement between Norway and South Africa. The mission has identified key issues of concern stated in this report, which have to be addressed during the course of the forthcoming planning process. These are issues related to the content of the Programme as well as aspects related to interactions with other activities, the organisation of the programme as well as its sustainability. A primary issue of concern identified during this mission is to secure the DWAF's capacity to organise and internalise the outputs of the Programme and that the government will secure funds and human resources for the implementation of the outputs of the Programme after its completion.

It is recommended that DWAF organise an objective oriented workshop to strengthen the project design in co-operation with key actors, target group representatives and other stakeholders. Such workshop would serve an excellent opportunity to discuss most of the issues of concern raised in this pre-appraisal report. This exercise should be based on the Logical Framework Approach (LFA) which is a commonly used tool for facilitating project planning and evaluation. It is proposed that the LFA workshop and subsequent revision of the proposal should be part of the implementation of the Programme in order not to loose momentum of the preparations.

The mission recommends that the follow-up deliberations between the governments of Norway and South Africa should include the following steps:

1. The Norwegian Embassy formulates a Mandate Document based on the submitted Programme proposal and this pre-appraisal report.
2. DWAF presents a revised overall Programme Document, in which those recommendations from this report which they agree with are included.
3. The Norwegian Embassy prepares an Appropriation Document including a Draft Agreement as a basis for final negotiations based on the revised Programme Document. Further revision of individual projects is to be done in the first year of the Programme.
4. The DWAF organises a planning workshop with broad stakeholder participation, based on the Logical Framework Approach, to revise the Programme and Projects.



5. DWAF prepares a revised plan and summary of the Programme and its individual projects. The revised project documentation is presented to NORAD during the first annual meeting and forms the basis for approval of budgets for the individual projects under the Programme.

Further details about issues and recommendations are presented in chapter 4.

# 1. INTRODUCTION

## 1.1 Background to the Programme

The Department of Water Affairs and Forestry (MWF) in South Africa has submitted to the Royal Norwegian Embassy in Pretoria a programme request aimed at enhancing the capacity of the department to promote and regulate sustainable use of groundwater resources for rural water supply and sanitation development. The first review of the Programme by NORAD Oslo concluded that the initiative seemed highly relevant to South Africa's need for institutional strengthening and was in line with Norwegian development assistance priorities. Therefore, it was recommended to further evaluate the proposal with a view to fund.

The pre-appraisal team consisted of Mona Gleditsch, NORADs Technical Division, and Torbjørn Damhaug, Norwegian Institute for Water Research (NIVA). Mr. Damhaug carried out a mission to South Africa during the period October 10<sup>th</sup> to October 16<sup>th</sup> 1998. He interviewed a number of representatives of relevant authorities, institutions, donors and beneficiaries, and submitted a debriefing report to the Norwegian Embassy before his departure from South Africa. Appendix 1 shows a list of people met or contacted during the course of the pre-appraisal. In Norway, the team further elaborated on the findings from the visit to South Africa and finalised this report. The present report contains the outcome of the pre-appraisal including recommendations for further follow-up actions and issues that need to be addressed in the dialogue between the governments of South Africa and Norway.

## 1.2 Objectives of the Pre-appraisal

The overall objective of the mission to South Africa and subsequent analysis was to pre-appraise the Programme proposal from DWAF to NORAD called "Sustainable Development of Groundwater Sources under the Community Water Supply and Sanitation Development Programme". In accordance with the terms of reference the pre-appraisal included the assessment of the following issues:

- The objectives of the Programme;
- The realism and relevance of the proposed projects including coherence with the national water sector policy and priorities;
- The interrelations between the various projects;
- How the proposed projects correspond to other ongoing sector activities;
- Proposed budgets compared to the goals of the projects;
- Institutional aspects including the capacity of the involved Norwegian and South African institutions and their sharing of roles;
- An overview of South African policies and plans regarding rural water supply and sanitation;
- Identify additional information and actions needed in connection with the preparation of a revised Project Document and further dialogue with the Government of South Africa.

## 2. FINDINGS

This section provides issues and findings that the appraisal team has identified as being important to the assessment of the Programme.

### 2.1 Water Sector Reform

The Water Services Act (1997) and the National Water Act (1998) provide the key legal framework for water services development and water resources management in South Africa. During 1997 the DWAF launched a White Paper on National Water Policy. According to this policy paper, water supply to meet the human needs and maintenance of a sustainable aquatic environment will be guaranteed as a right. The Government is channelling a large portion of the Central Government poverty relief funds (also for implementation of rural WS&S projects (R70 mill. last year)) through NGOs like Mvula Trust. At local level the Local Governments and Water Committees are key bodies in development of sustainable WS&S services. A major challenge that is facing the delivery of basic water supply and sanitation (WS&S) services to the rural populations is the ability of the schemes to perform effectively after hand-over to the beneficiary communities. It is generally acknowledged that community management of rural water supply and sanitation systems is critical to the sustainability of these schemes. The policy states that effective community management depends on empowered community leaders who have the necessary skills and authority to participate fully in all phases of project planning implementation and O&M after handing-over. There is also a need for strong institutional structures at all levels to ensure that community based structures receive full support and professional assistance from both regional and national government. Hence in order to achieve sustainable management of water resources and development of rural WS&S services, there must be a clear definition of roles, responsibility and lines of communication between government and local authority structures.

