PILOT STUDY FOR COLLECTION AND USE OF DATA ON RURAL VILLAGE WATER AND SANITATION IN SOUTH AFRICA

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EXECUTIVE SUMMARY

Introduction

This project was proposed in 1995 to investigate methods to improve the flow of information relating to water supply and sanitation infrastructure in rural areas of South Africa. The initiative to provide water services to much of the population that had not had those services in the past faced an enormous task of identifying priority areas that required and desired new water systems and of operating, maintaining, and evaluating existing systems and new systems being installed. The size of the task - to supply water and sanitation services to approximately 14 million people - required the creation of an organised system of information flow where minimal information was initially available. An effort to identify information needs and describe systems to collect and disseminate the information was identified as a vital first step in the information system that would support the related decision-making processes.

The project was conducted during a time of rapid and dramatic changes in the water services environment in South Africa. Major national effort was focussed on water services delivery and crucial decisions made by central government affected many ongoing projects. As custodian of the national water resource, the Department of Water Affairs and Forestry (DWAF) led the initiative to create the framework within which delivery would occur. That framework included the design of a database for water services delivery in rural areas. While close contact with all other initiatives was attempted during this project, the extent and speed at which development occurred hindered effective overall coordination and communication. The project maintained an overall objective of village level empowerment supported by ongoing information flow.

History

The concept of this project arose from the following two separate project ideas proposed to the Water Research Commission in 1995:

A proposal to develop a comprehensive information system to assess the progress and impact of implementation of the RDP programme within the Department of Water Affairs and Forestry.

> Two primary aims of the proposed project were (1) to develop key performance indicators that would enable decision makers to assess the success or problems associated with the implementation of the RDP water supply and sanitation projects and (2) investigate ways of ensuring the information is collected and analysed efficiently.

A proposal to develop community based information and monitoring systems linked to district and regional role players.

> The primary aims of this proposal were (1) to provide communities with procedures to gain information about their own situation so that decision making could be informed and relevant; (2) to enable communities to know their position in relation to other communities within their districts and to be kept informed of all water and sanitation related activities within the area; (3) to enable early warning of pending drought impacts or problems arising from breakdowns. District and regional authorities would also have more knowledge and control if all the community based systems were able to be linked through district and regional offices.

The Water Research Commission requested that the two proposers combine their respective proposals with a more moderate budget. The outcome was this project that aimed to include some of the pertinent aspects of both proposals.

Aim

The aim of the project, as stated in its proposal, has been:

To develop a pilot GIS database on community water and sanitation provision and investment in a sub-region of Northern Province, South Africa, **which assuming successful implementation will be replicated countrywide.**

The aims of developing the database are to assist:

- decision makers to plan and prioritise the water and sanitation needs of the region;
- communities to increase their level of involvement in and awareness of being an integral part of the overall development initiatives in the country, with a concomitant increased level of commitment and responsibility;
- in the development of an early warning system at the local or provincial level to detect water and sanitation problems within an area or specific community (this will include problems arising from the onset of drought, the loss in efficiency of equipment, the breakdown of system components, or potential health hazards); and
- decision makers to monitor implementation progress, implementation constraints and the effectiveness of different investment policies.

Planned methodology

The methodology planned for the project comprised the steps listed below.

- **Establish the existing situation, both locally and internationally**
- **Develop specifications for the database portion of the information system**
- **Develop data collection procedures emphasizing contributions at village level**
- **Implement the data collection procedures on a pilot scale**

Institutional aspects of the data collection activities were to be a major focus of the project. The numerous levels of government involvement in water supply and sanitation require that coordination of the efforts receive attention.

Impacts on planned methodology

Initial project planning gave way to a large extent to forces beyond the control of the project. The original intention was to have database specifications early in the project, then spend the majority of the time populating the database with actual data collected during the pilot study. The development of other software systems removed the necessity to proceed with this database design, but the priority remained the establishment of procedures and demonstration that a village level focus was appropriate for the data collection and subsequent information use efforts.

WasamS

The international situation was assessed through a literature review of databases developed and applied in similar situations internationally. A search was conducted specifically for any existing information system software programs that appeared to be able to be used, either as developed or with minimal modification. Learning about potential obstacles encountered in those earlier experiences that could also occur in South Africa's situation would be a second major focus of the literature review.

When the literature survey was carried out, it appeared that the WasamS (water and sanitation monitoring system) developed jointly by the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) was the only holistic monitoring programme developed specifically for the water and sanitation sector.

Water Supply and Sanitation Policy White Paper

The Water Supply and Sanitation Policy White Paper published in November 1994, was examined to establish South Africa's policy and inferred expectations relating to information systems and to confirm the policy and institutional framework within which the pilot study was to be implemented. A number of specific information needs were explicitly identified in the policy statement.

Conclusions from the literature survey

There is a very real need for the type of pilot study planned as part of this project and for further development of a WasamS type water and sanitation management tool that can provide relevant decision support in South Africa.

Examination of the November 1994 Water Supply and Sanitation Policy White Paper confirms that the Department of Water Affairs and Forestry seeks to develop a comprehensive National Information System within a framework which puts the community first.

Developments since the beginning of the project, in March 1995 indicate that the most urgent needs are for field trials in rural areas. The field trials should be integrated into and influence existing software development initiatives rather than develop additional software.

The database design specification

Discussions with stakeholders, primarily in DWAF, produced agreement on a number of issues, including priorities of information needs that were agreed with DWAF's Northern Province staff. A long list of possible data sets were ranked by participants at a workshop and the most important for the largest number of participants selected. **Table 1** lists the eight data sets ranked highest in importance.

Table 1. Data sets ranked by staff in DWAF's Northern Province

Rank	Data Set
1	Names and locations of settlements
2	Water supply infrastructure: number and location of schemes
3	Domestic water demand
4.5	Available water resources
4.5	Population of settlements
6	Socio-economic infrastructure; (for example, entrepreneurial initiatives)

7	Water demand by sectors other than domestic
8	Institutions involved; roles and relationships between them

Based on the Northern Province meetings and the initial work in developing data gathering forms, a draft design specification for a database was provided.

The specifications describe the functional design, the data form procedure, and the database design. Detailed instructions are provided for each function and cover screen layouts, menu functions, access functions, mouse functions, and report and form layouts. Database programming is in Oracle.

Because of other water and sanitation database initiatives that have taken place since March 1995 (see section 3 for details) the design specification was not developed further as part of this study and no computer programming was carried out. The specifications remain valid in general for any database system used to report water services information.

Stakeholder Consultation

During June 1997, one day regional workshops were held in Pretoria Gauteng, Bisho Eastern Cape, and Pietersburg Northern Province with representative groups of stakeholders to share thoughts and ideas on integrating regional water and sanitation database initiatives into a National plan. The "Proceedings" of these workshops have been issued as a separate report (CSIR, 1997) Participants at the workshops concurred that the pilot study was addressing the appropriate objectives but expressed a number of concerns about the resources being used to implement and integrate it into other initiatives.

Major benefits seen by the participants were the emphasis on sustainability issues and strengthening institutions from village level to central government. Warnings issued at the workshops included the need for substantial human and financial resources to complete a study that requires the iteration necessary in the current study, the need to provide sufficient capacity in the villages to sustain the information gathering initiatives, and the need for extensive networking to ensure dissemination of the lessons learned during the course of the project.

Data Collection Procedures

Before any field work was undertaken on the project, the Department of Water Affairs and Forestry (DWAF) was approached as the central government stakeholder to ensure that the project was integrated with their longer term aims of developing an

information management system. Part of the interaction included a series of planning meetings held with DWAF Northern Province. The Office of the RDP Commission Northern Province also participated in the discussions.

Initially DWAF expressed concern about the likelihood of the pilot study raising community expectations with respect to upgrading services within the community. However, it was agreed that the project would be useful to DWAF as a pilot study for improving their community water supply maintenance back-up services. As a result, a general strategy for liaising with representative community structures and for discussing the pilot study with them was planned and agreed with DWAF.

Data forms

The survey instruments consist of four "layers" of data, namely the core data form, the quarterly monitoring reports, the major water supply or sanitation breakdown report, and the water supply and sanitation services "hardware" data forms.

A sufficient number of the data gathering forms were drafted and used to begin the pilot study. The draft forms were forwarded to the DWAF and RDP Northern Province offices for comment.

Use of the Information

The following tables indicate how this information can be used at various levels for decision making and/or to support planning activities.

Table 1 Suggested uses by various groups of the data/information generated in the proposed information system

INFORMATION	USE BY COMMUNITY	USE BY O&M STAFF	USE BY PLANNERS	USE BY OTHER DECISION MAKERS
1. Core data form				
Basic community data	Planning and project proposals	Location and population size - useful for dealing with O&M problems	Vital for planning (more accurate data)	Monitoring by TLC
Community institutional capacity	List of skills - planning and implementation	Contact persons and skills base is vital for good O&M	Contact persons and skills base is vital for good planning	TLCs require contact persons and skills base
Water sources and supply improvements	Decision making and planning	Time and capital expenditure savings with use of this information	Decision making and planning	Working towards equity of services and knowing what assets are available

INFORMATION	USE BY COMMUNITY	USE BY O&M STAFF	USE BY PLANNERS	USE BY OTHER DECISION MAKERS
Access to health and sanitation	Decision making and planning	Time and capital expenditure savings with use of this information	Decision making and planning	Working towards equity of services and knowing what assets are available
Community's evaluation of their water and sanitation services	Develop plans and strategies to improve the standard of living	Target awareness campaigns and O&M strategies	Target awareness campaigns and development priorities	Target development priorities
2. Quarterly monitoring reports				
Water usage	Monitor and control consumption	Identify problems	Demand management planning	Water resource assessments
Cost recovery	Assess tariff system and viability of system	Target community awareness campaigns	Assess viability	
Breakdowns	Structure maintenance team	Identify and plan for major interventions	Assess viability of equipment and systems	
3. Hardware data forms				
Pump and engine	Spares and maintenance	Enhancing performance and reporting	Monitoring performance	
Other	Spares and maintenance	Enhancing performance and reporting	Monitoring performance	
4. Household registers				
Household lists	Planning, tariff collection, and poverty alleviation		Planning	

Implementation of the pilot study

Location of the pilot study area

Agreeing on the location of the pilot study proved a major problem. There was particular concern about the implementation being seen as favouring one district at the expense of others. The area finally selected is in the centre of Northern Province and combines parts of Northern, Lowveld and Central Districts. The area includes communities supplied with water from bulk surface water schemes and others supplied from ground water schemes serving individual communities. It is suspected that overall there is some surplus capacity in the former schemes whilst the overall quantitative adequacy of the ground water schemes is in doubt. The study area comprises about 120 communities with a population probably in excess of 100 000. The boundary is roughly a triangle bounded by Elim, Soekmekaar and the confluence of the Klein & Middel Letaba Rivers.

Summary of Community Characteristics

Data analysis from the pilot study area shows that additional skills development appears to be needed to help ensure that villages are able to operate and maintain water systems adequately. In particular, more people with plumbing, bookkeeping, and pump care-taking skills are likely to be needed. Some misunderstanding of central government policy on local involvement in water systems appears to exist since most respondents expected additional capacity for water system maintenance to be supplied by DWAF. Little need for additional capacity in cost recovery was expressed, indicating a need for additional understanding of the role of financial management in operating sustainable water systems. Awareness of the focus on women's representation on water committees appears to be needed to increase representation in about half the villages to the recommended minimum of 30% women.

Water Adequacy Criteria

Water inadequacy ranking of communities in each of the three sections of the pilot study area were estimated. The water adequacy criteria are included as part of the "decision-making" criteria framework. Evaluation of the adequacy is given by the sum of the four measures, access to water, quality of supply, quantity of supply, and reliability of supply.

Total scores are evaluated as:

- 0-25 - acceptable provision
- 25-50 - poor provision
- 50-75 - severe under-provision
- 75-100 - critical under-provision

The overwhelming majority of villages are in the category "severe under-provision" for water delivery. A few villages, 9 of the total of 74, were in the "critical under-provision" category and 5 ranked in the relatively high "poor provision" category. No villages were ranked as having acceptable provision of water.

This input illustrates the urgent need for a broader interpretation of what is required to achieve adequate water service provision at community level.

Sanitation Adequacy Criteria

Estimated sanitation and hygiene inadequacy ranking of communities in each of the three sections of the pilot study area were evaluated. The evaluation is similar to that for water adequacy. The sum of the four measures, sanitation hygiene, waste disposal, disease exposure, and latrine access, is used as the overall indicator using the scale:

- 0-25 - acceptable environment
- 25-50 - inadequate environment
- 50-75 - severely inadequate environment
- 75-100 - critically inadequate environment

The measurements illustrate an inadequate environment throughout most of the area. The south east section, which is marginally best off in terms of water adequacy, is marginally the worst off in terms of its sanitation and hygiene environment. The overwhelming majority of villages are in the category "severely inadequate environment" for sanitation and hygiene. A few more of the villages than in water adequacy provision, 12 of the total of 74, were in the "critically inadequate environment" category and only 5 achieved the "inadequate environment" category. No villages were ranked at an acceptable level of sanitation and hygiene.

Discussion and conclusions

Guidelines on village level information systems

The following points may be used as draft guidelines for the development of community based information systems:

- Plan and develop the information system with representatives of the communities involved.
- Ensure that all information gathered at the local level is useful at the local level (and is not just for higher level structures).
- Data collection forms must be simple and understandable, and at the same time enable easy estimation of performance based on key performance indicators.

A system to improve sustainability of water system must take the following into account:

- work through problems with communities so they observe that the project improves their lives
- complete the building up of the set of internal water scheme monitoring and management forms so that the community can collect information for quarterly monitoring reports
- work with communities to improve their operation, caretaking and management skills
- provide training in general budgeting, bookkeeping, and financial management, including the role of cost recovery
- liaise with DWAF, Local Government and other stakeholders in the area to plan a strategy for carrying out minor and major maintenance repairs

Completion of project aim

The aim of the project has been met with the exception of the inclusion of a geographical component in the database. While the countrywide replication has not been achieved, considerable progress has been made in understanding the information needs of communities so they can operate and maintain their water services systems in an effective and sustainable manner.

The core data forms have been designed to elicit information that will assist decision makers to plan and prioritise the water and sanitation needs of the region. The water adequacy and sanitation hygiene adequacy criteria will enable ranking of individual villages to provide more consistent prioritisation.

Focus of the data collection effort at village and community level has assisted communities to become more involved in their own development and, by providing additional information on conditions in similar villages, has assisted each village to become more aware of other development initiatives in the country.

The on-going data collection efforts will provide a more accurate assessment of potential problems related to loss in efficiency of equipment, breakdown of system components, and potential health hazards related to sanitation and hygiene conditions. This additional information will be invaluable in planning drought mitigation activities for the region.

Implementation of the procedures developed in the project will provide sufficient information for decision makers to monitor implementation progress, implementation constraints, and the effectiveness of different investment policies. In addition, the decision makers will be in a better position to evaluate which conditions lead to sustainable water systems and in which villages those conditions exist.

A sound foundation for a community water services database has been developed in this project. Considerable progress has been achieved in defining appropriate content of the database. Input from information users at community level through central government level has been incorporated in the recommended database content and implemented in the field study in the pilot study area. An initial analysis of data collected in the field study has demonstrated that the content produces useful information. The success of the data collection effort at village level has demonstrated that the concept is feasible and can enhance the sustainable operation and maintenance of the water systems, if approached correctly.

Recommendations

The conclusion that must be drawn as a result of many complex forces acting in the water services database development arena at this time is that the data collected during the course of this project should be used where possible. The data are available at WRC, DWAF Head Office, DWAF Northern Province, and should be accessible to the villages that participated in the pilot study.

However, further development of software associated with the database design specifications should not be continued as an isolated project. Efforts are being undertaken elsewhere to ensure that the technical aspects of storing and retrieving data are well in hand. However, the progress achieved in this project in terms of understanding data needs and constraints to data collection at village level should be incorporated in any further information system development. In order to make the data collected in South Africa more generally accessible, consideration should be given to ensuring that it is possible to output data from any water and sanitation database developed in South Africa to WasamS, the database developed by WHO and used more generally in international settings.

Further effort should be focused on contributing to existing databases, either in populating the database or in aggressively using the data for decision-making and insisting that the data provided is adequate, accurate, and appropriate.

The procedures developed here to include village level participation in data collection and use should be extended to other regions of the country. Additional effort should be focussed on providing an efficient and effective flow of information through the circuit that includes the villages, regional water institutions, provincial government structures, and central government structures.

ACKNOWLEDGEMENTS

The research in this report emanated from a project funded by the Water Research Commission and entitled:

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The Steering Committee responsible for this project consisted of the following persons:

Dr NP Mjoli	Water Research Commission (Chairman)
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The financing of the project by the Water Research Commission and the contribution of the members of the Steering Committee is acknowledged gratefully.

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1 Introduction

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1.2 Aim

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- decision makers to monitor implementation progress, implementation constraints and the effectiveness of different investment policies.

2 Methodology

2.1 Planned methodology

The methodology planned for the project comprised the steps listed below.

- **Establish the existing situation, both locally and internationally**
  The international situation would be assessed through a literature review of databases developed and applied in similar situations internationally. A search would be conducted specifically for any existing information system software programs that appeared to be able to be used, either as developed or with minimal modification. Learning about potential obstacles encountered in those earlier experiences that could also occur in South Africa's situation would be a second major focus of the literature review.

  Assessment of the local situation would be conducted through workshops and stakeholder consultation. Stakeholders in central government, local authorities, and villages would form the major groups for consultation.

- **Develop specifications for the database portion of the information system**
  Details of the complete software system would be developed. The system includes, among other things, forms and procedures for data entry, data storage specifications, reporting formats, maintenance procedures, access control. Identification of data content, including numeric and spatial data, is also an important element of the specifications.

  This step was planned as an iterative one that would rely on information developed in the two following steps.

- **Develop data collection procedures emphasizing contributions at village level**
  This step focussed on defining data content and developing procedures that could accurately and effectively elicit information, primarily at village level. An important part of this development was to provide for honest and enthusiastic participation from those people in the villages who held, and would be asked to supply, the data.