### 2.2 Department of Water Affairs and Forestry

One of the most important changes that has taken place in South Africa and which impacts on the role of DWAF, was the incorporation of the former homelands in the formation of nine national provinces. This is to create a more equitable resource distribution redirect resources to the poorer communities. In response to these structural changes, the Geohydrology Directorate recently took the decision to operate within the regional structure of the DWAF. Geohydrologists are now being placed in the Regions under the control of the Regional Directors to undertake groundwater services at local level including training of local societies in groundwater data collection, monitoring and assessment. The Head Office will be responsible for policy matters, guideline development, and staff training. Hence, DWAF is moving from being a water service provider to become a regulator and water resource management institution in charge of the national groundwater database and information services, issuing of water licences, and promoter of public awareness and decentralised groundwater management. People met estimated the transition period of the department's role to be about 3 years. Therefore, the department will provide significant catalytic effects in the evolution of effective public-private-community-NGO partnerships in the water sector.

In the context of the proposed Programme, the Directorates within DWAF relevant to groundwater management and rural WS&S development are:

- The Directorate of Geohydrology
- The Directorate of Community Water Supply and Sanitation
- The Institutional and Social Development Directorate (ISD) DWAF

- The Directorate of Hydrology
- The Regional Directorates

One of the primary issues of concern identified during this mission is the shortage of staff and funds available to the DWAF and the Geohydrology Directorate, and whether they will be able to perform and expand effective groundwater monitoring and information services. The losses of personnel are particularly critical in the early and mid-career positions in key fields of competence like science, engineering and IT. The mission learned that the Geohydrology Directorate is currently understaffed by about 60%. Although DWAF has limited resources, and is undergoing institutional changes, it is important that key staff members at central and local levels are actively involved in the preparation and implementation of the proposed Programme, even though the Directorate will be the implementing agency. The DWAF envisage domestic and international experts working under the Programme in the field to help with training and awareness building during the project period.

## **2.3 The Proposed Programme**

### **2.3.1 Justification**

An immense gap in the delivery of basic water and sanitation services in rural areas has built up over the years. In response to this challenge, the government has initiated fast moving investment programmes in the rural water supply and sanitation sector in all provinces. Many of the new schemes are based on groundwater which is to date the most under-utilised water resource for community water supply in South Africa. Therefore, sound and efficient groundwater resources management is one of the main concerns in extending the community water supply and sanitation services in rural areas. The mission learned that the success of the current investments is quite variable, as many of the developed wells and boreholes have too low capacity, some were even dry or stopped functioning shortly after completion. Due to the low performance of past and current groundwater projects, many communities are suspicious to the use of groundwater, even if the problems were not related to the use of groundwater as such. They were merely due to lack of skill and guidance leading to improper siting of well fields, over-pumping of aquifers, or neglected maintenance because of lack of feeling of ownership at community level. Many problems could be avoided if the communities themselves knew how to monitor the groundwater resources and adjust the exploitation accordingly. One of the reasons for these shortcomings seems to be lack of communication between the agencies involved in development of rural water and sanitation services and the Directorate of Geohydrology at DWAF as the key water resources management and regulatory authority. New rural WS&S schemes have been constructed without consulting the DWAF and the department has received very limited borehole and groundwater data from these projects. Another limiting factor is that the current institutional capacity is insufficient to guide and support the massive national investment drive towards improved water supply and sanitation services for the poor. DWAF has not yet developed the necessary tools and institutional capacity to perform its new roles in an efficient way. The above aspects underline the need to support concerted efforts to strengthen DWAF's capacity to promote sustainable development of groundwater resources for community water supply in terms of:

- Better understanding of the geohydrology in the various regions;
- Enhanced groundwater resources monitoring routines at local and central levels;
- Locally oriented groundwater information services and information exchange;
- Increased local awareness about opportunities of groundwater use and the importance of proper monitoring and protection;
- Appropriate guidelines for groundwater abstraction technology and resource protection;
- Efficient procedures for issuing of groundwater rights and abstraction licensing.

From the above, it is apparent that the requested support from NORAD Programme is well placed within the in key challenges facing the rural water development sector in South Africa.

### 2.3.2 Objectives, Scope and Design

As a background for the elaboration, the mission summarised key information about the eight projects (goals, focus, participating institutions, target groups and beneficiaries) presented in a table in Annex 2. It is recognised that the project is aimed at strengthening DWAF's professional and technical capacity and strategies for promoting the development of sustainable groundwater based WS&S services in unserved rural communities.

- The overall scope of the Programme is quite broad in terms of the number of topics, geographical distribution and variety of actors and stakeholders involved. The pre-appraisal team has identified some possibilities for more integration and co-ordination between the projects in orders to optimise the use of human and financial resources and achieves synergies among the various Programme components (see section 2.3.4). We suggest that the budgetary should have some flexibility to accommodate possible adjustments of the scope of the Programme, which could arise during the Logical Framework Workshop.
- Among issues that should have been addressed by the Programme is groundwater for agricultural use. Pumping for agricultural purposes is significant and the use of groundwater for this private sector activity must be monitored and controlled. Therefore, it is necessary to strengthen the institutional capacity at central and local level for licensing and monitoring the groundwater exploitation for agricultural use. The institutional competence and responsibilities at national and regional level for sustainable use of groundwater for agriculture has to be clarified. This issue should be further explored as part of the final preparation of this Programme.
- According to the Act all boreholes will have to be registered while those with a yield of higher than 5 l/s will have to be licensed. This calls for a new groundwater abstraction licensing and registration strategy and related guidelines for DWAFs operations. Moreover, DWAF will need adequate staff and an effective data management system to handle the information submitted from the borehole owners. This would require more attention being paid to DWAF's role as regulator and licensing authority, which implies building DWAF's capacity at central and regional level. The mission recommends that the final version of the Programme should address the water licensing issue. It should be mentioned that Norway is already co-operating with South Africa on licensing in other sectors, and expertise within water licensing could be put at the disposal of the DWAF if required.
- Selection of locations for pilot implementation should be co-ordinated among the projects as part of the final preparations. The Northern Province is considered an appropriate area for pilot testing of project outcomes.

### 2.3.3 Comments and Recommendations on each Project

#### **Project 1. Practical Analysis of Rural Water Supply Schemes in Southern Africa**

This is a best practice evaluation with a considerable regional relevance beyond the demands of the DWAF in South Africa. Adaptation of good practices from other countries to help resolving the O&M institutional problems is a positive feature of this proposal. This sub-project presents a particularly good opportunity for DWAF to work in a more regional context. We recommend enhancing the SADC regional orientation, but at least as a beginning keep the project implemented under the proposed Programme. The results should be made available through a common regional database. The project plan should envisage how this regional information base will be maintained and further developed after project completion. The project team should establish contacts with key regional agencies, in particular the UNDP-World Bank Water and Sanitation Program - Regional Office in Nairobi, the Water Supply and Sanitation Collaborative Council's Africa group (WSSCC), and the SADC Water Sector Co-ordination Unit in Maseru. The UNDP-World Bank Program could be assigned to the

project as an advisor. The proposed collaboration with NGOs like Mvula Trust is a good idea since this ensures that one of the active implementers of rural WSS schemes in South Africa is involved.

It seems like the proposed project team, composition and budgetary resource allocation are somewhat biased towards groundwater, geology and IT issues compared to other aspects such as the human and institutional factors determining the sustainability of rural water supplies. It is advised to seek a more balanced skill mix for this project. It is particularly important that a multi-disciplinary team participates in the initial planning of the project and selection of study approach and areas. The collection of appropriate and representative project information is as important for the outcome of this project as the database and IT solutions themselves. Other projects of this Programme have also proposed study tour components to learn from lessons in other countries in the region (Project no. 2, 4, and 5). For the reason of strengthening the focus of Project 1 and more effective use of the Programme funds, it is recommended to consider integration of all regional field study components into Project 1. Concerning the project's scope and approach, it is suggested that the evaluation should focus on both sustainability of water supply service provision and water resources factors, and profit from similar studies in the region.

### **Project 2. Development of Groundwater Management Support Systems for Rural Water Supply Managers**

The development and activation of a simple rural groundwater management tool is very important, and the discussion document "Towards a framework for Rural Groundwater Management" prepared by CSIR Stellenbosch is a valuable starting point for this project. One important aspect will be to develop link between local actors in charge of water supply service development (local governments, water committees, NGOs and others) and those dealing with groundwater monitoring and management (DWAF regional office, local stakeholders). Another important aspect will be to maintain the information and data flow between local communities and regional and national groundwater management authorities. The Mvula Trust Project Handbook includes a section on monitoring of aquifers that could serve as important project input, and so do the DWAF Water Supply and Sanitation Directorate's "Minimum Standards and Guidelines for Groundwater Resources Development for the CWSS Programme". The mission feels that the project would benefit from a broader skill mix to include training, institutional development, and sociological issues. The project plan should elaborate more specifically on the roles of the NGOs involved. Since institutional development is one of the major challenges, it would be an idea to involve the DWAF's Institutional and Social Development Directorate (ISD) in project preparation and implementation. The project components that imply study visits to other African countries should as earlier suggested be integrated in Project 1.

### **Project 3. Effective Groundwater Data Management in South Africa**

The focus of this project is strengthening of the central geohydrological database and groundwater information systems, including GIS presentations and Internet links. Various aspects of linking the geohydrological databases of DWAF and CGS should be addressed during the final Programme preparations. These aspects include ownership to the developed systems, selection of host institution of the database, and issues of user rights between CGS and other commercial actors in the country's water industry. It is important to establish which institution shall be in charge of the national groundwater data services and it is the opinion of the mission that system development and capacity building should be directed towards strengthening of DWAF. The timeframe and budget for this project appears to be on the high side compared to the expected outputs which is database systems and IT tools. We suggest that the project concentrates on the system development and technical training as such and that feeding of data and regular system operations will be part of the Programme Implementation (Project 8). It is also necessary to clarify the interconnections and synergies between this project, the national groundwater information project supported by the Dutch and other relevant projects.

### **Project 4. Increased Public Awareness in Community Water Supply and Sanitation**

The project addresses important issues of building awareness. In addition to producing information products (leaflets, videos etc.) the project should be more proactive in conveying the awareness

messages to all rural stakeholders. This could be achieved by linking up with appropriate institutional channels, such as Institute of Training and its extension network in terms of community trainers. Another point is the need to develop project performance indicators to monitor the impacts of the project, although it is not an easy task to measure the level of "awareness". This will require the input of social science expertise. On the client side it is suggested that the Institutional and Social Development Directorate (ISD) should be one of the key actors in this project. Having established the indicators, it is advisable to undertake an initial baseline study to verify the existing awareness in the pilot communities. The results of this study will be the benchmark in future monitoring of the impacts of the envisaged awareness building. The project should be planned in conjunction with Project 2, and the possibilities for merging these two projects should be explored.