- **Implement the data collection procedures on a pilot scale**
  The lasting impact of the project would be a demonstration that the incorporation of a village level focus for the data collection efforts could be successful. Implementation of the procedures and database specifications developed in the previous two steps would be done in a selected area, large enough to demonstrate the applicability of the procedures in a number of villages, but small enough to complete in a reasonable amount of time and draw conclusions before wider implementation.

Institutional aspects of the data collection activities were to be a major focus of the project. The numerous levels of government involvement in water supply and sanitation require that coordination of the efforts receive attention.

2.2 Impacts on planned methodology

Initial project planning gave way to a large extent to forces beyond the control of the project. The original intention was to have database specifications early in the project, then spend the majority of the time populating the database with actual data collected during the pilot study. The development of other software systems removed the necessity to proceed with this database design, but the priority remained the establishment of procedures and demonstration that a village level focus was appropriate for the data collection and subsequent information use use efforts.

3 The literature survey

A broad range of literature on community water supplies and sanitation recommends that water authorities should empower community structures to act as the water service provider and operating agent for small schemes and the distribution portions of large schemes. Such empowerment of community structures builds up autonomy and self reliance but not total self-sufficiency. Hence the need for a comprehensive database to sustain performance auditing and management support.

3.1 WasamS

In March 1995, when the literature survey was carried out, it appeared that the WasamS (water and sanitation monitoring system) developed jointly by the World Health Organisation (WHO) and the United Nations Children's Fund (UNICEF) was the only holistic monitoring programme developed specifically for the water and sanitation sector. "Holistic" is used to mean that:

- it has been specifically designed to facilitate the collection of data from the lowest level of policy implementation through to the national level;
- it goes beyond simply noting the availability of facilities and services and provides data to assess the effectiveness of their operation and maintenance.

WHO kindly forwarded a copy of the programme to the CSIR. Appendix A contains the text of the WasamS core data questionnaire. The survey contains four parts, namely:

Part I - SERVICE COVERAGE, including Demographic Data, Proportion of Population with Access to Safe Water Supply and Proportion of Population with Access to Sanitation

Part II - CONTRIBUTION TO OPERATION AND MAINTENANCE COSTS, listing sources of funds
Part III - CONTRIBUTION TO CAPITAL INVESTMENTS, listing sources of funds
Part IV - GENERAL COMMENTS, regarding quality of data, definitions used and decentralization of monitoring.

On evaluation it was clear that, while the questionnaire is focussed correctly, it would require significant modification to make it suitable for use in South Africa. The possibility of implementing the required modification was considered and only abandoned because WasamS is a "FOXPRO" application. This programming language was little used in South Africa and its international use was not increasing. Consideration should still be given to ensuring that it is possible to output data from any water and sanitation database developed in South Africa to WasamS.

3.2 Water Supply and Sanitation Policy White Paper

The Water Supply and Sanitation Policy White Paper published in November 1994, was examined to establish South Africa's policy and inferred expectations relating to information systems and to confirm the policy and institutional framework within which the pilot study was to be implemented. A number of specific information needs were explicitly identified in the policy statement. Text from the "Monitoring and Information" section is quoted below:

For monitoring and auditing to be effective: ...

An appropriate information system must exist which will enable the Department to know what is actually happening at both grass root level and in the public bodies responsible for water supply and sanitation provision

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Central Government has a responsibility to ensure that basic services are delivered and has a performance monitoring role. Other organisations at various levels will be responsible for implementation and operation. Such functions at different levels are not possible in the absence of adequate information. The Department is therefore planning to establish a National Water Supply and Sanitation Information Management System.

The information system must provide useful and accessible information for communities, local water committees and local authorities, second tier water bodies, that is, water boards, Provincial Governments, consultants, NGOs, and various other central government departments.

The principles of the proposed National Water Supply and Sanitation Information Management System will be:

- *The National System must be people focused and service orientated.*
- *Information should be accessible to communities and to all levels of the water industry. Information available to different sectors should be useful, relevant, reliable and in an appropriate format (electronic formats and printed format).*
- *The information system should make maximum use of the previous Department of Water Affairs and Forestry information systems and information from all other relevant sources in the country.*
- *Participation in the information system must encourage co-operation and co-ordination among the various levels in the water industry.*
- *The New Department of Water Affairs and Forestry will be the custodian of the information system and will rely heavily on various organisations for updating the information.* *Pg 30*

Additional abstracts from the document are given in Appendix B.

3.3 Additional initiatives to develop information systems

Since March 1995 when this project began, there have been a number of developments in the field of water and sanitation database generation in South Africa. First, the Department of Water Affairs and Forestry has been very active in the field and any software developments in South Africa should be fully integrated into these initiatives, as implied in the policy statement quoted above. Second, a private company, Hydraulic Computer Services, founded in South Africa, has developed "integrated information systems with sufficient functionality to cover most requirements in the areas of maintenance, operation, monitoring, management, design and planning of water supply systems" (refer Constantinides *et al,* 1996). These systems are being implemented in both developed and developing environments. These initiatives are far advanced in terms of software development and application. Early applications included Roodepoort and a part of Sandton in Gauteng, in the "more developed" category. More recently, HCS has implemented a fully integrated water services information system in the 17 largest villages in Botswana.

Figure 1 illustrates the main components of a typical Hydraulic Computer Services software package. This configuration was used as the model on which development of the database in this project was based. Data input to the information system would occur at intervals appropriate to the rate of change of the element being tracked. For

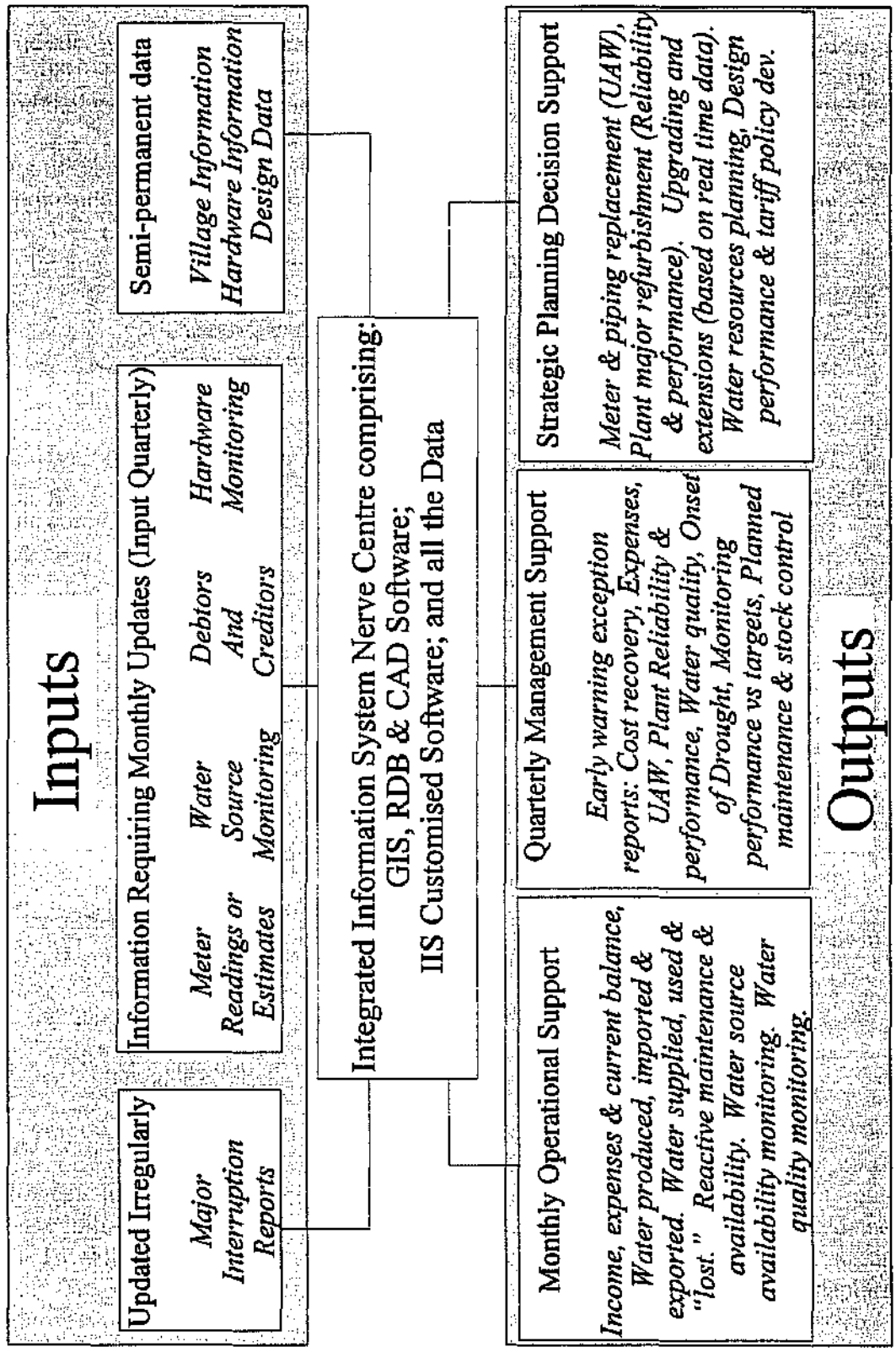

Figure 1. The main components of a typical integrated water information management system (Adapted from Ressman, 1997)

example, major interruption reports would be entered into the database on an irregular interval, depending on whether interruptions occurred or not; meter readings would be recorded monthly, but would be entered into the database quarterly. Similarly, reports would be produced at an appropriate interval - monthly for operational support information, quarterly for management support information. Other special reports would be distributed as needed for strategic planning decision support. Data input and reporting would be controlled in the information system's "nerve centre" - the software needed for data entry storage, manipulation, and reporting.

3.4 Conclusions from the literature survey

There is a very real need for the type of pilot study planned as part of this project and for further development of a WasamS type water and sanitation management tool that can provide relevant decision support in South Africa.

Examination of the November 1994 Water Supply and Sanitation Policy White Paper confirms that the Department of Water Affairs and Forestry seeks to develop a comprehensive National Information System within a framework which puts the community first. The Water Services Act of 1997 and the National Water Act of 1998 both contain statements of the importance of an information system and note the Department's responsibility for the systems.

Developments since March 1995 indicate that the most urgent needs are for field trials in rural areas. The field trials should be integrated into and influence existing software development initiatives rather than develop additional software.

4 The database design specification

Discussions with stakeholders, primarily in DWAF but also with community liaison officers working at village level, produced agreement on a number of issues, including priorities of information needs that were agreed with DWAF's Northern Province staff. A long list of possible data sets were ranked by participants at a workshop and the most important for the largest number of participants selected. **Table 1** lists the eight data sets ranked highest in importance. More detail on the consultation is given in Appendix C.

Table 1. Data sets ranked by staff in DWAF's Northern Province

Rank	Data Set
1	Names and locations of settlements
2	Water supply infrastructure: number and location of schemes
3	Domestic water demand
4.5	Available water resources
4.5	Population of settlements
6	Socio-economic infrastructure; (for example, entrepreneurial initiatives)
7	Water demand by sectors other than domestic
8	Institutions involved; roles and relationships between them

Based on the Northern Province meetings and the initial work in developing data gathering forms, a draft design specification for a database was provided. The complete specifications are shown in Appendix D. The draft design specification only considers the layer 1 core data form in detail.

The specifications describe the functional design, the data form procedure, and the database design. Detailed instructions are provided for each function and cover screen layouts, menu functions, access functions, mouse functions, and report and form layouts. Database programming is in Oracle.

A few additional notes on how reports could be generated from the database records are attached in Appendix E and summarized in the paragraph below. The reporting procedure is flexible enough to respond to individual requests for information; those requests are encouraged.

General public users, with Level One access, have only viewing rights, and are unable to print reports. Other level access rights can generate either printed or screen reports. Reports are available at village level, aggregated by section, accompanied by graphs, accompanied by interpretation, and/or accompanied by trend analysis. The data can be sorted by a number of fields to facilitate interpretation.

Because of other water and sanitation database initiatives that have taken place since March 1995 (see section 3 for details) the design specification was not developed further as part of this study and no computer programming was carried out. The specifications remain valid in general for any database system used to report water services information.

5 Stakeholder Consultation

During June 1997, one day regional workshops were held in Pretoria Gauteng, Bisho Eastern Cape, and Pietersburg Northern Province with representative groups of stakeholders to share thoughts and ideas on integrating regional water and sanitation database initiatives into a National plan. The "Proceedings" of these workshops have been issued as a separate report (CSIR, 1997) Participants at the workshops concurred that the pilot study was addressing the appropriate objectives but expressed a number of concerns about the resources being used to implement and integrate it into other initiatives.

5.1 Output from regional workshops

The participants at the workshops concurred that the proposed activities for the pilot study were appropriate to achieve its core objectives of village level empowerment supported by ongoing information flow. The major benefits listed by the participants were the production of new insights into how implementors of the Government's RDP and DWAF Policy White Papers can improve the sustainability, and other benefits, of community water supply and sanitation (CWSS) projects. Such projects would include those already commissioned, those being implemented currently and those to be implemented in years to come.

Participants felt that attention to sustainability issues was needed and the development and refinement of new ideas aimed at overcoming the current constraints frustrating the achievement of acceptable standards would be a welcome outcome from the project. Strengthening institutions from the village level up was seen as necessary to prevent a frightening growth in community water supply schemes giving a poor quality of service or failing outright.

In addition to a major focus on sustainability, participants also wanted the study to produce guidelines to help stakeholders, primarily in central and regional government, prioritise and target their finite resources in extending coverage as well as in supporting initiatives to improve sustainability.

Three warnings were raised. The first was that the objectives of the project imply an iterative process that will require substantial time and resources to complete. The issues related to empowering villages through improved information flow are complex and affected by a wide range of forces. Successful completion of the objectives is not assured.

The second warning was that the pilot study might not leave sufficient capacity in the area for the information system itself to be sustainable. There was optimism that the monitoring and evaluation component would focus resources where they are most needed and thus help with successful institutional capacity building and effective operations and maintenance training. However, a sustainable effort would require a

large "activation energy" for the procedures to become installed in the ongoing routines of the villages.

The third warning was the failure of other pilot studies to serve as learning platforms for wider dissemination of lessons learned. If such dissemination does not take place the study is likely to result in an unfair focussing of resources and an unacceptable decrease of potential benefits when the total cost of implementation is considered. Extensive networking as the study continued was recommended to ensure that the work is integrated into the other initiatives in the DWAF and that lessons learned are replicated in an ongoing manner.

Thus participants were keen for the pilot study to be implemented but stressed that it needs a strong flexible team with good networking skills and a long-term commitment to the area to achieve success.

5.2 Results from other consultation

The issue of handling project applications and prioritisation of both capital projects and crisis relief work was a concern from stakeholders on DWAF's Northern Province staff. A set of objective criteria were proposed to assist in the evaluation process. **Figure 2** shows a schematic of the decision-making criteria. The "direct prioritising related criteria" provide for an evaluation of the community submitting the business plans. The community's proposed water supply or sanitation upgrading demands are classified on a high to low priority implementation scale. The "preparation related criteria" provide for an evaluation of a community's capacity to implement and sustain their upgrading proposals and the appropriateness of the proposals themselves. If any of these second set of criteria are not met, the recommendation is that implementation should not be rejected, but deferred, until satisfactory standards are attained. It is envisaged that DWAF may sometimes have to assist the community in achieving the required standards. These criteria were evaluated for villages in the pilot study area and results are given in Section 7.

A set of procedures or guidelines will be useful to help promote consistent handling of applications and to ensure critical steps in communication are not overlooked. Appendix F lists some of the fundamental steps that are recommended at each of the decision points for an application for modification in water services. Those decision points are:

- receipt of the application,
- receipt of the recommendation report, and
- completion of the project.

One of the outcomes of the recommendation report is a request for more information. In that case, the cycle would be repeated again after the next receipt of the revised application.

DIRECT PRIORITISING-RELATED CRITERIA
Water Adequacy Criteria
Quantity - Quality - Reliability - Access

Sanitation Adequacy Criteria
Latrine access - Sanitation hygiene - Wastes disposal - Disease exposure

PREPARATION-RELATED CRITERIA
Community capacity criteria
Project acceptability criteria

Figure 2 Decision making criteria for handling project applications

6 Data Collection Procedures

Before any field work was undertaken on the project, the Department of Water Affairs and Forestry (DWAF) was approached as the central government stakeholder to ensure that the project was integrated with their longer term aims of developing an information management system. Part of the interaction included a series of planning meetings held with DWAF Northern Province. The Office of the RDP Commission Northern Province also participated in the discussions.

Initially DWAF expressed concern about the likelihood of the pilot study raising community expectations with respect to upgrading services within the community. However, it was agreed that the project would be useful to DWAF as a pilot study for improving their community water supply maintenance back-up services. As a result, a general strategy for liaising with representative community structures and for discussing the pilot study with them was planned and agreed with DWAF. Appendix G contains the full text of the documents resulting from those discussions. The information covers a description of the explanation to be given to the residents of the study area. It explains that the costs of the project were covered by the Water Research Commission and that the community will be required to cover their own costs of any water services that are installed. The explanation to the community also contained a description of the planned use of the information and its benefits to the community and to DWAF .

A general strategy for data gathering was formulated and agreed upon among project workers. The strategy is described in Appendix H, "notes on data gathering forms." The explanations are considerably more detailed than those given in Appendix G, relating to the pilot study.

6.1 Data forms

The survey instruments consist of four "layers" of data, namely the core data form, the quarterly monitoring reports, the major water supply or sanitation breakdown report, and the water supply and sanitation services "hardware" data forms.

A sufficient number of the data gathering forms were drafted and used to begin the pilot study. The draft forms were forwarded to the DWAF and RDP Northern Province offices for comment. The forms used in the exercise are shown in the following Appendices:

- I Guidelines for filling in the core data form
- J The core data form
- K Water or sanitation major interruption report card
- L "Hardware" data forms, and
- M Community internal data gathering; and water and sanitation facility management forms

The core data form covered data on the community. It gathered data in four categories:

- **basic data**: such as the community location, population, and general services in the vicinity
- **institutional capacity**: skills capacity, training courses completed by community members, availability of operation and maintenance materials
- **water sources**: improvements to bulk water supply, improvements to access, access to health and sanitation facilities
- **community evaluation**: self evaluation of the communities' water supply and health and sanitation services

Community residents are able to supply most of the data, with only a minimal dependence on technical input. The data covered is likely to change slowly, so updates would only be required on a multi-year cycle or if major changes occur in the conditions of water supply or related issues in the community.