#### **Project 5. Alternative Solutions for Optimising Exploitation of Rural Water Sources at the Community Level in Southern Africa**

The purpose of the project is to pursue the implementation of suitable groundwater exploitation solutions in the rural water supply context. The project has an important mission to convey best practice knowledge into the communities. Initiatives have already been taken to develop the knowledge base for instance as documented in the Guidelines for the Evaluation of Water Resources for Rural Development with an Emphasis on Groundwater" (Sami and Murray, May 1998). It is anticipated that the main target groups of the project will be the local actors and stakeholders involved in water supply and sanitation service development (local governments, water committees, NGOs and others). The Programme preparation team should explore the possibilities of co-ordinating the pilot operations of this project with projects number 2 and 3. The initial survey and evaluation of international best practice component should basically be integrated in Project 1.

#### **Project 6. Establishment of Groundwater Source and Aquifer Monitoring Network for Operational Purposes to Ensure Sustainable Utilisation**

The project is aimed at a community-operated aquifer monitoring network for observation and surveillance for national, regional and local resource monitoring. This project responds to a major inadequacy of geohydrological monitoring in South Africa by attempting to formalise groundwater monitoring network at local level including improvement of the data capture procedures and information flow. The project seems to have quite a few common features with other projects under the Programme (technological elements, awareness building, and local monitoring aspects). Therefore, co-ordination and joint operations between this project and the other projects are particularly important.

#### **Project 7. Groundwater Protection in the Community Water Supply in South Africa**

The project is intended to fill the need for best practice guidelines (technical as well as non-technical) for groundwater protection in the rural water supply and sanitation environment. The main product will be a set of guidelines, but the project will also include pilot testing in two provinces. Possibilities of using the same pilot sites as the other projects should be considered.

#### **Project 8. Implementation of the Sustainable Development of Groundwater Resources in the Provinces under the Community Water and Sanitation Programme**

The purpose of this project is to apply the results from the other projects on a pilot basis in two provinces. Moreover, the project will serve as an umbrella for revising the results of the Programme and translating them into a long-term strategy for the implementation of the Programme in the remaining provinces. Therefore, the project should indicate a clear overall strategy for how the results of the Programme are going to be used and how they will add value to the ongoing capacity building within South Africa's water sector.

Since each single project also includes an implementation activity and related budgets it will be necessary to clarify the interface and sharing of responsibility between Project 8 and the other projects. The pre-appraisal team suggests that all pilot implementation activities should be carried out under the auspices of Project 8. This implies that all implementation and pilot testing activities of the Programme would have to be jointly planned under Project 8 in the revised project documents. The mission learned that the Northern Province would be suitable as an area for pilot testing of various

Programme outputs. This is because about 70-80% of the water supply in this region is based on groundwater, the geohydrology is complex, and the regional DWAF operations and awareness building are reportedly successful.

### **2.3.4 Programme Organisation and Participating Institutions**

The Agency with overall responsibility for implementation will be the DWAF. A key actor will be Geological Survey of Norway (NGU). The South African Council for Geoscience (CGS) will actually implement some of the projects and has been suggested to act as project manager for DWAF. The National Council for Geoscience (CGS) has demonstrated relevant skill and experience within the core fields of the Programme and would be a natural leading partner on the South African side. However, it has to be clarified if there are any conflicts of interest related to CGS's double role as project administrator and implementation agency.

The Norwegian Geological Survey (NGU) has basically limited experience from rural water supply and sanitation related projects, but has comparative advantages in the field of geology and groundwater monitoring and development. NGU has the potential of continuing its development towards becoming a considerable Norwegian resource in the field of rural water supply, through recruitment of new staff and long term partnerships with sister organisations abroad. In keeping with South African law, at least 70% of the project budget should be allocated for South African project partners, which put a limit to NGU's participation in the programme.

The mission acknowledges that the various projects intend to involve a broad range of stakeholders, such as NGOs, Council for Scientific and Industrial Research (CSIR), consultants, regional and local water authorities.

### **2.3.5 Relevant Sector Programmes and Initiatives**

It is important to achieve maximum synergies and avoid duplicating efforts between the Programme and other relevant projects and initiatives. The following activities and sources of information were drawn to the mission's attention:

- Community Water Supply and Sanitation (CWSS) Programme. DWAF has launched a CWSS programme in order to improve the water and sanitation situation for the rural poor. One of the key focal points is to build local capacity and promote participatory involvement of the local government in developing and maintaining community based water supply and sanitation services. The CWSS is a major programme of co-operation for the proposed groundwater development Programme.
- Working for Water Programme. A large nation-wide programme. A special group outside the DWAF manages this programme on a contract basis, but in close co-operation with DWAF. NORAD involved in one project (Elim) under the South African – Norwegian Environmental Co-operation.
- Development of a National Groundwater Information System – bilateral assistance from the Government of the Netherlands.
- Umgeni Groundwater Development Programme.
- "Institutional Ground Water Management and Utilisation in the Semi-Arid and Arid Northern Cape" (CSIR Stellenbosch - Community interactions, sustainable exploitation, treatment, health, regional aspects, practical approach)
- Towards a Framework for Rural Groundwater Management. Discussion Document. CSIR March 1998 – A basis for Project number 2.



- Guidelines for Rural Groundwater Management. CSIR - Basic guidelines for a simple monitoring system operated by the community. Including an uncomplicated method for assessment of the data i.e. if the situation is in "red" or "green" zones of the trend curve. Plans to get schools involved in future measurements and conservation of groundwater.
- Guidelines for the Evaluation of Water Resources for Rural Development with an Emphasis on Groundwater. Sami and Murray May 1998, Institute for Water Research Rhodes University)
- Project and O&M Guidelines of Mvula Trust. These guidelines include a section regarding monitoring of aquifers.
- Minimum Standards and Guidelines for GW Resources Development for the CWSS Programme. DWAF April 1997, Water Supply and Sanitation Directorate.
- Sub-Saharan Africa Hydrological Assessment SADC Countries. Report South Africa July 1996. (Diagnosis of hydrological geohydrological services and recommendations)

### **2.3.6 Donor Funded Activities**

The mission learned that there are several donor co-operation programmes with close relations to the proposed Programme. As mentioned in the previous section, the Government of the Netherlands supports the development of a National Groundwater Information System. Other relevant donor countries are Denmark, UK, Ireland, Japan, EU, USA, Australia, Canada, Finland, France and UN-agencies. The titles of some of the projects indicate that it would be worthwhile to explore the possibilities for project and donor co-ordination.

## **3. ASSESSMENT**

In general, a great deal of thought has gone into the design and preparation of this proposal. The Programme is considered a relevant and important contribution to the strengthening institutional capacity crucial to sustainable development of the nation's groundwater resources for rural water supply and sanitation services.

### **3.1 The Relevance of the Programme**

The pre-appraisal team has noted that the rationale of the proposed Programme is appropriate to and significant for the needs expressed by the Government of South Africa. The key issues of the proposal respond to national policies and priority rural development programmes. Substantial investments in rural water supply and sanitation will require proper guidance, water licensing, technical support, and monitoring. The proposed programme is therefore highly relevant for DWAF's new areas of responsibility as regulator, promoter, and provider of information services.

#### **3.1.1 Justification**

In general, groundwater has not been perceived to be an important water resource in South Africa. As a result, this field has received limited attention and consequently limited allocation of funds for this sector. The mission observed that the status of geohydrological monitoring and information services in the South Africa is in a fragile and inadequate state because of inadequacy of geohydrological monitoring combined with insufficient resource allocations and loss of trained personnel during the last few years. The recent political changes in the country have resulted in a new Water Act and substantial efforts and resources being focused on the Reconstruction and Development Programme (RDP). In that connection, the value and importance of groundwater as a resource is increasing because of the current focus on community water supply and sanitation under the RDP. The sustainable development and management of groundwater resources is crucial since groundwater will play a major role in satisfying these water demands. The Programme will contribute to improved groundwater utilisation through better guidance in technological, institutional and water resources matters and access to systematic information at all levels will contribute to making the investments in rural water supply and sanitation services more sustainable.

#### **3.1.2 Coherence with Norwegian Policy and Principles;**

The proposed Programme is in accordance with Norwegian development assistance policy related to poverty alleviation and sustainable environmental and natural resources management. It is also in line with the emphasis on RSAs role in the regional co-operation in the SADC region. The project complements and ties in well with the current Environmental Co-operation Programme between the Department of Environment and Tourism in South Africa and the Ministry of Environment in Norway.

#### **3.1.3 Justification in Relation to User's Needs and Priorities**

The Programme is aimed at a broad range of beneficiaries, which will be directly affected by the various project interventions encompassing school children, mothers, users, local authorities and water service providers, and regional and central water authorities (Appendix 2). During the pilot implementation phases the populations in the selected pilot areas will benefit from the Programme whereas an increasing part of the rural population will benefit from the Programme during the nation-wide implementation of its outputs.

#### **3.1.4 The Potential for Using Norwegian Resources**

The Norwegian Geological Survey (NGU) has limited experience from rural water supply and sanitation related projects, but has comparative advantages in the field of geology and groundwater

monitoring and development. The recent recruitment of a hydrogeologist with substantial rural development experience could serve as a nucleus to expand NGU's in-house capacity within the key subjects of the proposed Programme. NGU has good potential for development work and should become an important Norwegian resource in this field through long term partnerships with sister organisations abroad. Other relevant resource bases for this Programme is the Norwegian Institutes for Environmental Research comprising five research institutes covering i.a. the fields of social science, environmental and water resources, and agriculture and geological sciences.

### 3.2 Programme Design Aspects

The proposed Programme, which was based on primary issues identified by the Directorate of Geohydrology – DWAF, constitutes eight individual projects that have been designed with a logical hierarchy and interconnections. It is suggested that the Programme and each of its projects should undergo an analysis based on the Logical Framework Approach as an integral part of the Programme. This would allow assessment of its goals and contents in a broader group of authorities and beneficiaries.

#### 3.2.1 General

The Programme proposal is well structured and apparently a result of considerable joint efforts between the Directorate of Geohydrology of the DWAF as the Implementing Authority and the main programme partners in South Africa and Norway. The presented project documents are generally quite clear as to the specific project goals, physical and financial inputs, personnel, activities and expected tangible results. However, at this stage the Programme would benefit from a joint analysis its overall objectives and a confirmation of how each project contribute to meeting the requirements of South Africa's water sector and rural development policies, and how they respond to the needs of the users and beneficiaries. In order to capture a broader range of issues and interests, the analysis would require the participation of all relevant directorates of the DWAF and outside institutions and beneficiary groups, as suggested in the following section.