Quarterly monitoring reports gather summary data on:

- water usage and unaccounted for water,
- system and equipment faults and breakdown report, and
- operation and maintenance cost recovery and money balance sheet

In the majority of villages, community residents can complete these forms, although some initial training may be required. The forms are intended to be completed and used at village level each month but the data would be submitted to the data capturing team each quarter. Feedback to the community would be given by the data capturing team during the course of the three months following submission of the quarterly report.

Additional development will be required for the quarterly monitoring report forms. While the major issues have been addressed with the current development, more detail will be needed to ensure sufficient data are available.

Major water supply or sanitation breakdown reports comprise a postcard intended to be used whenever a major interruption in service occurs. The postcard would be sent to the nearest support structure to notify them of the interruption.

Water supply and sanitation services "hardware" data forms capture data on the water resources used as supply, pumps, motive power and ancillaries, water treatment plants, water conveyance structures, intermediate storage, and special ancillaries, such as meters, float control valves, etc.

These forms are intended to be completed as part of the operation and maintenance package supplied by consultants, NGOs, or equipment suppliers.

6.2 Use of the Information

The following tables indicate how this information can be used at various levels for decision making and/or to support planning activities.

Table 2 Suggested uses by various groups of the data/information generated in the proposed information system

INFORMATION	USE BY COMMUNITY	USE BY O&M STAFF	USE BY PLANNERS	USE BY OTHER DECISION MAKERS
1. Core data form				
Basic community data	Planning and project proposals	Location and population size - useful for dealing with O&M problems	Vital for planning (more accurate data)	Monitoring by TLC
Community institutional capacity	List of skills - planning and implementation	Contact persons and skills base is vital for good O&M	Contact persons and skills base is vital for good planning	TLCs require contact persons and skills base
Water sources and supply improvements	Decision making and planning	Time and capital expenditure savings with use of this information	Decision making and planning	Working towards equity of services and knowing what assets are available

INFORMATION	USE BY COMMUNITY	USE BY O&M STAFF	USE BY PLANNERS	USE BY OTHER DECISION MAKERS
Access to health and sanitation	Decision making and planning	Time and capital expenditure savings possible with use of this information	Decision making and planning	Working towards equity of services and knowing what assets are available
Community's evaluation of their water and sanitation services	Develop plans and strategies to improve the standard of living	Target awareness campaigns and O&M strategies	Target awareness campaigns and development priorities	Target development priorities
2. Quarterly monitoring reports				
Water usage	Monitor and control consumption	Identify problems	Demand management planning	Water resource assessments
Cost recovery	Assess tariff system and viability of system	Target community awareness campaigns	Assess viability	
Breakdowns	Structure maintenance team	Identify and plan for major interventions	Assess viability of equipment and systems	
3. Hardware data forms				
Pump and engine	Spares and maintenance	Enhancing performance and reporting	Monitoring performance	
Other	Spares and maintenance	Enhancing performance and reporting	Monitoring performance	
4. Household registers				
Household lists	Planning, tariff collection, and poverty alleviation		Planning	

7 Implementation of the pilot study

7.1 Location of the pilot study area

Agreeing on the location of the pilot study proved a major problem. There was particular concern about the implementation being seen as favouring one district at the expense of others. Six smaller pilot studies were initially proposed to cover a larger number of districts, however, it was eventually agreed that this would significantly increase the financial and other resources required for implementation without necessarily increasing the benefits. A compromise was reached by choosing an area in the centre of Northern Province which combines parts of Northern, Lowveld and Central Districts. The area includes communities supplied with water from bulk surface water schemes and others supplied from ground water schemes serving individual communities. It is suspected that overall there is some surplus capacity in the former schemes whilst the overall quantitative adequacy of the ground water schemes is in doubt. **Figure 3** shows the location of the pilot study area. It comprises about 120 communities with a population probably in excess of 100 000. The boundary is roughly a triangle bounded by Elim, Soekmekaar and the confluence of the Klein & Middel Letaba Rivers. In line with agreements reached with stakeholders, the pilot study was implemented as a community-driven project which focussed on operation, care-taking, maintenance and cost recovery where the greatest information gaps had been recognised. The pilot study did not deal with any aspects of new project planning or implementation.

At the end of June 1996, nine members of the study team visited 50 of the 116 or so villages in the pilot study area to collect core data and to begin to understand the communities needs/demands better. As a result of these visits, core data from 74 villages were collected. Several adjacent villages arranged to have the forms photocopied and requested to be included in the pilot study. In addition, 54 communities conducted house by house censuses in their villages. All communities but one showed an interest in continuing "voluntary" involvement in the operation, care-taking and management of their own schemes or distribution systems. Thus the trust building to date laid an excellent foundation for the successful implementation of an in-depth study. However, it is clear that without an adequate response to the information already provided, the communities will cease to cooperate.

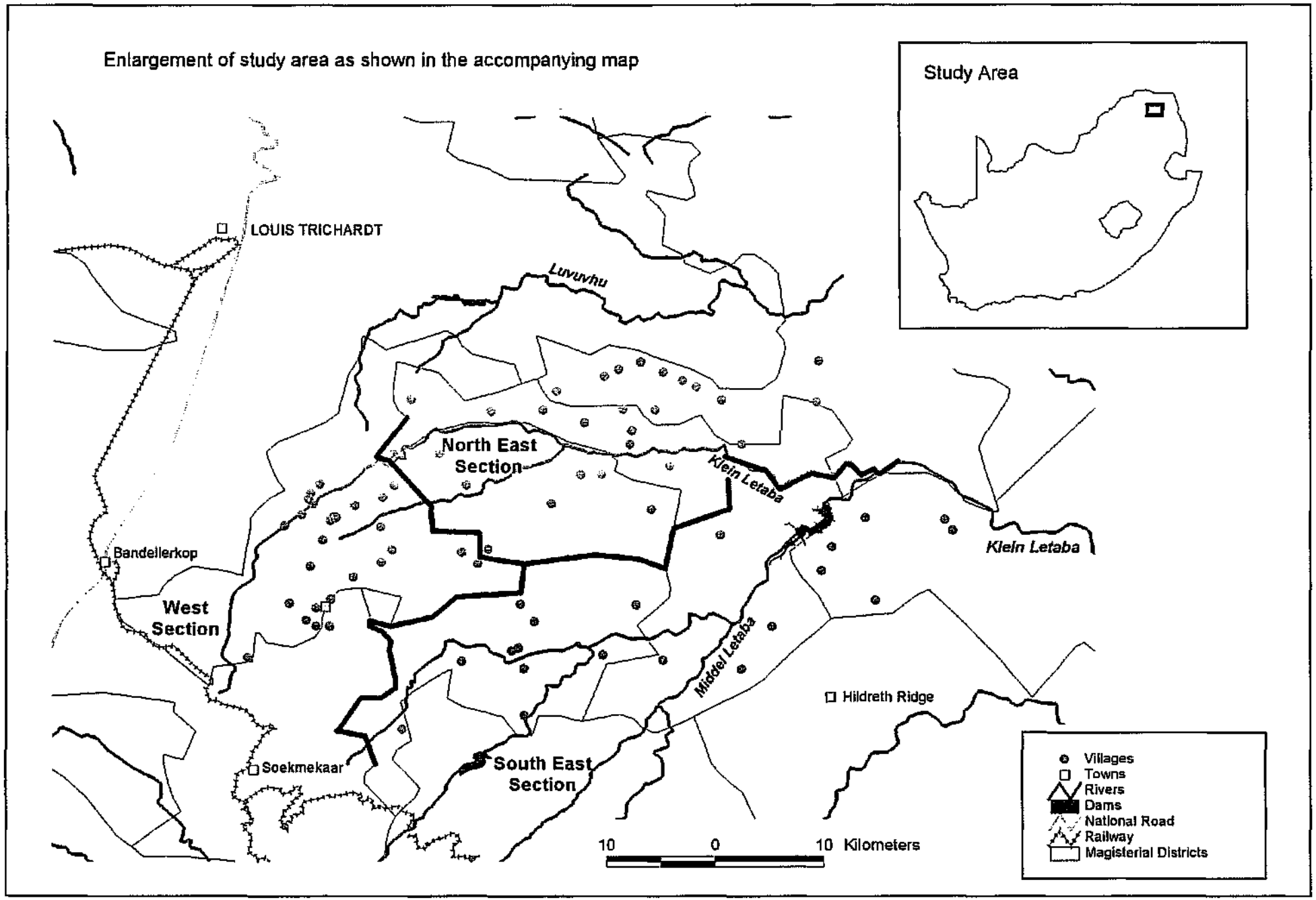

Figure 3. Location of the pilot study area.

7.2 Analysis of data collected

Information on Community Characteristics

Representation of women on Village Water Committees is shown in **Figure 4.** The graph on the left shows that the overall average of women members on water committees ranges from 38% in the south east section to 47% in the west section. These overall averages are above the recommended minimum 30% women members. Despite the good overall averages, the graph on the right shows that approximately 33 of the communities (slightly more than half) have less than the recommended proportion of women. The percentage of office bearers who are women is typically less than 25%, except for secretaries in the south east section. There may be a need for more emphasis on women's representation in the west and north east sections, particularly in increasing the number of women who are officers.

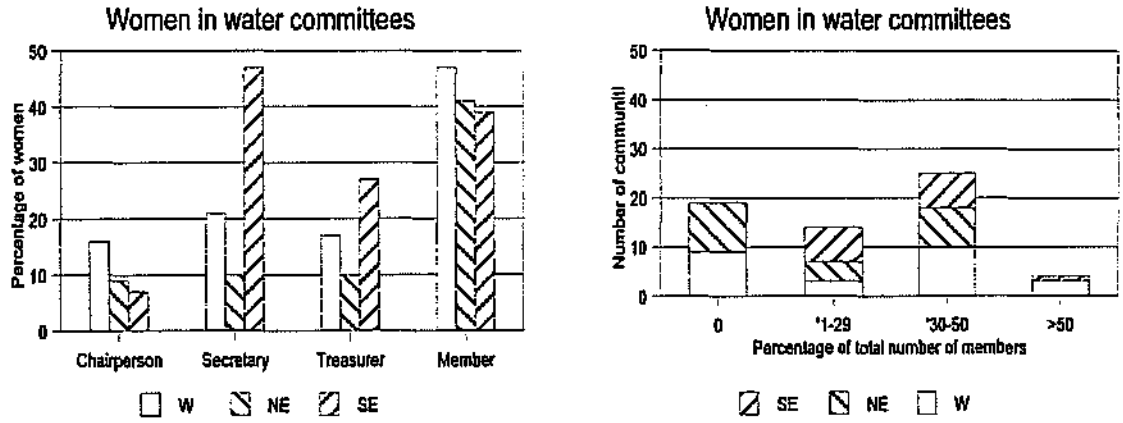

Figure 4 Representation of women on water committees

The results of analysis of data collected from communities on the core data forms are shown in the following figures. The availability of skills required for sustainable operation of water services within communities is shown in **Figure 5.** The graphs illustrate that the presence of these skills is highly variable, with an abundant supply in some communities and the complete lack of skills in others. In order to provide sufficient skills for all communities to operate and maintain the systems, more people with plumbing, bookkeeping, and pump care-taking skills are likely to be needed.

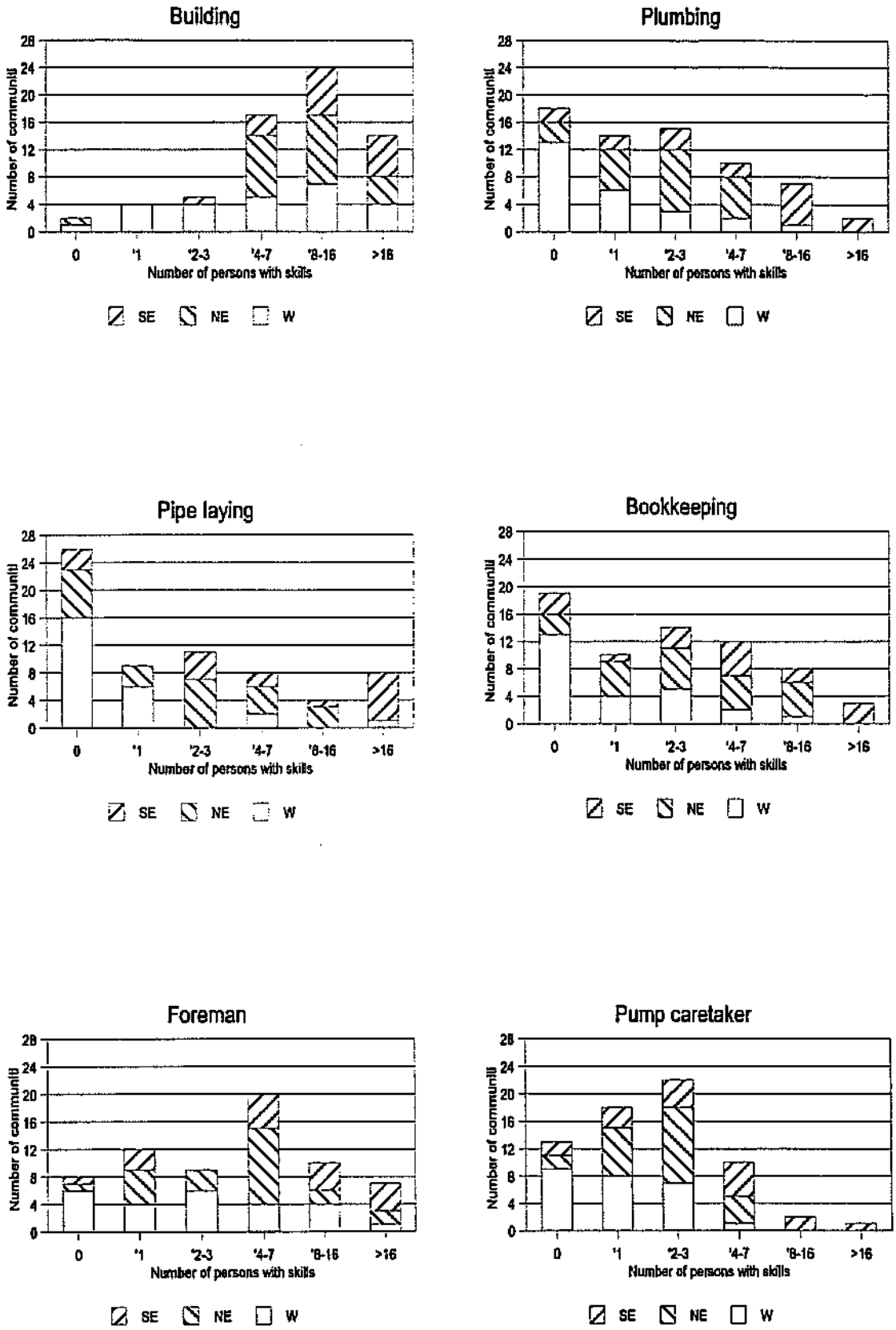

Figure 5 Water services-related skills available in the community

Data that describe community demands for additional capacity and where the communities expect that additional capacity to come from are shown in **Figure 6**. The graphs illustrate a high demand for additional capacity and an expectation that the capacity will be supplied by DWAF. Additional operational, maintenance, and managerial capacity is expected from DWAF, but additional cost recovery capacity is expected to come from the villages or else not be supplied. This is perhaps a symptom of a lack of interest in developing any cost recovery capacity. In general, the results indicate a need to disseminate information about existing government policy on local government responsibilities and community capacity building. More general information dissemination related to cost recovery and its importance in sustaining a water system may also be needed.

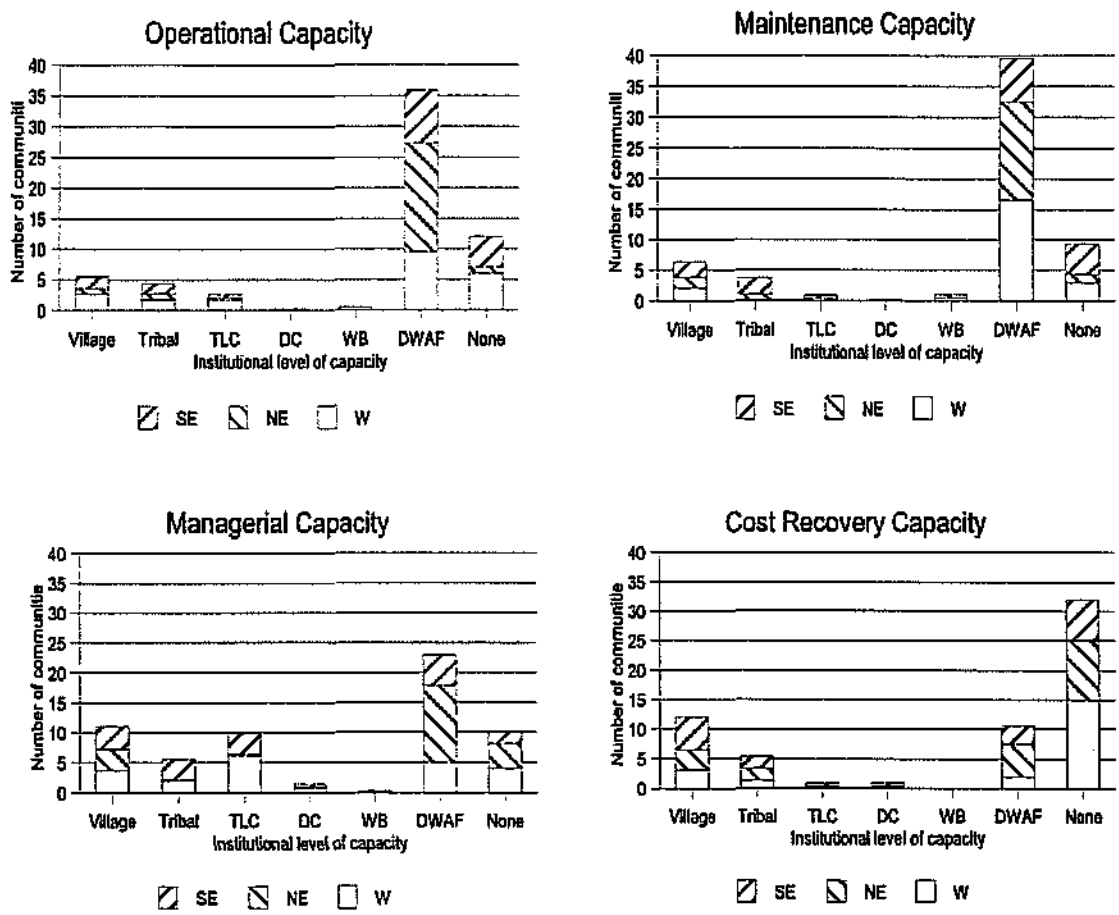

Figure 6 Communities' perception of the additional capacity required to operate and maintain schemes listed by the anticipated source of the additional capacity

Summary of Community Characteristics

Data analysis from the pilot study area shows that additional skills development appears to be needed to help ensure that villages are able to operate and maintain water systems adequately. In particular, more people with plumbing, bookkeeping, and pump care-taking skills are likely to be needed. Some misunderstanding of central government policy on local involvement in water systems appears to exist since most respondents expected additional capacity for water system maintenance to be supplied by DWAF. Little need for additional capacity in cost recovery was expressed, indicating a need for additional understanding of the role of financial management in operating sustainable water systems. Awareness of the focus on women's representation on water committees appears to be needed to increase representation in about half the villages to the recommended minimum of 30% women.