#### 3.2.2 The Connections between the Programme and other Ongoing Activities

Some relevant sector activities have been identified in section 2.3.5 of this report. Among relevant activities can be mentioned the Community Water Supply and Sanitation (CWSS) Programme, the Working for Water Programme, and the upgrading of the National Groundwater Information System supported by Dutch aid. The interconnections between these projects and the Programme should be addressed in conjunction with the LFA workshop.

#### 3.2.3 Programme Organisation and Participating Institutions

Institutional co-operation is considered an important vehicle in international development co-operation. It seems to be an appropriate balance between the responsibilities assigned to NGU under the Programme and those assigned to Council for Geoscience (CGS) and other South African partners. The formalities around CGS's dual position as project administrator and a major project implementation partner has to be addressed and agreed during the dialogue.

As mentioned in section 2.3.3, the skill mix of some project teams could preferably be revised to comprise more expertise in training, institutional development and social sciences. Since institutional development is one of the major challenges a senior person from DWAF's Institutional and Social Development Directorate (ISD) should participate in project preparation and implementation to look after the training components.

Regarding participating institutions, the programme implementing authority and executing agencies should also consider a closer collaboration with relevant South African universities and the Water Research Commission (WRC). The latter plays a central role in project identification and allocation of funds and monitoring of applied research projects executed by DWAF as well as by research councils

and universities. More efforts to incorporate and exchange knowledge with these institutions would enrich the Programme.

The programme should have a Programme Steering Committee to guide and monitor its implementation. This will be complementary to the proposed steering committees for each project. The Steering Committee should comprise representatives from various DWAF directorates and from participating institutions, target groups and beneficiaries.

### 3.3 Assessment of Sustainability

The sustainability of the Programme will rely on the Government of South Africa pursuing its major objectives following termination of the Programme. One of the primary issues of concern identified during this mission is the shortage of staff and funds available to the DWAF and the Geohydrology Directorate, which will be necessary to secure future implementation of the proposed projects. Attention should be paid to the long term staffing and funding requirements necessary for the future implementation.

#### 3.3.1 Institutional Sustainability

A primary issue of importance identified during this mission is the shortage of staff and funds available for the various directorates of the DWAF. This has a significant impact on the groundwater business of the country as a whole and is perceived as one of the greatest threats to the sustainability of the Programme and the future groundwater monitoring and management services. Even if the DWAF has the expertise to perform national and regional groundwater monitoring, there is a need to develop and secure an adequate institutional capacity in the long run to manage the Programme and internalise its outcomes. The capacity building aspects of the Programme should therefore emphasise some crucial institutional shortcomings. For instance, the focus of Programme should take into consideration the fact that DWAF is delegating power to the regional offices and therefore it should support the ongoing transfer of responsibilities from the Headquarter to the Regional Directors Offices.

The institutional sustainability will depend on DWAF taking an active leadership and ownership in the Programme. A broader participation within DWAF in preparation and implementation of the Programme would be beneficial to its quality and enhance the staff's feeling of ownership to the programme. This would promote the results being continuously internalised in the respective directorates. Although DWAF has limited resources and is undergoing institutional changes, it is important that key staff from various directorates is involved in project preparation and implementation.

#### **Environmental aspects**

The Programme is expected to have only positive environmental impacts, as its objectives are to improve groundwater resources management and sustainable exploration

#### **Socio-cultural (including gender) aspects**

In brief, many Programme components are directed towards training and activation of the local societies, including school children and mothers in the use and protection of groundwater and simple monitoring techniques. Therefore it is anticipated that the Programme will have beneficial contributions to socio-cultural aspects.

### **Technological Aspects**

The technology and methods used in the various projects varies from very simple monitoring techniques at local level to the required modern IT systems at national and regional levels. It appears that the selected technological solutions and methods of the various projects regarding groundwater surveillance (data collection storing, processing and dissemination etc.) is adapted to the appropriate user levels.

### **3.3.2 Financial Sustainability**

The project will be financed through bilateral funding, so the Programme costs as such will not have to be recovered. The question that will have to be addressed during the dialogue is if RSA will continue to support the implementation of the project outputs including operation and maintenance costs after Programme completion.

## **4. ISSUES AND PROCEDURES FOR DIALOGUE**

### **4.1 Areas of Concern that Need Further Consideration**

Some identified issues that should be considered by DWAF and the project team during the forthcoming planning activities are given below. These aspects have been elaborated more in detail under chapter 2 "Findings".

#### **4.1.1 Issues Related to the Content of the Programme**

- The DWAF should explore the opportunities of incorporating the aspects of groundwater licensing and DWAF's role as regulatory authority. This would imply the preparation of a licensing strategy including a set of guidelines for effective groundwater licensing and identification of necessary institutional strengthening to perform these services.
- Monitoring and licensing of groundwater for agricultural use should also be considered included in the Programme.
- Modify project number 1 "Practical analysis of rural water supply schemes in Southern Africa" towards a stronger regional orientation. Establish contacts with key regional agencies, in particular the Nairobi-based Regional Technical Group of the UNDP-World Bank Water and Sanitation Program, which could be engaged as an advisor to the Programme.
- All implementation components of projects number 2 to 7 should be integrated in and co-ordinated by Project number 8 "Implementation of the Programme". The selection of pilot areas should be co-ordinated among the projects. Northern Province is considered a suitable and representative area for piloting and learning lessons of project outcomes. Project number 8 should also include the development of a strategy for the internalisation and use of the outputs of the Programme.