7.3 Water Supply and Sanitation Information

Water Adequacy Criteria

Estimated water inadequacy ranking of communities in each of the three sections of the pilot study area are given in **Figure 7-9**. Each figure shows the ranking in each community in the section (West, NE, SE) of the pilot study area in four issues related to water adequacy. Total scores are evaluated as:

- 0-25 - acceptable provision
- 25-50 - poor provision
- 50-75 - severe under-provision
- 75-100 - critical under-provision

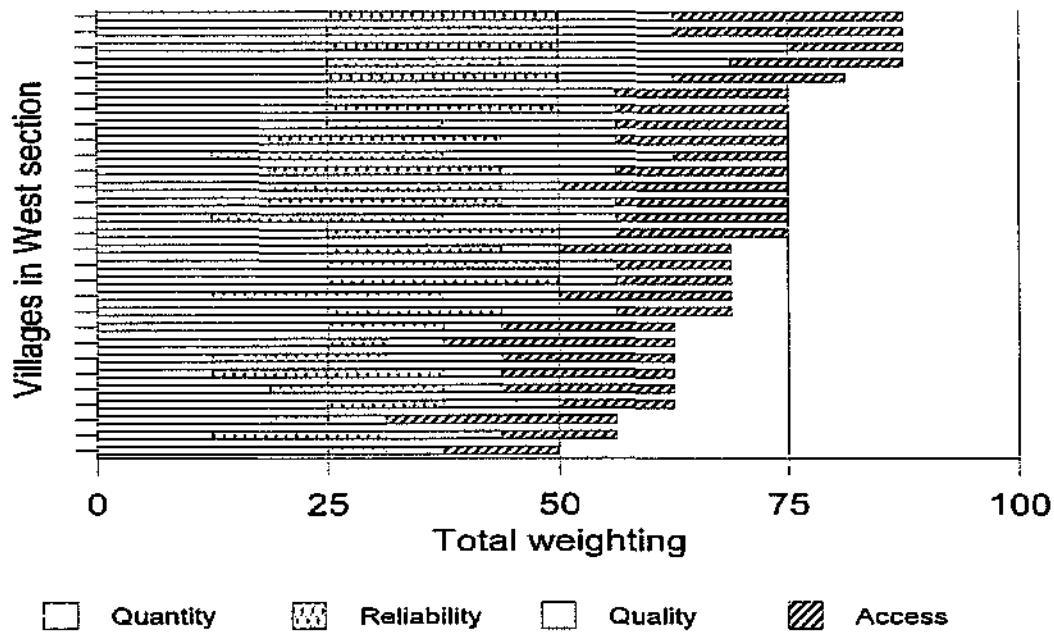

Figure 7 Weighting for water adequacy criteria in villages in the west section of the pilot study area. Lower weights indicate more adequate delivery.

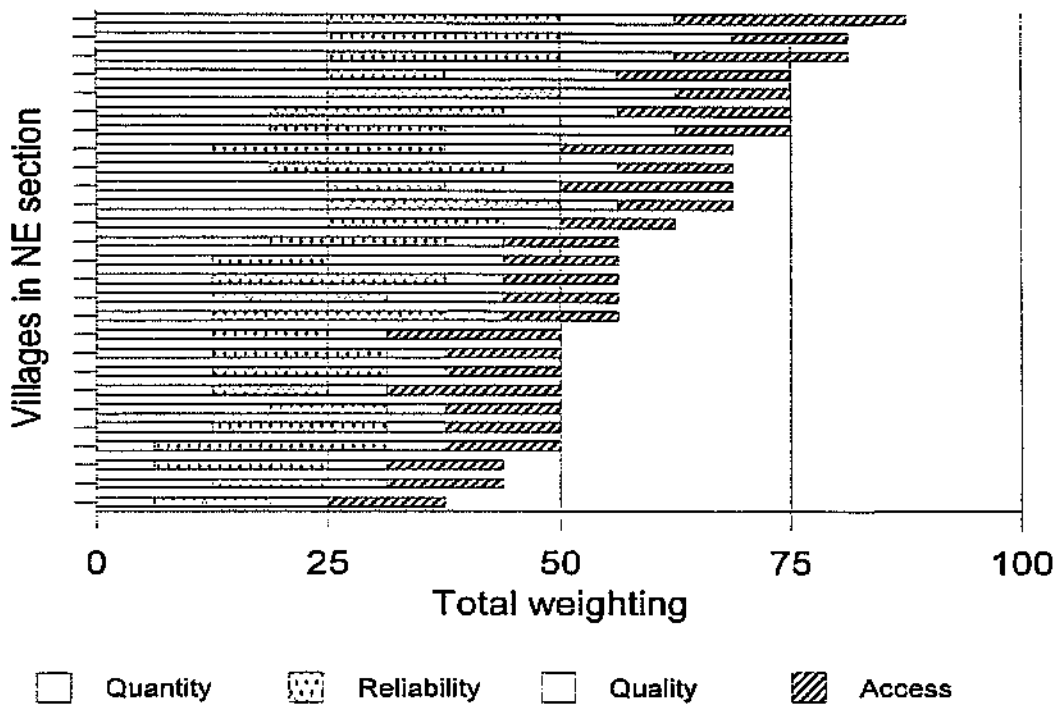

Figure 8 Water adequacy weighting in villages in the north east section of the pilot study area. Lower weights indicate more adequate delivery.

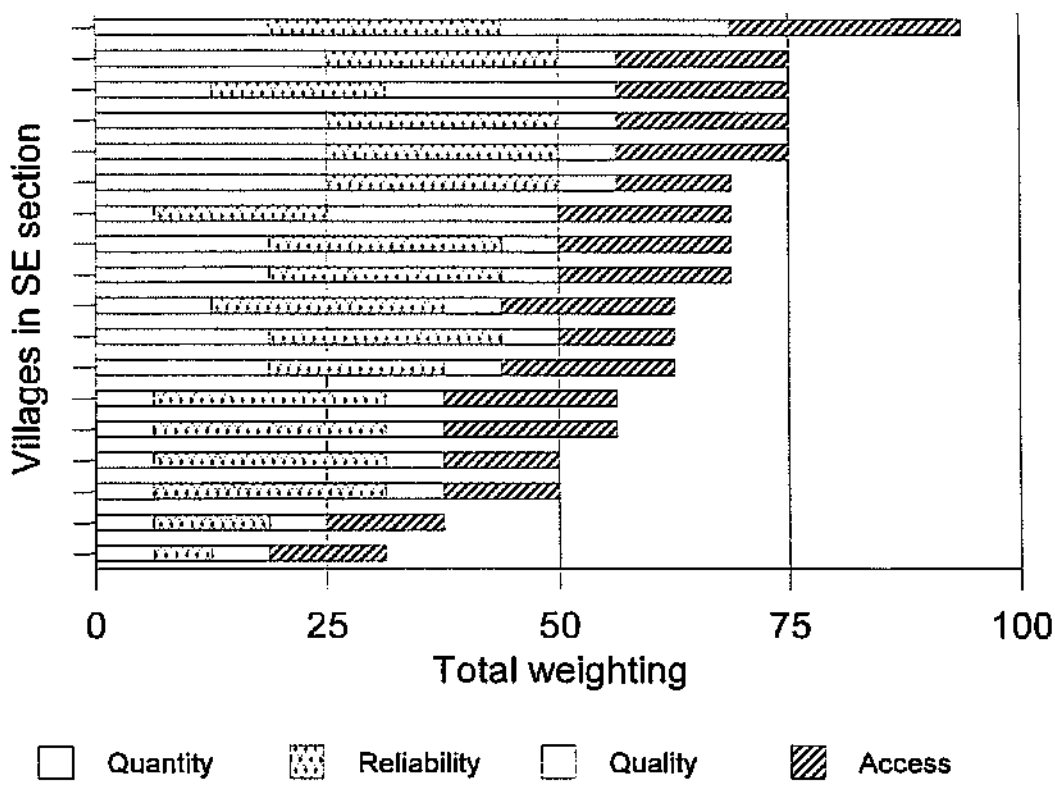

Figure 9 Water adequacy weighting in villages in the south east section of the pilot study area. Lower weights indicate more adequate delivery.

The water adequacy criteria are included as part of the "decision-making" criteria framework shown in Figure 2 and listed in detail in Appendix N. This input illustrates the urgent need for a broader interpretation of what is required to achieve adequate water service provision at community level. Evaluation of the adequacy is given by the sum of the four measures, access to water, quality of supply, quantity of supply, and reliability of supply.

Of the four broad constraints examined, adequate reliability of supplies was attained by the lowest number of the communities visited, with an overall average of 20. Improved reliability will most often be achieved through improved operation and maintenance.

The quantity of water delivered was slightly more adequate with an overall average of 18. Low delivery in the area is more often caused by inadequate storage capacity for delivered water, poor operations or excessive demand due to free water rather than a shortage of water at source or an inadequate overall scheme design capacity.

Access to water was ranked third in inadequacy among the four issues, with an overall average of 17. In every community, access for some members was below the basic RDP standard but substantial improvements could be made by refurbishing existing non-operational standpipes.

Water quality was ranked most adequate of the constraints reported, although nearly 10% of communities reported water that may be a health hazard has been delivered from improved distribution systems. The average for quality of supply was 11.

The overwhelming majority of villages are in the category "severe under-provision" for water delivery. A few villages, 9 of the total of 74, were in the "critical under-provision" category and 5 ranked in the relatively high "poor provision" category. No villages were ranked as having acceptable provision of water.

Sanitation Adequacy Criteria

Estimated sanitation and hygiene inadequacy ranking of communities in each of the three sections of the pilot study area is shown in **Figure 10-12**. The measured variables are those shown in Figure 2 as "decision-making criteria" for selection of projects. The evaluation is similar to that for water adequacy. The sum of the four measures, sanitation hygiene, waste disposal, disease exposure, and latrine access, is used as the overall indicator using the scale:

- 0-25 - acceptable environment
- 25-50 - inadequate environment
- 50-75 - severely inadequate environment
- 75-100 - critically inadequate environment

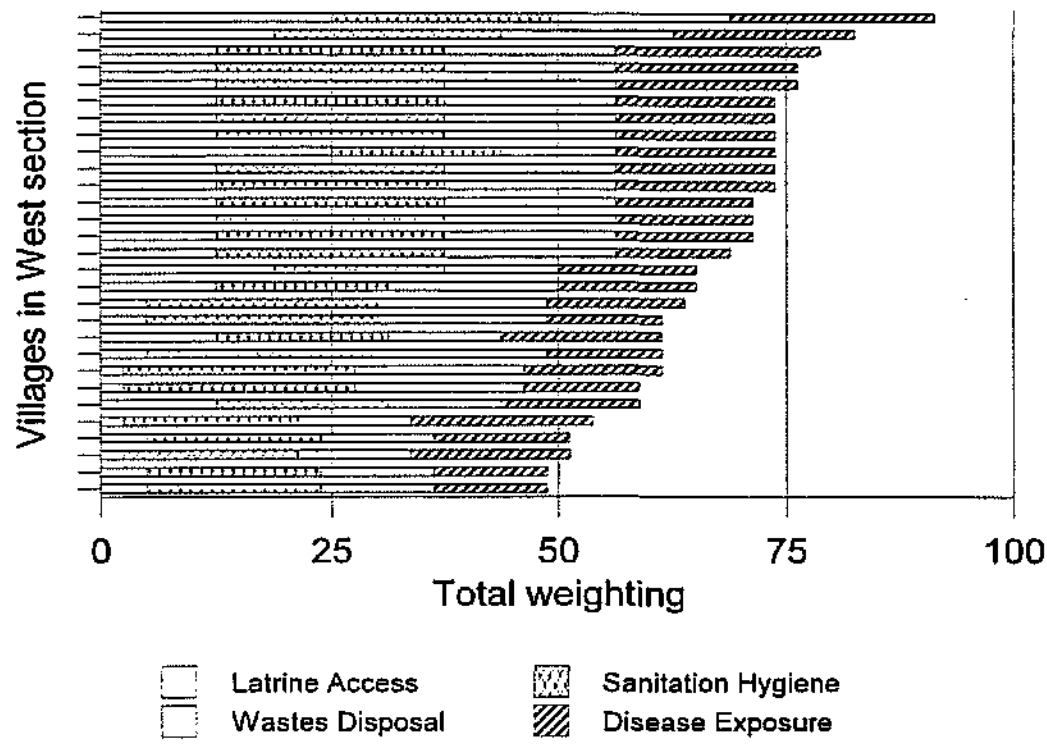

Figure 10 Estimated sanitation and hygiene inadequacy weighting in villages in the west section of the pilot study area. Lower weights indicate more adequate sanitation and hygiene.

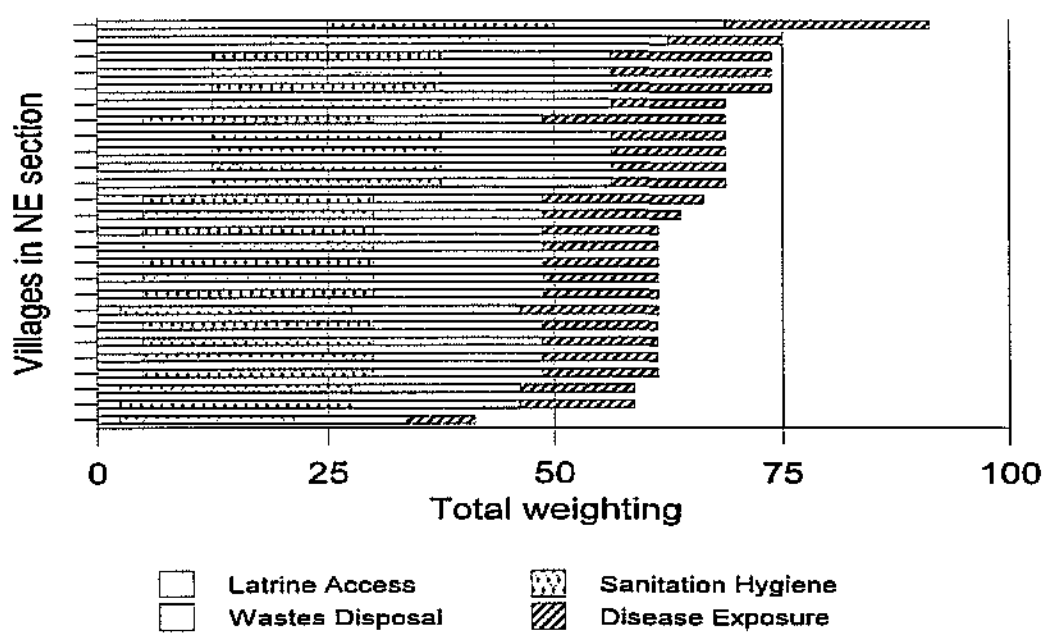

Figure 11 Estimated sanitation and hygiene inadequacy weighting in villages in the north east section of the pilot study area. Lower weights indicate more adequate sanitation and hygiene.

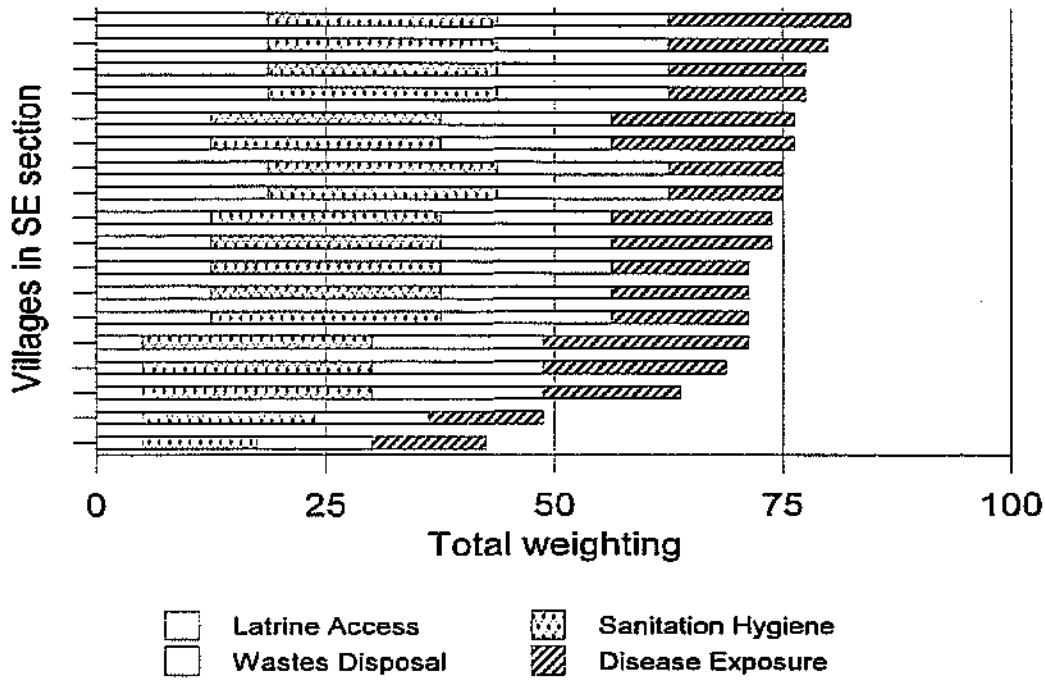

Figure 12 Estimated sanitation and hygiene inadequacy weighting in villages in the south east section of the pilot study area. Lower weights indicate more adequate sanitation and hygiene.