#### **4.1.2 Aspects Related to Interactions, Project Organisation and Sustainability**

- Identify relevant projects and sector activities inside and outside the DWAF and explore the possibilities for synergies and co-ordination between these and the Programme.
- Clarify if there are any conflicts of interest related to CGS's double role as project administrator and implementation agency.
- Establish a Programme Steering Committee with representatives from various DWAF directorates and key target groups and beneficiaries to guide and monitor the whole Programme.
- Ensure that the Programme will place sufficient emphasis on the interaction between DWAF and the Local Governments, NGOs and the private sector that will be the future nuclei of community water supply and sanitation development.
- Since institutional development is one of the major challenges a senior person from DWAF's Institutional and Social Development Directorate (ISD) should participate in project preparation and implementation to look after the training components.
- Although DWAF has limited resources, and is undergoing institutional changes, it is important that key staff members at central and local levels are actively involved in the preparation and implementation of the proposed Programme.

- A key question regarding institutional sustainability that has to be addressed during the dialogue is how the project efforts are envisaged to survive after Programme completion. Important determining factors in that respect will be to secure the DWAF's capacity regarding the key objectives of the Programme and that RSA will continue to allocate funds and resources for the implementation of the outputs of the Programme after its completion.
- Carry out a planning workshop based on the Logical Framework Approach (LFA). This would allow assessment of its goals and contents in a broader group of authorities and beneficiaries. More details about this suggestion are given in section 4.3.

## 4.2 Logical Framework Approach

As part of the final project planning and prioritisation it would be advantageous to analyse the Programme and each of its projects in a broader forum. This would allow assessment of the Programme's overall objectives and goal hierarchy and would provide an opportunity to confirm how each project contribute to meeting the requirements of South Africa's water sector and rural development policies, and how they respond to the needs of the users and beneficiaries. It would also be appropriate to analyse external factors that determine success or failure of the programme, including those outside the control of the project administration. It is also important to establish a set of performance indicators for each project that are sufficient to give valid and reliable information to facilitate future monitoring and evaluation of the Programme. Suggested success indicators in relation to ensuring Programme sustainability could be that:

- The project activities have been channelled through the DWAF.
- DWAF maintains a stable staffing situation.
- Domestic funding of the implementation of the core activities of the Programme after its completion has been secured.
- The results achieved in the Programme have been internalised within the DWAF's new structure and are being implemented nation-wide.

It is recommended to use the *Logical Framework Approach* (LFA) as a tool to guide both the planning and the monitoring of the Programme. This idea was supported by several of the people met. NORAD and other international development agencies are frequently using this method in connection with the preparation of new projects. The method is duly described in NORAD's LFA-Handbook. The Norwegian Embassy in Pretoria will arrange an orientation seminar in this method for South African partner institutions early December 1998. DWAF and its partner institutions involved in the Programme should also attend this orientation.

LFA project planning should be implemented as an integral part of the Programme. In our view the DWAF should get planning funds from Norway, if needed for instance for NGU participation, for the initial redrafting of the overall Programme, but funds for further re-planning as well as monitoring should be included in the Programme funding. Since major changes in the Programme are not needed, appropriation of funds can be done on the basis of a revised overall Programme Document. It is not considered necessary to arrange this workshop prior to the preparation of the project agreement between Norway and South Africa. The replanning exercise will be a more useful exercise within an already agreed upon programme cooperation.

## 4.3 Follow-up Procedure

Issues that need to be addressed in the dialogue between the governments of Norway and South Africa in the preparatory phase have been suggested in section 4.1. The proposed budget is considered as a budgetary frame for Norwegian funding support. It is anticipated that this budget will be sufficient to accommodate possible modifications of single projects, through savings and redistribution of funds within the Programme. The finalisation of the Programme plan through the LFA workshop should be regarded as an integrated part of the Programme. The final planning of the Programme and each

individual project will be based upon the outcome of the dialogue between the Governments of Norway and South Africa and the forthcoming LFA workshop. This planning exercise will lead to revised objectives, scope of work, staffing, budgets and timeframes for each project. The revised project documentation shall be presented to NORAD during the first annual meeting.

The mission recommends that the follow-up deliberations between the governments of Norway and South Africa should include the following steps:

1. The Norwegian Embassy formulates a Mandate Document based on the submitted Programme proposal and this pre-appraisal report.
2. DWAF presents a revised overall Programme Document, in which those recommendations from this report which they agree with are included.
3. The Norwegian Embassy prepares an Appropriation Document including a Draft Agreement as a basis for final negotiations based on the revised Programme Document. Further revision of individual projects is to be done in the first year of the Programme.
4. The DWAF organises a planning workshop with broad stakeholder participation, based on the Logical Framework Approach, to revise the Programme and Projects.
5. DWAF prepares a revised plan and summary of the Programme and its individual projects. The revised project documentation is presented to NORAD during the first annual meeting and forms the basis for approval of budgets for the individual projects under the Programme.