The measurements illustrate an inadequate environment throughout most of the area. The south east section, which is marginally best off in terms of water adequacy, is marginally the worst off in terms of its sanitation and hygiene environment. The overwhelming majority of villages are in the category "severely inadequate environment" for sanitation and hygiene. A few more of the villages than in water adequacy provision, 12 of the total of 74, were in the "critically inadequate environment" category and only 5 achieved the "inadequate environment" category. No villages were ranked at an acceptable level of sanitation and hygiene.

Access to latrines was better than expected but the latrines are almost exclusively of the basic pit variety. The overall average score for all villages for latrine access was 10, the highest of the four measures. Three villages, all in the western section of the pilot study area, reported the collapse of a large number of the village's pit latrines in recent heavy rains. The villages indicated that latrines which were not rebuilt by individual families would be rebuilt communally at the beginning of the dry winter season. Another village in the western section, a rather isolated one situated at the end of a seven kilometre dirt road, had an outbreak of typhoid in which three adults and four children died between our first and second visit. During this period the village's diesel driven water pump was out of order. There was also one hand pump in the village but it was in very poor condition. If unused for just one hour, it took a full half hour to prime before delivering water at a very low rate. During periods when the diesel engine driven pump was not working, poorer families went down to the river for all their water needs, including drinking water.

A small number of professional families in the pilot study area have full flush toilets connected to septic tanks. A few of these septic tank installations are inadequately designed and overflow comes to the surface away from the owner's property.

The almost exclusive use of basic pit latrines, rather than ventilated improved pit latrines (VIP's), immediately classifies a village's sanitation hygienic environment as severely inadequate since adequacy criteria denote such structures as inappropriate. If a significant number of latrines were reported as "not being cared for" the sanitation hygienic environment has been classified as critically inadequate although no human excreta was visible anywhere in any of the villages surveyed. As a result, the overall average score of all villages for sanitation hygiene was 24, the worst of the four measures.

The disposal of non-sanitary wastes appeared to be sound in all villages. However waste disposal in shallow covered pits is classed as being inadequate. As this was the norm and no villages disposed of their wastes in deep pits, "inadequate" is the best rating assigned to a village for wastes disposal. In addition, the majority of villages reported that a significant number of households disposed of non-sanitary wastes in an unhygienic manner. In these villages, waste disposal has been classified as severely inadequate although all villages appeared neat and tidy despite the obvious poverty in many of them. The overall average score for all villages for wastes disposal was 18.

Although rated less critical than either sanitation hygiene or waste disposal, disease exposure was high reflecting unhygienic practices possibly in areas such as the preparation and storage of food, the general insufficient use of water to prevent water washed diseases and, to a degree, exposure to poor quality drinking water. The overall average score for all villages for disease exposure was 16.

In terms of improving the health of communities it would therefore appear that the greatest need is for some well-presented, broadly-based health and hygiene education. Added benefits are likely if this is followed by pilot projects which teach local builders how to construct ventilated improved pit latrines (VIP's) and demonstrate their advantages to communities.

Communities were asked to specify the common causes of death of children under five years. Diarrhoea was the most quoted cause but a significant number of communities specified malnutrition. This should also be taken into account when considering actions to improve community health.

8 Discussion and conclusions

8.1 Guidelines on village level information systems

The following points may be used as draft guidelines for the development of community based information systems:

- Plan and develop the information system with representatives of the communities involved.
- Ensure that all information gathered at the local level is useful at the local level (and is not just for higher level structures).
- Data collection forms must be simple and understandable, and at the same time enable easy estimation of performance based on key performance indicators.

A system to improve sustainability of water system must take the following into account:

- work through problems with communities so they observe that the project improves their lives
- complete the building up of the set of internal water scheme monitoring and management forms so that the community can collect information for quarterly monitoring reports
- work with communities to improve their operation, caretaking and management skills
- provide training in general budgeting, bookkeeping, and financial management, including the role of cost recovery
- liaise with DWAF, Local Government and other stakeholders in the area to plan a strategy for carrying out minor and major maintenance repairs

8.2 Completion of project aim

The aim of the project has been met with the exception of the inclusion of a geographical component in the database. While the countrywide replication has not been achieved, considerable progress has been made in understanding the information needs of communities so they can operate and maintain their water services systems in an effective and sustainable manner.

The core data forms have been designed to elicit information that will assist decision makers to plan and prioritise the water and sanitation needs of the region. The water

adequacy and sanitation hygiene adequacy criteria will enable ranking of individual villages to provide more consistent prioritisation.

Focus of the data collection effort at village and community level has assisted communities to become more involved in their own development and, by providing additional information on conditions in similar villages, has assisted each village to become more aware of other development initiatives in the country.

The on-going data collection efforts will provide a more accurate assessment of potential problems related to loss in efficiency of equipment, breakdown of system components, and potential health hazards related to sanitation and hygiene conditions. This additional information will be invaluable in planning drought mitigation activities for the region.

Implementation of the procedures developed in the project will provide sufficient information for decision makers to monitor implementation progress, implementation constraints, and the effectiveness of different investment policies. In addition, the decision makers will be in a better position to evaluate which conditions lead to sustainable water systems and in which villages those conditions exist.

A sound foundation for a community water services database has been developed in this project. Considerable progress has been achieved in defining appropriate content of the database. Input from information users at community level through central government level has been incorporated in the recommended database content and implemented in the field study in the pilot study area. An initial analysis of data collected in the field study has demonstrated that the content produces useful information. The success of the data collection effort at village level has demonstrated that the concept is feasible and can enhance the sustainable operation and maintenance of the water systems, if approached correctly.

9 Recommendations

The conclusion that must be drawn as a result of many complex forces acting in the water services database development arena at this time is that the data collected during the course of this project should be used where possible. The data are available at WRC, DWAF Head Office, DWAF Northern Province, and should be accessible to the villages that participated in the pilot study.

However, further development of software associated with the database design specifications should not be continued as an isolated project. Efforts are being undertaken elsewhere to ensure that the technical aspects of storing and retrieving data are well in hand. However, the progress achieved in this project in terms of understanding data needs and constraints to data collection at village level should be incorporated in any further information system development. In order to make the data collected in South Africa more generally accessible, consideration should be given

to ensuring that it is possible to output data from any water and sanitation database developed in South Africa to WasamS, the database developed by WHO and used more generally in international settings.

Further effort should be focused on contributing to existing databases, either in populating the database or in aggressively using the data for decision-making and insisting that the data provided is adequate, accurate, and appropriate.

The procedures developed here to include village level participation in data collection and use should be extended to other regions of the country. Additional effort should be focussed on providing an efficient and effective flow of information through the circuit that includes the villages, regional water institutions, provincial government structures, and central government structures.

10 References

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APPENDIX A

WasamS Core Data Questionnaire

WATER AND SANITATION MONITORING SYSTEM

* W A S A M S *

Status as at 31 December 199_

COUNTRY NAME :

SOURCE OF INFORMATION

The statistics provided in this questionnaire are issued by:
(name and address of the issuing institution)

WHAT TO DO WITH THIS DATA

If WASAMS is computerized, please down-load collected data to the 3 1/2" or 5 1/4" diskette. Alternatively, if WASAMS is not computerized, enter collected data on this hard copy of WASAMS questionnaire.

SEND THESE DATA TO

NOTE:
Before completing this questionnaire please refer to the INDICATIVE DEFINITIONS by pressing function key F1 or, if using a hard copy, see attached appendix.
These definitions are INDICATIVE ONLY. Therefore, they could and should be adapted to local perceptions and usage.

WATER AND SANITATION MONITORING SYSTEM

* W A S A M S *

Status as at 31 December 199_

LOCALITY CODE : ... /... /... /... /... /...

Country	:	Sub-level 3.	: . . . . .
Sub-level 1.	:	Sub-level 4.	: . . . . .
Sub-level 2.	:	Sub-level 5.	: . . . . .

Latitude : . . . . . Longitude : . . . . . .

PART I. SERVICE COVERAGE

I. D E M O G R A P H I C D A T A

1. Estimated population (in thousands)

Urban: _____ Rural: _____ Total: _____

_____% _____%

1.1 Disaggregate the above urban data into following two categories (if practicable)

Urban high-income : . . . Urban low-income : . . . . . .

. . . . . % . . . . . %

WATER AND SANITATION MONITORING SYSTEM

* W A S A M S *

Status as at 31 December 199_

LOCALITY CODE : ... /... /... /... /... /...

PART I. SERVICE COVERAGE (continued)

II. S A F E W A T E R S U P P L Y

Population with access to functioning safe water supply (in thousands)

Indicate technologies considered as providing an adequate level of service from the government's perspective (tick all boxes that apply).

	Urban			Rural		
a) House connections	☐	.....	.....%	☐	.....	.....%
b) Yard taps	☐	.....	.....%	☐	.....	.....%
c) Public standpipes	☐	.....	.....%	☐	.....	.....%
d) Boreholes with handpumps	☐	.....	.....%	☐	.....	.....%
e) Protected dug wells	☐	.....	.....%	☐	.....	.....%
f) protected springs	☐	.....	.....%	☐	.....	.....%
g) Rainwater collection	☐	.....	.....%	☐	.....	.....%
h) Other	☐	.....	.....%	☐	.....	.....%
Total served		.....	.....%		.....	.....%
Total unserved		.....	.....%		.....	.....%

Disaggregate the above urban data into following two categories (if practicable)

	Urban high-income			Urban low-income		
a) House connections	☐	.....	.....%	☐	.....	.....%
b) Yard taps	☐	.....	.....%	☐	.....	.....%
c) Public standpipes	☐	.....	.....%	☐	.....	.....%
d) Boreholes with handpumps	☐	.....	.....%	☐	.....	.....%
e) Protected dug wells	☐	.....	.....%	☐	.....	.....%
f) protected springs	☐	.....	.....%	☐	.....	.....%
g) Rainwater collection	☐	.....	.....%	☐	.....	.....%
h) Other	☐	.....	.....%	☐	.....	.....%
Total served		.....	.....%		.....	.....%
Total unserved		.....	.....%		.....	.....%

WATER AND SANITATION MONITORING SYSTEM

* W A S A M S *

Status as at 31 December 199_

LOCALITY CODE : ... /... /... /... /... /...

PART I. SERVICE COVERAGE (continued)

III. S A N I T A T I O N (Sanitary means of excreta disposal)

Population with access to adequate excreta disposal(in thousands)

Indicate technologies considered as providing an adequate level of service from the government's perspective (tick all boxes that apply).

		Urban			Rural	
a)	Household connections to conventional public sewers	☐	.....%	☐	.....	.....%
b)	Household connections to small-bore public sewers	☐	.....%	☐	.....	.....%
c)	Household connections to septic systems	☐	.....%	☐	.....	.....%
d)	Latrines, wet (pour flush etc.)	☐	.....%	☐	.....	.....%
e)	Latrines, dry (ventilated improved pit)	☐	.....%	☐	.....	.....%
f)	Latrines, dry (simple pit etc.)	☐	.....%	☐	.....	.....%
g)	Other	☐	.....%	☐	.....	.....%
	Total served	.....	.....%	.....	.....	.....%
	Total unserved	.....	.....%	.....	.....	.....%

Disaggregate the above urban data into following two categories (if practicable)

		Urban high-income			Urban low-income	
a)	Household connections to conventional public sewers	☐	.....%	☐	.....	.....%
b)	Household connections to small-bore public sewers	☐	.....%	☐	.....	.....%
c)	Household connections to septic systems	☐	.....%	☐	.....	.....%
d)	Latrines, wet (pour flush etc.)	☐	.....%	☐	.....	.....%
e)	Latrines, dry (ventilated improved pit)	☐	.....%	☐	.....	.....%
f)	Latrines, dry (simple pit etc.)	☐	.....%	☐	.....	.....%
g)	Other	☐	.....%	☐	.....	.....%
	Total served	.....	.....%	.....	.....	.....%
	Total unserved	.....	.....%	.....	.....	.....%

WATER AND SANITATION MONITORING SYSTEM

* W A S A M S *

Status as at 31 December 199_

LOCALITY CODE : ... /... /... /... /... /...

PART II. CONTRIBUTION TO OPERATION AND MAINTENANCE COSTS

Average annual exchange rate : 1 US$ = ... national currency units.

1. Contribution to Operation and Maintenance Costs (in 1,000 USD)

1.1 Safe Water Supply	GOV'T	ESAs	BENEFICIARIES	NGO's/OTHER	TOTAL
a) Urban	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Disaggregate the above urban data into following two categories (if practicable)					
b) Urban high-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
c) Urban low-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
d) Rural	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Water total	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
2 Sanitation					
a) Urban	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Disaggregate the above urban data into following two categories (if practicable)					
b) Urban high-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
c) Urban low-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
d) Rural	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Sanitation total	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
SECTOR TOTAL	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	

WATER AND SANITATION MONITORING SYSTEM

* W A S A M S *

Status as at 31 December 199_

LOCALITY CODE : ... /... /... /... /... /...

PART III. CONTRIBUTION TO CAPITAL INVESTMENTS

1. Contribution to Capital Investments for NEW FACILITIES (in 1,000 USD)

1.1 Safe Water Supply	GOV'T	ESAs	BENEFICIARIES	NGO's/OTHER	TOTAL
a) Urban	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Disaggregate the above urban data into following two categories (if practicable)					
b) Urban high-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
c) Urban low-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
d) Rural	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Water total	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
2 Sanitation					
a) Urban	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Disaggregate the above urban data into following two categories (if practicable)					
b) Urban high-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
c) Urban low-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
d) Rural	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Sanitation total	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
SECTOR TOTAL	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	

WATER AND SANITATION MONITORING SYSTEM

* W A S A M S *

Status as at 31 December 199_

LOCALITY CODE : ... /... /... /... /... /...

PART III. CONTRIBUTION TO CAPITAL INVESTMENTS (continued)

2. Contribution to Capital Investments for REHABILITATED FACILITIES (in 1,000 USD)

1.1 Safe Water Supply	GOV'T	ESAs	BENEFICIARIES	NGO's/OTHER	TOTAL
a) Urban	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Disaggregate the above urban data into following two categories (if practicable)					
b) Urban high-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
c) Urban low-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
d) Rural	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Water total	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
2 Sanitation					
a) Urban	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Disaggregate the above urban data into following two categories (if practicable)					
b) Urban high-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
c) Urban low-income	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
d) Rural	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
Sanitation total	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	.....%
SECTOR TOTAL	.....	.....	.....	.....	.....
	.....%	.....%	.....%	.....%	

WATER AND SANITATION MONITORING SYSTEM

* W A S A M S *

Status as at 31 December 199_

LOCALITY CODE : | ... /... /... /... /... /... |

PART IV. GENERAL COMMENTS

1. Quality of Data Reported
   Please comment on the quality of data.

2. Definitions Used
   If you have adapted INDICATIVE DEFINITIONS[1] (1) to the local perceptions, please comment.

(Use extra sheet if necessary)

3. Decentralization of Monitoring

   What is the lowest administrative level from which data was obtained this year? (Tick appropriate box)

National	☐	Sub-level 1.	☐	Sub-level 2.	☐
Sub-level 3.	☐	Sub-level 4.	☐	Sub-level 5.	☐

[1] i.e. broad INDICATIVE DEFINITIONS for CORE INDICATORS as seen when function key F1 is pressed when running WASAMS computer system or, the attached appendix.

APPENDIX I

INDICATIVE DEFINITIONS FOR CORE INDICATORS

To enable regional and global promotion and advocacy on behalf of the sector, there is need for standardization in the broadest sense of the terms used to define elements of the sector. This is of paramount importance.

Therefore,

> the definitions provided hereafter relate to the CORE INDICATORS
>
> and must be considered as INDICATIVE only.
>
> They could and should be adapted to local perceptions and usage.

It is important to note that the WASAMS CORE INDICATORS will be the only ones to be channelled upwards from national level for use at regional and global levels for advocacy and fund raising purposes.

GEOGRAPHIC CATEGORIZATIONS

URBAN HIGH-INCOME AREAS :

are those whose populations are perceived locally to normally have a good physical standard of dwelling and access to other services such as health, safe water, sanitation and public transport.

URBAN LOW-INCOME AREAS :

are those whose populations do not fit into the previous category, and have minimum access to services enjoyed by the afore-mentioned group.

RURAL AREAS :

are those populations perceived by local definition to reside outside urban centers and being generally dispersed populations, as defined in the local population census.

APPENDIX I

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RURAL AREAS :

are those populations perceived by local definition to reside outside urban centers and being generally dispersed populations, as defined in the local population census.

SAFE WATER SUPPLY II

HOUSE CONNECTIONS :

are taps installed within the individual house, normally more than one tap. irrespective of the source and extraction method.

YARD TAP :

generally a single tap installed within a private plot of land, but is positioned outside the house structure, irrespective of the source or extraction method.

PUBLIC STANDPIPES :

taps installed on public grounds and accessible to the general public/community. irrespective of the source or extraction method.

BOREHOLES WITH HANDPUMPS :

these are drilled boreholes with a final diameter (cased or uncased), generally smaller than 6 inches and with static water levels (SWL) of usually less than eighty (80) meters depth. Equipped with a handpump which is manually operated and, which is rarely able to lift water from depths greater than 80 meters.

PROTECTED DUG WELLS :

are those which are adequately protected (guarded) against surface or outside contamination through the use of lining or covering. with a rim sufficiently raised above ground level, and may be equipped with a pump (any type). In completing the WASAMS Questionnaire specify if the pump is high-cost or low-cost technology (by local definition).

PROTECTED SPRINGS :

a capped spring with a direct outlet on the site. This implies that the population collects water at the spring and carries it to the household.

RAINWATER COLLECTION :

these are individual household or communal rainwater harvesting systmes. The system normally consists of a catchment area (roof or other type of preferably impermeable or almost impermeable surface), and a storage system consisting of a cistern. drums, clay pots or other such container. Sometimes the system is fitted with a filter usually located between the catchment and storage components. The water must be rendered safe to drink as an end product.