## APPENDICES

### Appendix 1 People met

<b>Name</b>	<b>Position</b>	<b>Institution</b>
Ms. Mona Gleditsch		NORAD, Oslo
Mr. Edgar Ryan		NORAD, Oslo
Mr. Ragnvald Boyd		NGU
Mr. Fridtjov Ruden		NGU
Mr. Tore Lium		UNDP-World Bank Reg. WS&S Group, Nairobi
Mr. Brian Appelton		W&S Collaborative Council
Mr. Geoffrey Matthews	Sr. Water Mgmt Spec.	World Bank Washington DC
Mr. Lars B. Møller		DANIDA, Copenhagen
Mrs. Malene Hedlund	First Secretary	Royal Danish Embassy, Pretoria
Mr. Bengt Johansson		SIDA, Stockholm
Mr. Per Ø. Grimstad	Ambassador	Royal Norwegian Embassy, Pretoria
Ms. Anne Strand	Councillor	Royal Norwegian Embassy, Pretoria
Mr. Tor Øivind Tanum		Royal Norwegian Embassy, Pretoria
Mr. Eberhardt Braune	Director Geohydrology	DWAF Directorate of Geohydrology
Mr. Stephen Marais		DWAF Community Water Supply
Mr. Willem du Toit	Manager	DWAF Northern Province
Mr. Felix Wulff	Dep. Dir. Hydrometry	DWAF Part time SADC-HYCOS Coordiantor
Mr Stefan van Biljon	Director Hydrology	DWAF Directorate of Hydrology
Dr. Frick	Director General	Council for Geoscience
Mr. Johan Barkhuizen		Council for Geoscience Geophysics Division
Mr. Karim Sami	Deputy Manager	Council for Geoscience Geohydrology
Mr. Martin Roll		Mvula Trust, Braamfontein (NGO)
Mr. Reinie Meyer		Council for Scientific and Industrial Research CSIR
Dr. George C. Green	Dep. Exe. Director	Water Research Commission

**Appendix 2: Project Briefs**

<b>No</b>	<b>Title</b>	<b>Expressed goal</b>	<b>Focus</b>	<b>Participating Institutions</b>	<b>Target groups &amp; beneficiaries</b>	<b>Budget 1000 USD</b>
1	Practical Analysis of rural water supply schemes in SA	Policy advice to decision-makers. Assist training institutions at community level WS	Study tour & assessment of lessons learnt in SADC. Establish Database. Improve rural WS guidelines	NGU CGS DWAF, CSIR, NGOs (Mvula Trust) Consultants, Agencies in other countries	DWAF, Water authorities in SA & SADC, Water consumers, Donors, NGOs	2010
2	Development of GW management support systems for rural water supply managers	Assist the process of establishing groundwater mgmt systems for rural WS managers	Study tour to African countries to learn. Pilot study to test a GW mgmt system geared on catchment agencies and water boards (Eastern Cape).	CSIR CGS DWAF, LCs, DCs, catchment mgmt agencies and water boards.	Village Water Committees, service providers, local govts. DCs, Catchment mgmt agencies, DWAF provincial & national. + NGOs ?	218
3	Effective Groundwater data management in SA	Establish desired linkage of geohydrological databases of CGS and DWAF. Using internet as a common interface for information flow to users and public. Pilot test of the resulting database	Combine databases of CGS and DWAF and development of a GIS oriented information system	DWAF CGS NGU	DWAF, regional water authorities, consultants, water consumers, NORAD and other aid org. and NGOs	1578
4	Increased public awareness in community water supply and sanitation	Provision of tools for integrated health hygiene and sanitation and opt. use of GW. Reach all stakeholders with the GW protection message.	Production of leaflets books, video-films, and other appropriate info. products. Internet. Establish representative communities as study objects.	DWAF NGOs (i.e. MVula Trust), National Community WS & S Institute	school children, mothers, public in general GW users, water mgmt institutions etc.	1171

No	Title	Expressed goal	Focus	Participating Institutions	Target groups & beneficiaries	Budget 1000 USD
5	Alternative solutions for optimising exploitation of rural water sources at the community level in Southern Africa	Develop implementation guidelines for alternative abstraction technologies.	Survey of international best practice for water resource exploitation methods. Pilot studies. Development of Guidelines. Dissemination of knowledge.	CGS Public Bodies (RSA and SADC, NGU, DWAF National Community WS&S Training Institute Water Systems Mgmt Ltd, CSIR,Rural Support Services (NGO)	DWAF Regional Authorities NGOs Implementing agents rural WS&S SADC: Geol. Surveys, WS&S companies	1001
6	Establishment of Groundwater source and aquifer monitoring network for operational purposes to ensure sustainable utilisation	Promote systematic GW monitoring at various levels. Establish and initiate an aquifer monitoring network as part of GW mgmt procedures and a GW observation & surveillance network for national and regional monitoring.	Implementation in one province. A plan for countrywide implementation. Documentation for implementation of regional and local GW monitoring networks	DWAF, CGS, NGU CSIR,Water Boards District/Regional Councils Water Service Auth. Rural Councils Village Water Committees	DWAF Regional water authorities Village Water Committees	716
7	Groundwater protection in the community water supply in South Africa	Best practice guidelines for groundwater protection in the community WS&S. Provide a guide to local authorities etc.	Prepare guidelines Carry out testing in two selected areas. Report from testing.	DWAF (Geohydrology) DWAF (Water Quality) Institute for Water Quality Studies Chief Directorate Water Service, CGS, NGU Mvula Trust CSIR	Consumers Water Authorities Other relevant auth. (health, agric, employment) Planners and Consultants, NGOs supporting WS&S	456
8	Implementation of the sustainable development of GW resources in the provinces under the Community Water and Sanitation Programme	Apply integrated results on a pilot basis. Report the pilot study along with relevant user groups.		CGS NGU Regional Water Authority		623
	<b>Abbreviations</b> <i>WS: Water Supply</i> <i>WS&amp;S Water Supply and Sanitation</i> <i>GW: Groundwater</i> <i>DC: District Council</i> <i>LC: Local Council</i>					