OTHER TECHNOLOGIES :

as defined and perceived at the country level.

SANITATION III

HOUSEHOLD CONNECTIONS TO CONVENTIONAL PUBLIC SEWERS :

this refers to a pipeline outlet from the household to the public sewerage system. Its function is to conduct and discharge human excreta and wastewater from the household to a sewerage treatment system.

HOUSEHOLD CONNECTIONS TO SMALL-BORE PUBLIC SEWERS :

refers to unconventional sewerage system suitable for areas where water supply is low i.e. where consumption is normally less than 30 liters/capita/day (which implies dwellings where public standpipes are used, usually). These small-bore sewers are normally of 4 to 6 inches in diameter and are buried at shallow depths (less than 1 meter) below the surface. Such systems are usually designed for low-income populations in unplanned settlements where the population density usually exceeds 200 persons per hectare.

HOUSEHOLD CONNECTIONS TO SEPTIC SYSTEMS :

this refers to all on-site water carriage sanitation systems discharging to a septic tank, a cess pool or other means into the soil.

LATRINES, WET (POUR-FLUSH ETC.) :

refers to on-site latrine system which uses a small amount of water (1-3 liters) for hand-flushing the human excreta and has single or double pits for excreta and wastewater collection. Therefore, it may or may not be connected up to a small-bore or conventional sewerage system.

LATRINES, DRY (VENTILATED IMPROVED PIT) :

refers to an on-site improved "dry pit" latrine comprising a vent pipe with a fly screen used to trap flies in the pit and, also allows evacuation of foul air into the atmosphere above the latrine roof. This minimizes foul odour within the latrine super-structure and traps flies that could spread diseases through faecal contamination.

LATRINES, DRY (SIMPLE PIT) :

refers to a conventional "dry" pit latrine without any improvements such as vent pipes and fly screen (as fitted to the VIP). This type of latrine is often foul smelling and also allows flies to escape resulting in the risk of food contamination etc.

OTHER TECHNOLOGIES :

as defined and perceived at the country level.

INDICATIVE EXAMPLES: DEFINTION OF "FUNCTIONING" IV

Emphasis is stressed on the following definitions as examples only. Therefore these examples should be elaborated upon at country level to suit specific needs.

Water systems:

i. For reticulated systems leading to household connections, yard taps or standpipes to be considered "functioning", they should operate above 50 percent of design capacity on a daily basis.

ii. For handpumps, "functioning" will mean those operating at over 70 percent of the time. and where the time-lag between breakdown and repair does not exceed two weeks.

Sanitation:

i. "Functioning" will mean that the facility is structurally and operationally sound and it is attractive for and encourages use.

OTHER DEFINITIONS V

EXTERNAL SUPPORT AGENCY (ESA)

refers to an external donor be it a multilateral or international organization such as UNICEF or UNDP, a bilateral such as USAID, an external nongovernmental organization (NGO) such as OXFAM, or intergovernmental organization (IGO) such as EEC or African D.B.

NGO's/OTHER

refers to national non-governmental organizations (as opposed to external NGOs).

"ACCESS"[1]

as a broad indicative definition refers to:

i. Access to water supply: the availability of at least 20 liters of safe water per person per day, located within one kilometer from the user's dwelling.

ii. Access to sanitation: the availability of a sanitary facility for human excreta/waste disposal within a convenient distance from the user's dwelling i.e. not too far away to discourage its use.

EXCRETA DISPOSAL :

implies a satisfactory sanitory means of excreta disposal indicating that it hygienically separates excreta from human contact.

CONTRIBUTION TO OPERATION AND MAINTENANCE COSTS :

implies on-going, regular or recurrent upkeep including repairs.

NEW FACILITIES :

implies new capital investment for expansion of service coverage, but not for the rehabilitation of existing systems which may result in improvement of service level (from standpipe to yard tap).

REHABILITATION :

implies a substantial capital investment which may or may not increase the level of service (e.g. from a standpipe to a house connection for convenience), but does not contribute towards expansion of service coverage.

[1] Should be specifically defined at the country level.

APPENDIX B

Abstracts from

WATER AND SANITATION POLICY
White Paper

ABSTRACTS FROM "WATER SUPPLY AND SANITATION POLICY" WHITE PAPER: CAPE TOWN NOVEMBER 1994

Page

09 INSTITUTIONAL FRAMEWORK

11 The role of Provincial Governments

To ensure effective formal communication and liaison between the Department and the Provinces, Provincial Water Liaison Committees have been established. .... The functions of the Provincial Water Liaison Committees include liaison with the Department, the identification of priorities and critical areas of need, and advising on the implementation of the Reconstruction and Development Programme as it relates to water supply and sanitation.

13 The role of the Professions

Among the requirements will be a change in the world view of the people and organisations concerned. In terms of the RDP, it is Government's intention to put the community first, to ensure transfer of control to the local level, to make the community the client. Engineers and other professions will thus have to adapt to serving non-expert clients. ....

15 BASIC SERVICE PROVISION POLICY

17 Training and capacity building

Training is one of the factors which will determine whether or not the objectives of the Government of National Unity will succeed in the implementation of the Reconstruction and Development Programme. This is particularly the case in the water and sanitation sector. The enormous backlog of basic water and sanitation services to local communities will not be reduced unless the communities themselves are empowered to undertake their own development. This is not possible if they do not have the skills required which they can only acquire through training and experience.

Although training is not cheap, the costs of project failure are far greater. Because of the long lead times in establishing training resources and in training suitable trainers, it is imperative that the issue receives a high and early priority. ....

18 .... a National Community Water and Sanitation Training Institute is to be established at the University of the North ....

18 FINANCE AND TARIFF POLICY

19 Financial policy

....where poor communities are not able to afford basic services, Government may subsidise the cost of construction basic minimum services but not the operating, maintenance or replacement costs.

In order to establish the financial implications of this policy, a national water supply and sanitation development strategy will be completed in the near future which will provide greater detail of the extent of a national programme in terms both of numbers of households to be served and the cost of supporting such service provision.

29 MONITORING AND INFORMATION

29 Monitoring, performance auditing and regulatory functions

An important function of the Central Government is, whilst devolving implementation to the lowest level possible, to ensure that what happens at grass roots level meets the required standard. The policy in this White Paper is aimed at opening up the arena for as many participants as possible to engage in the task of developing basic water and sanitation services. For this to be effective, it will be necessary to monitor and regulate their performance.

The policy is designed to ensure that the local community controls the process through existing Local Authorities or the proposed Local Water Committees. ....

High standards of performance will be expected of statutory bodies including second tier bodies such as Water Boards and local authorities. The policy of the Government, as expressed in the RDP, is to promote a more thorough approach to performance auditing in Government and para-statal organisations. The monitoring of performance will both be to ensure that standards are maintained and to ensure that adequate basic service coverage is achieved and maintained in order to achieve the equity objectives of the Government. The financial performance of institutions will be regularly assessed including the effectiveness and efficiency with which subsidies are used.

30 For monitoring and performance auditing to be effective:

* A system of clear standards and criteria must exist. The Department will establish such criteria, after broad consultation, and will ensure that all parties are aware of the standards and regulations.
* An appropriate information system must exist which will enable the Department to know what is actually happening at both grass root level and in the public bodies responsible for water supply and sanitation provision.

A Directorate will be established .... to undertake these functions. (NOTE: The Directorate, titled Planning and the RDP, in now established. The Director is Mr Fred van Zyl.)

The objective of monitoring and performance auditing is not primarily punitive but supportive. The objective is to ensure that goals are met, which is best achieved through support and co-operation....

30 Information and decision support systems

Central Government has a responsibility to ensure that basic services are delivered and has a performance monitoring role. Other organisations at various levels will be responsible for implementation and operation. Such functions at different levels are not possible in the absence of adequate information. The Department is therefore planning to establish a National Water Supply and Sanitation Information Management System.

The information system must provide useful and accessible information for communities, Local Water Committees and Local Authorities, second tier water bodies i.e. Water Boards, Provincial Governments, consultants, NGOs, and various other Central Government Departments.

The principles of the proposed National Water Supply and Sanitation Information Management System will be:

* The National System must be people focussed and service orientated.
* Information should be accessible to communities and to all levels of the water industry. Information available to different sectors should be useful, relevant, reliable and in an appropriate format (electronic formats and printed format).
* The information system should make maximum use of the previous Department of Water Affairs and Forestry information systems and information from all other relevant sources in the country.
* Participation in the information system must encourage co-operation and co-ordination among the various levels in the water industry.
* The new Department of Water Affairs and Forestry will be the custodian of the information system and will rely heavily on various organisations for updating the information.

31 SUPPLEMENTARY POLICY

31 Women - the focus of development

.... all statutory bodies in the water sector, including Local Water Committees, shall be recommended to comprise a minimum of 30% women. This should apply at all levels, particularly in management, and should be instituted within five years. Measures will be established to monitor progress in this regard.

31 Water and the environment

The Department will compile guidelines for sustainable development.... The guidelines will aim to ensure that, in all developments irrespective of size, the following issues are addressed:

* Provision is made for monitoring the resource,

32 Managing droughts and other disasters

33 Because drought is a common occurrence it would be expected that greater preparedness would exist to alleviate its impact.

33 BRIEFING INFORMATION

36 The sanitation issue

....Personal, family and cultural hygiene practices and habits are critical.... Therefore sanitation improvement encompasses an entire process, aimed at the home and the individual, which must include health and hygiene education as well as improving the physical infrastructure of toilet facilities, water supply and disposal of domestic waste water.

APPENDIX C

DWAF Northern Province

Staff's Agreed Information Needs

Water supply and sanitation data base project

Data sets needed for fast-track data base

20 May 1995

1. Introduction

Arising out of the workshop held on Friday 12 May 1995, in the offices of the Municipality of Pietersburg, and previous project meetings, the following are the data sets identified for the "fast-track" data base.

The first table (ref page 2) provides the raw rankings assigned by the workshop participants: the rankings are anonymous, and the columns are shown in random order. Each number is the ranking provided by the participants, with those data sets that were not ranked being assigned the ranking of 39. The rows are provided in the order that the data sets were listed on the posters. The right-hand column provides the combined ranking of the rows, where the lowest number equates to the highest ranking.

The second table (ref page 3) shows the priority data sets, in order. The first column shows the ranking, the second provides the descriptions of the data sets as described by the participants and the third gives the combined priorities for the data sets. To aid in interpreting the data, double lines have been added to separate the data sets into nine groupings, where the first group are of the utmost importance and the last group are not considered to be necessary, at all (no participant ranked them).

Table 1: raw rankings by participants

Data set	a	b	c	d	e	f	g	h	Total ranking
Payment of water accounts	39	39	39	15	39	14	21	39	245
Training and education	39	39	5	11	10	15	39	15	173
Socio-economic infrastructure	4	7	11	13	7	16	11	14	83
Cost recovery of projects	16	39	39	14	21	13	39	21	202
Community perception	18	15	39	22	39	19	39	13	204
Institutions involved	6	16	4	10	6	2	15	39	98
Development priority index	39	14	7	39	11	3	16	20	149
Water quality	8	8	39	16	15	39	10	19	154
Logistics (power, etc)	39	39	39	28	39	39	13	8	244
Planned projects	14	39	39	39	39	39	39	39	287
Operating and maintenance costs	15	39	13	23	19	17	5	22	153
Breakdown/failure records	39	39	12	27	20	39	39	9	224
Water supply infrastructure	2	4	39	9	2	1	4	6	67
Rainfall data	39	19	39	39	39	39	14	39	267
Available water resources	3	3	39	17	3	4	3	3	75
Supply areas	1	18	39	3	39	39	39	5	183
Watershed data	39	17	39	1	39	39	39	39	252
Number of schemes	39	39	39	39	39	39	39	7	280
Abandoned schemes	39	39	39	26	39	39	39	10	270
Capital costs of new projects	17	39	14	12	18	18	20	39	177
Demographic profiles	13	39	39	35	9	39	19	39	232
Population of settlements	11	6	6	4	22	20	2	4	75
Names & locations of settlements	12	5	1	2	4	5	1	1	31
Projected population changes	39	39	39	39	39	39	39	39	312
Funders	39	20	15	39	14	9	39	18	193
Communities in crisis	39	39	8	29	12	8	39	11	185
Water supply adequacy rating	10	39	3	7	5	39	9	39	151
Domestic water usage	9	2	16	8	13	6	39	39	132
Water demand by other sectors	7	11	10	5	8	21	12	23	97
Domestic water demand	5	1	39	6	1	7	8	2	69
Sanitation	20	10	9	18	23	39	39	39	197
Health	39	9	39	39	39	39	39	39	282
Land cover	21	39	39	33	39	39	39	39	288
1:500 000 data	22	12	39	39	17	39	7	39	214
Cadastral boundaries	19	13	2	32	16	12	6	17	117
Water tariffs	23	39	39	19	39	11	17	16	203
Land use	24	39	39	31	39	39	18	39	268
Elevation data	25	39	39	25	39	39	39	39	284

Table 2: Summarised, ordered ranking of priority data sets

Rank	Data set	Priority
1	Names and locations of settlements	31
2	Water supply infrastructure; number and location of schemes; bias	67
3	Domestic water demand	69
4=	Available water resources; water supply sources; groundwater recharging; conjunctive exploitation of water	75
4=	Population of settlements; spread	75
6	Socio-economic infrastructure; entrepreneurial initiatives; degree of organisation, participation and commitment by communities	83
7	Water demand by other sectors; utilization of resources	97
8	Institutions involved; policy and its implementation; DWAF organogram and decision making chart; rôles and relationships between organisations	98
9	Cadastral boundaries; TLC boundaries	117
10	Domestic water usage	132
11	Development priority index	149
12	Water supply adequacy rating; level of service; adequacy/security	151
13	Operating and maintenance costs	153
14	Water quality; quality of available resources	154
15	Training and education; empowerment; human resource information; community trainers; educational institutions	173
16	Capital costs of new projects; investments and outlays	177
17	Supply areas	183
18	Communities in crisis	185
19	Funders	193
20	Sanitation; cultural issues	197
21	Cost recovery of projects	202
22	Water tariffs	203
23	Community perception	204
24	1:500 000 data	214
25	Maintenance breakdown records; borehole failure records	224
26	Demographic profiles	232
27	Logistics: access to power, diesel and electricity	244
28	Payment of water accounts	245
29	Watershed data	252
30	Rainfall data	267
31	Land use	268
32	Abandoned schemes	270
33	Number of schemes	280
34	Health	282
35	Elevation data	284
36	Planned projects and their details	287
37	Land cover	288
38	Projected population changes	312

2. Conclusions

For the fast track data base, the following data sets need to be obtained and collated. The questions posed need to be answered by the participants, or others.

(1) **Names and locations of settlements:** now the highest ranked data set! This data set provides the base for many other data sets. Who has the data?

(2) **Water supply infrastructure:** these are the dams, boreholes, reservoirs, pipes, valves, pumps and so on. Who has the data?

(3) **Domestic water demand per settlement:** this is the expected demand by each settlement for water for domestic usage: presumably this is the expected demand during the 1995/6 financial year. What are the units needed (eg: daily, weekly, monthly)? Who has the data? What if the data are not available per settlement, but only per district or region?

(4) **Available water resources:** these are the surface water and groundwater available, whether developed (exploited) or undeveloped (available). What are the units needed (eg: individual water schemes, dams, boreholes, aquifers)? Who has the data?

(5) **Population of individual settlements:** this is the total number of people in each settlement, without differentiating on the basis of age, sex or any other demographic profile. While the 1991 South African and Venda censuses are probably still accurate enough to use at a district level, they are probably too old to use at a settlement level. Who has better data?

(6) **Socio-economic infrastructure:** a new data set on the priority list. This data set will have to be defined more clearly, but it includes entrepreneurial initiatives and the degree of organisation, participation and commitment by communities towards projects. Who has the data?

(7) **Water demand by other sectors:** this is the non-domestic demand, that is, the water demand by agriculture, mining, industry, forestry and so on. Who has the data?

(8) **Institutions involved:** another new data set on the priority list. This data set will also have to be defined more clearly, but it includes policies and their implementation, an organogram and decision making chart of DWAF, and the rôles and relationships between organisations. Who has the data?

The following data sets are of a lower priority:

(9) **Cadastral boundaries, including the new TLC boundaries:** CDSLI also provides a national data set of the provincial, administrative and magisterial district boundaries. The Department of Health is compiling a data base of TLC boundaries. Who has better data?

(10) **Domestic water usage per settlement:** this is current usage, as opposed to expected demand. Who has the data?

(11) **Development priority index:** another new data set on the priority list. This will have to be defined. Who has the data?

(12) **Water supply adequacy rating, per settlement:** this is the volume of water supplied to each settlement: the adequacy rating could be determined from this and the domestic demand (see above). Who has the data?

(13) **Operating and maintenance costs:** these are the operating and maintenance (as opposed to capital) costs for water supply projects. Who has the data?

(14) **Water quality:** another new data set on the priority list. This could cover a multitude of sins, so it will have to be defined clearly. Who has the data?

The remaining data sets are of a much lower priority, and the project team will have to decide whether or not they should be included in the fast-track data base.

These conclusions are not definitive, and would have to be analysed and agreed to by the rest of the project team.

APPENDIX D

Draft Database Design Specifications

CSIR Informationtek
Decision Support Services

Design Specification

Water & Sanitation System

Doc No:	EJ/21/11/95
Version:	1.0
Date:	21/12/95
Authors:	E Gouws & J Holloway

TABLE OF CONTENTS

1. THIS DOCUMENT

1.1 Audience

Any person who needs an understanding of the functionality and design of the Water & Sanitation Pilot Database System.

1.2 Aim

To describe the functionality available in the system and to describe the database design and screen designs of the system.

1.3 Scope

An overview of the whole system with detail only on Layer 1 data entry forms.

1.4 Glossary

1.4.1 Glossary of words

Locality -	A specific [country/province/district/local council/ward/community] combination. Data is collected and entered under this structure.
Community -	Smallest possible cohesive body at which data can be collected.
Community ID -	A unique number allocated to a specific community. The community ID is a number ranging from 00000 - 99999 (5 digits long). Only a set of numbers is allocated to a district at a time (or level at which data is electronically captured). Hence the numbers for a district are not necessarily sequential. The community ID is the key used to access all information on a specific community.
Form Layer -	This refers to the different types of data gathering forms eg., 'Core Data Form: QS01' is known as form layer 1.
Form -	A form comprises of a series of questions with space allocated for the capturing of answers (or data).

1.4.2 Glossary of computer terms

Table -	The layout in which data is stored within the database system. Related information is kept in the same table.
Look up Table -	The data kept in a look up table. does not refer to a specific locality. Rather it is used in the generation of the different form layers. For eg., a list of all available livestock is kept in a look up table. Should the user decide to add an extra animal to this list, he/she only need to modify the relevant look up table.

Record -	A single entry of data into any of the above tables.
Screen -	A rectangular image that occupies the whole of a computer screen, like the main menu on page 9.
Window -	A pop up box containing information or instructions and occupies a smaller part of the screen. A pop up box is a temporary box that gets displayed until it is acted upon. For eg., the 'Delete Selected Records' window on page 18.
Text box -	Rectangular area in which text is displayed and edited.
List box -	List of available values for a specific field.
Combo box (V) -	Combination of a text box and a list box, with space to enter data and a drop down list with currently available values.
Button -	Rectangular area displaying a command which is executed when the button is selected.
Option control (@) -	Only one of a list of available options can be selected. As soon as one option is selected, any previously selected option is deselected.
Check box (X) -	An on/off switch which allows the user to select or deselect a relevant option.

2. THE WATER & SANITATION SYSTEM

2.1 Overview

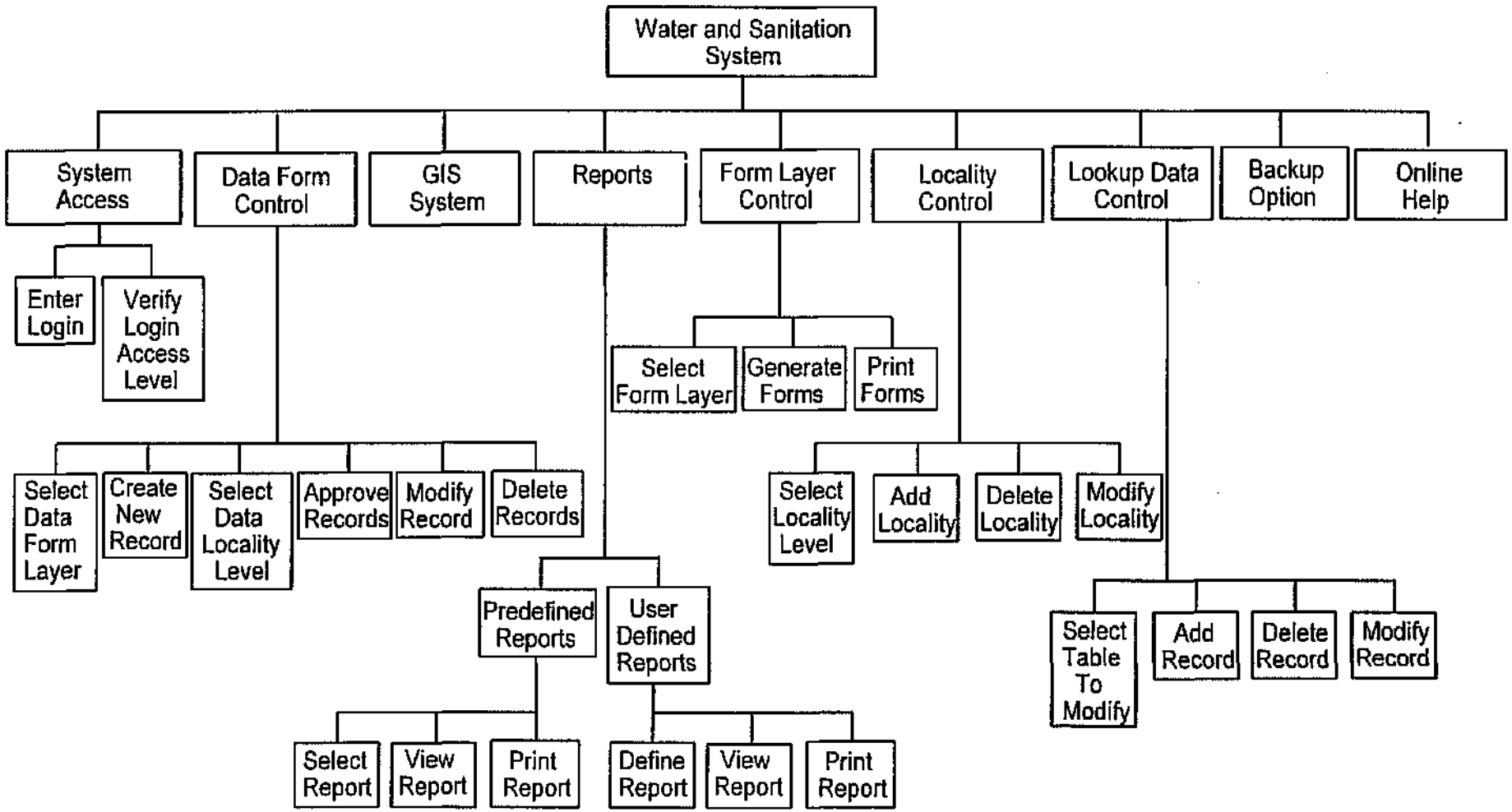
The objective in creating this system is to provide a management tool dealing with water and sanitation information on a national basis. The system is designed to support South African needs but flexibility is provided to allow the system to be used by other countries. The system is designed for decentralised capture of data with each of these decentralised data capturing centres having access to all the national data. The design facilitates maximum community participation particularly in allowing each community to supply their data to the system and by providing each community with reports from the system thus encouraging community members to become involved in the management of their water and sanitation schemes. Generally data will be written on paper forms at community level and subsequently captured into the system at district or provincial level.

Security access levels are provided via the login names thus ensuring that access to certain facilities is only available to users with the appropriate access rights. The system provides for data capturing via 5 layers of forms, known as data gathering forms, and the period intervals (eg. hourly, monthly) at which data may be entered into the system is unlimited. A facility for adding locality information (i.e. countries, provinces, ... , communities) and functionality for maintaining various look-up tables is provided. A GIS facility provides graphical representations of the data available. Paper copies of the data gathering forms may be printed from the system. Various reports, both predefined and user-defined, can be generated from the approved data available in the database.

2.2 Functional Design

The functional design gives an overview of all the functionalities linked to the system. The different screen layouts and menu functions, also form part of this design.

2.2.1 Functional Block

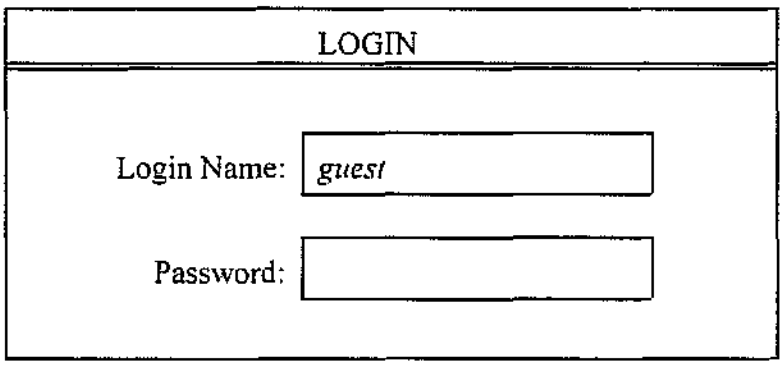


2.2.2 Screen Layouts and Functionality

2.2.2.1 System Access

A number of different level users exist for the system. Certain users have the right to enter new information into the system, but do not have the right to modify or delete existing information. Other users only have the right to view information already entered. On starting up the system, the name and password of a user must be entered and after verification, the user has access to all options allocated to his/her access level (see ***2.2.4 Access Functions***). In the case of a user with read-only access, a password is not required and the user will login as 'guest'. 'Guest' will be the default value displayed in the 'Login Name' field when the system is started.

a. Enter Login

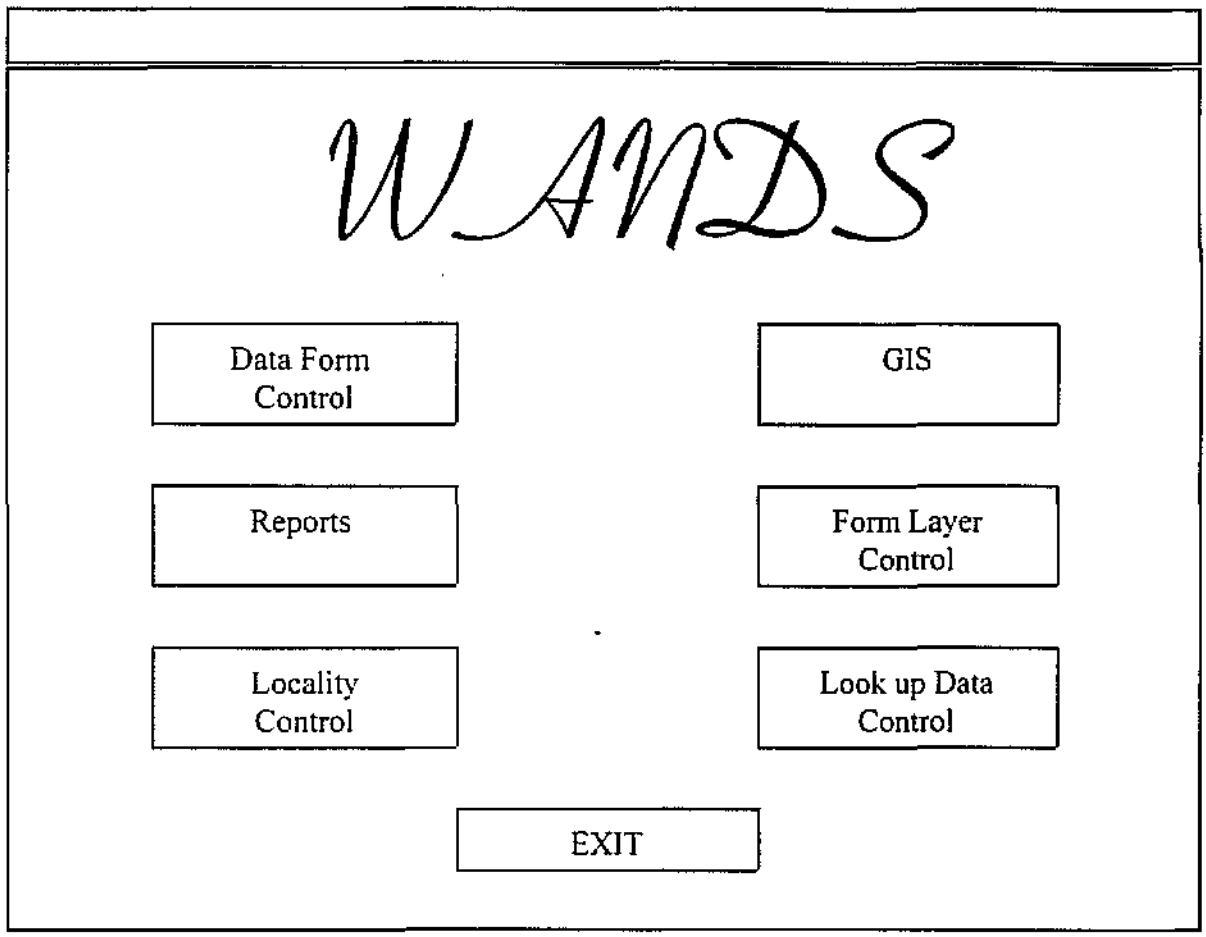


b. Verify Login Access Level

The information received from the login screen, is internally verified by this function. The relevant access level of the user is checked, and he/she is assigned access rights accordingly.

2.2.2.2 Menu Selection

Main Screen



The 7 buttons on the main WANDS menu allows the user to branch to the screens he/she requires by selecting the appropriate button with the mouse.

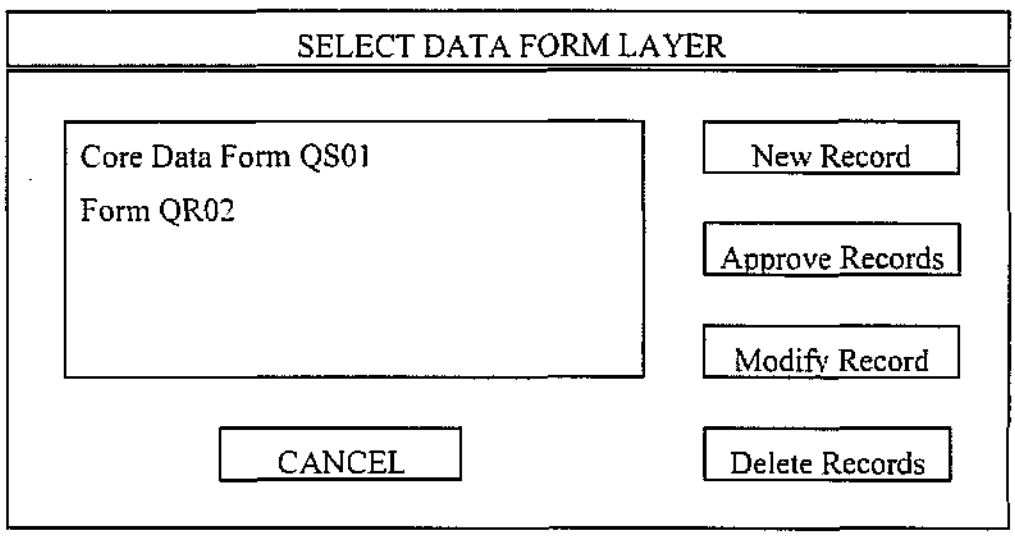
Data Form Control -	displays the Data Form Control screen in which new data may be entered into the system, existing data modified, approved or deleted.
GIS -	brings up the GIS application.
Reports -	displays the Reports screen from which the user can either select predefined reports or generate user-defined ones.
Form Layer Control -	provides a screen from which the user may select the layer and number of forms to be printed.
Locality Control -	displays the screen which contains functionality to allow the user to add or modify locality information.
Look up Data Control -	displays a screen from which the user may alter any data look up table information.
EXIT -	allows the user to exit the system after receiving confirmation from the user.

2.2.2.3 Data Form Control

The system consists of 5 different layers of data gathering forms. A level 2 (and upwards) user can add new information into the system (see ***2.2.4 Access Functions***). However, the data entered by certain level users still needs to be approved by a higher level user. Thus, an option to extract all these unapproved entries is provided. After entry of a questionnaire, the need may arise to modify certain information added in that form. The functionality to modify any record, approved or unapproved, is therefor also provided, as well as the essential functionality to be able to delete certain questionnaires entered into the system.

a. Select Data Form Layer

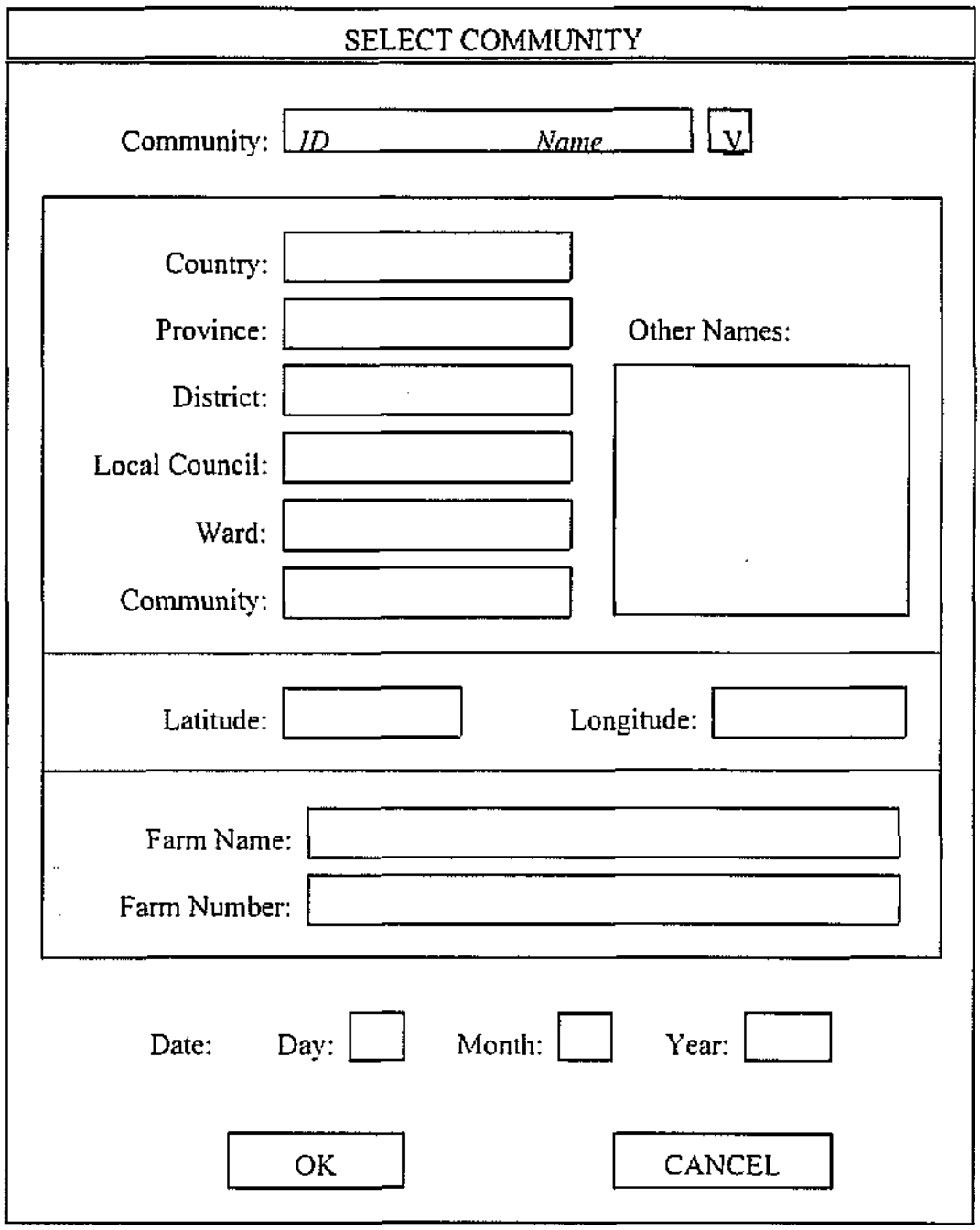
On selecting 'Data Form Control' from the main menu, the following screen is displayed:



The large box is a list box containing a list of all the types of data gathering forms available. The user must choose a type of form and then select whether he/she wishes to create a new record, or approve, modify, or delete an existing record for that form layer. 'CANCEL' allows the user to exit the screen and return to the main menu. Should any of the form layers not need to execute a certain option, that option will be disabled.

b. Create New Record

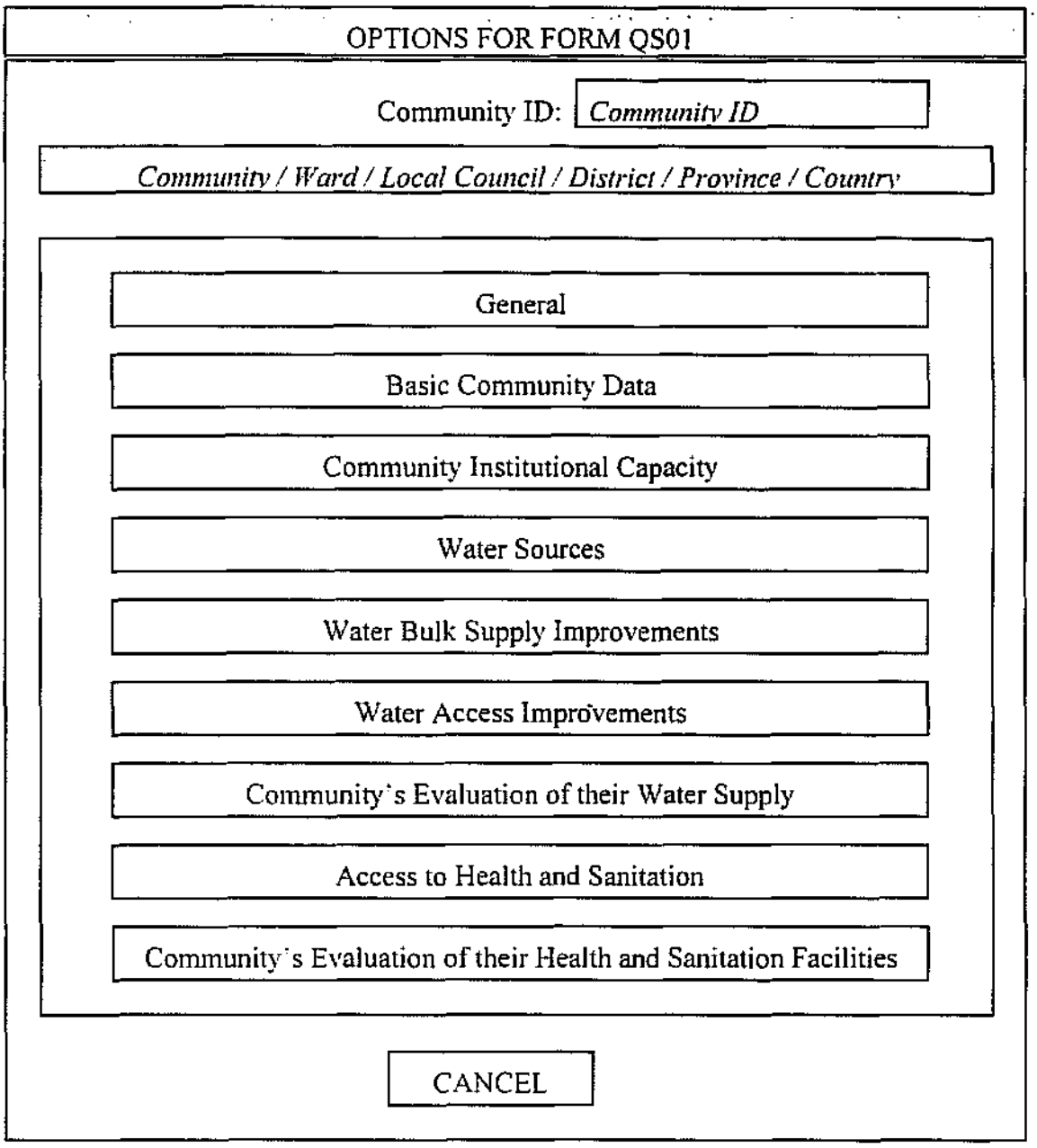
On selecting the Core Data Form (Layer 1 form) and clicking on the 'New Record' button, the following screen is displayed:



The user selects from an existing list the community ID indicated on top of the form. This is displayed together with the community name. The locality details in the centre of the screen are view only and reflect the details of the community ID selected on the combo box. The user must enter the date on which the data capturing was done. Selecting 'OK' confirms the community selection and date and opens up the options screen for this QS01 form. 'CANCEL' returns the user to the previous 'Select Data Form Layer' screen.

Form QS01 Options

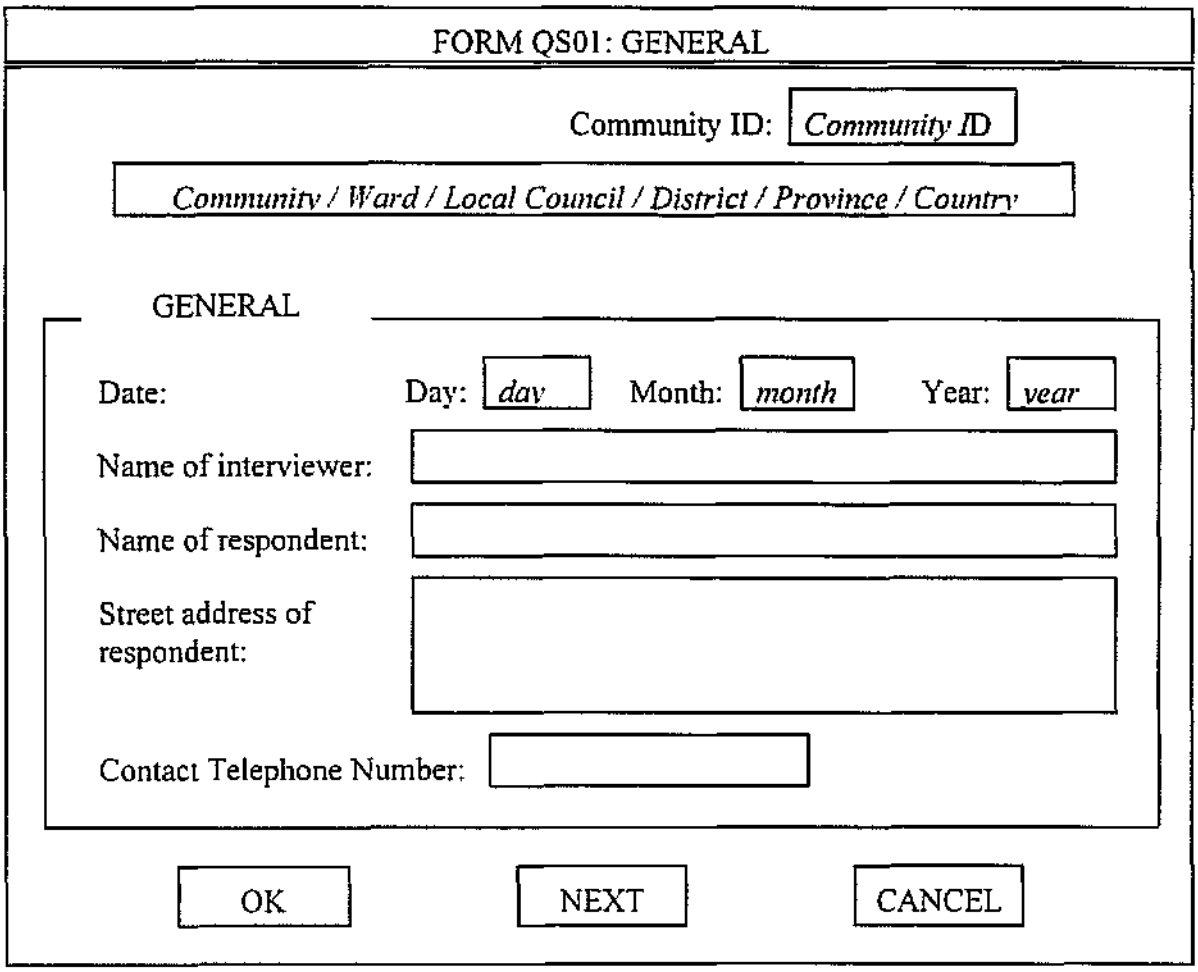
On selecting 'OK' on the 'Select Community' screen, the following screen is displayed:



This screen contains buttons for the different sections of the QS01 form. Clicking on a button will display the appropriate screen for that section of the form. On the top of the screen the selected community ID and description are displayed. 'CANCEL' will exit this screen and return the user to the previous 'Select Community' screen.

General

Selecting 'General' from the options screen brings up the following screen with most fields empty. The community ID and description fields contains the appropriate information for the community selected. The date field defaults to that entered on the 'Select Community' screen.



Selecting the 'OK' button returns the user to the options screen for the QS01 form and saves the data entered while selecting 'CANCEL' closes this screen and returns the user to the options screen without saving. 'NEXT' takes the user immediately to the next section of the form whilst saving the current section's data. The fields for community ID, locality, and date are defaulted to the appropriate values and are not editable.

Basic Community Data

The screen design for the 'Basic Community Data' reflects the same layout as the Basic Community Data section in the QS01 form. The difference is that the design has a screen's appearance, as in the 'General' screen, rather than a report appearance. The buttons 'OK', 'NEXT', 'PREVIOUS' and 'CANCEL' appear at the bottom of the screen and function exactly the same as those in the 'General' screen. See ***2.2.6 Form Layouts*** for the form layout.

Community Institutional Capacity

Similarly to the Basic Community Data, this screen layout reflects the layout of the 'Community Institutional Capacity' section in form QS01 which can be seen in ***section 2.2.6***.

Water Sources

Similarly to the Basic Community Data. this screen layout reflects the layout of the 'Water Sources' section in form QS01 which can be seen in ***section 2.2.6***.

Water Bulk Supply Improvements

Similarly to the Basic Community Data. this screen layout reflects the layout of the 'Water Bulk Supply Improvements' section in form QS01 which can be seen in ***section 2.2.6***.

Water Access Improvements

Similarly to the Basic Community Data. this screen layout reflects the layout of the 'Water Access Improvements' section in form QS01 which can be seen in ***section 2.2.6***.

Community's Evaluation of their Water Supply

Similarly to the Basic Community Data. this screen layout reflects the layout of the 'Community's Evaluation of their Water Supply' section in form QS01 which can be seen in ***section 2.2.6***.

Access to Health and Sanitation

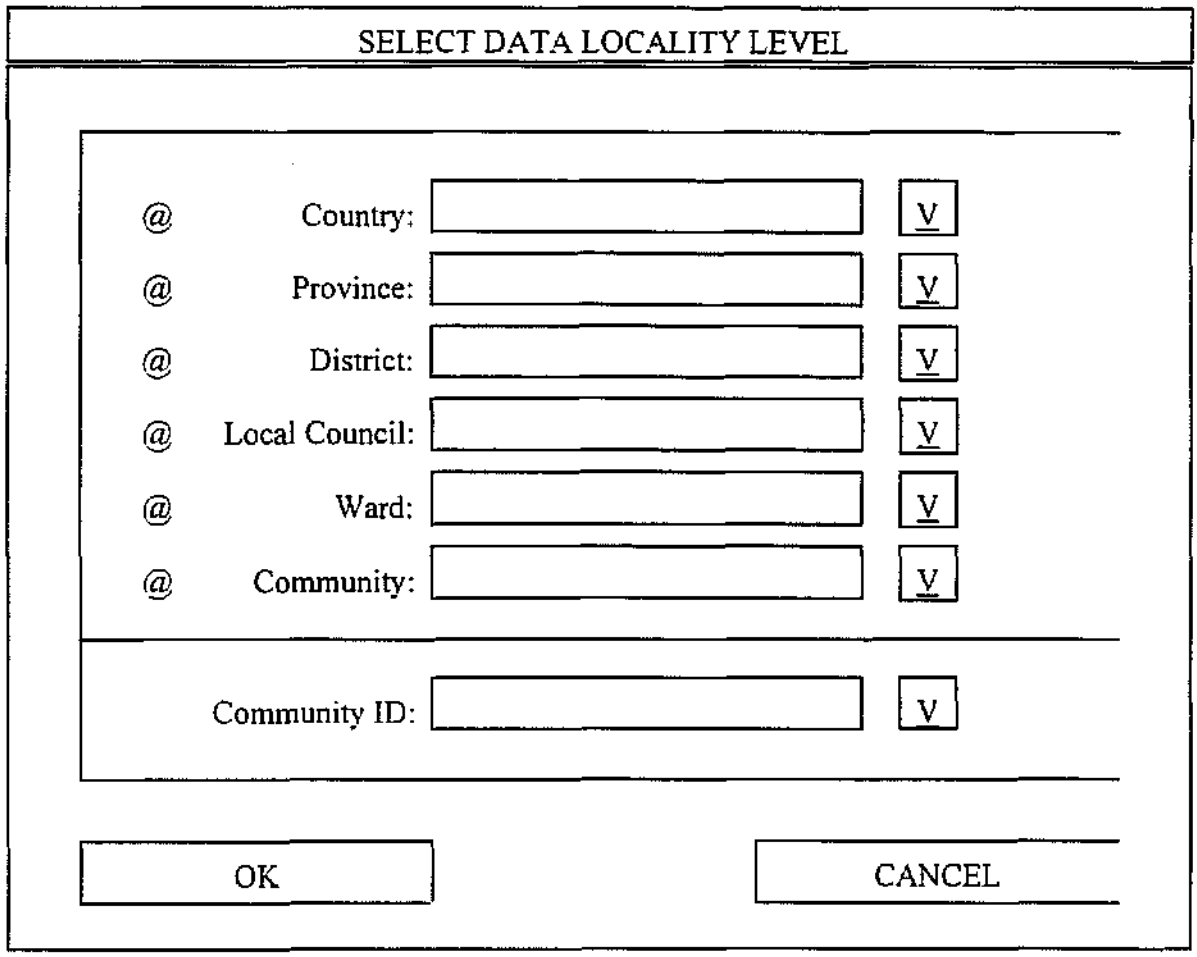
Similarly to the Basic Community Data. this screen layout reflects the layout of the 'Access to Health and Sanitation' section in form QS01 which can be seen in ***section 2.2.6***.

Community's Evaluation of their Health and Sanitation Facilities

Similarly to the Basic Community Data. this screen layout reflects the layout of the 'Community's Evaluation of their Health and Sanitation Facilities' section in form QS01 which can be seen in ***section 2.2.6***.

c. Select Data Locality Level

In the event of the user selecting approve. modify or delete record/s (from 'Select Data Form Layer'), a filter appears where-in he/she has the option to select a subgroup of localities. This group is selected on specific criteria ranging anywhere from country level up to community level. In the instance where the community ID is known , the user only needs to select that community.

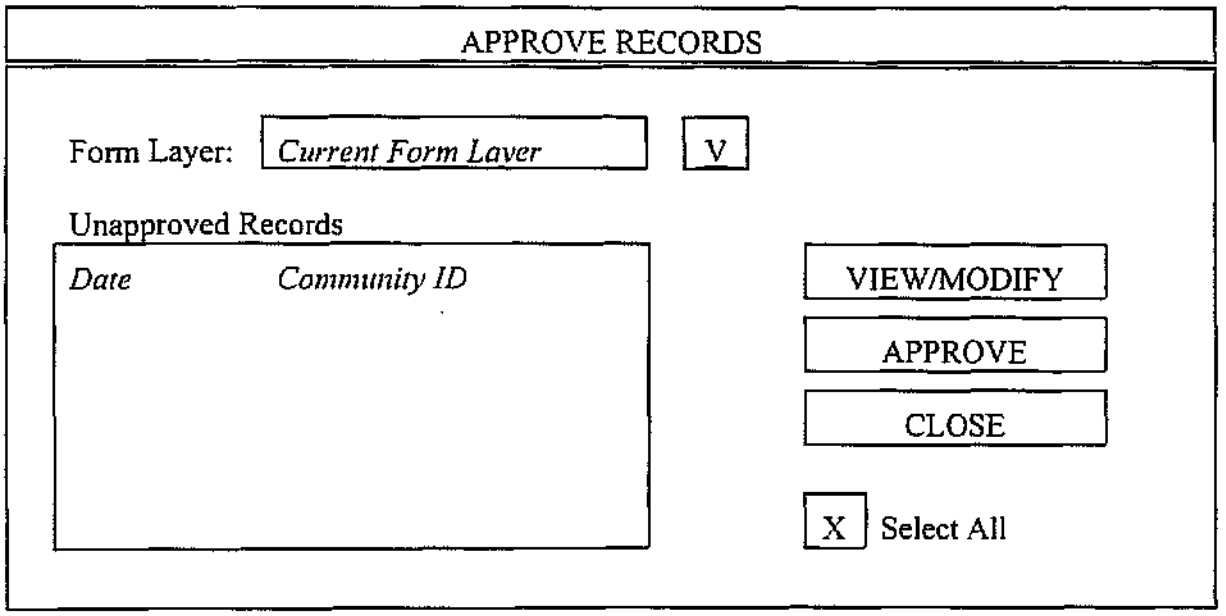


Depending on the option control(@) selected, the level on which the locality structure is filtered out, is defined. Selecting the 'OK' button, either brings up Approve, Modify or Delete Record/s, depending on which button was selected on the 'Select Data Form Layer' screen. The 'CANCEL' button closes this screen and returns the user to the 'Select Data Form Layer' screen, without saving any information.

d. Approve Records

A level 2 user only has the right to enter collected data into the system. All information entered by him/her, however, is unapproved. A level 3 user, on the other hand, has rights to enter a form and have it approved automatically. The facility also exists, for a level 3 (or upwards) user, to extract all unapproved data entry forms, view and modify information where appropriate and approve it.

On selecting 'Approve Records' from the 'Select Data Form Layer' screen, and passing through the locality filter, the following screen is displayed:



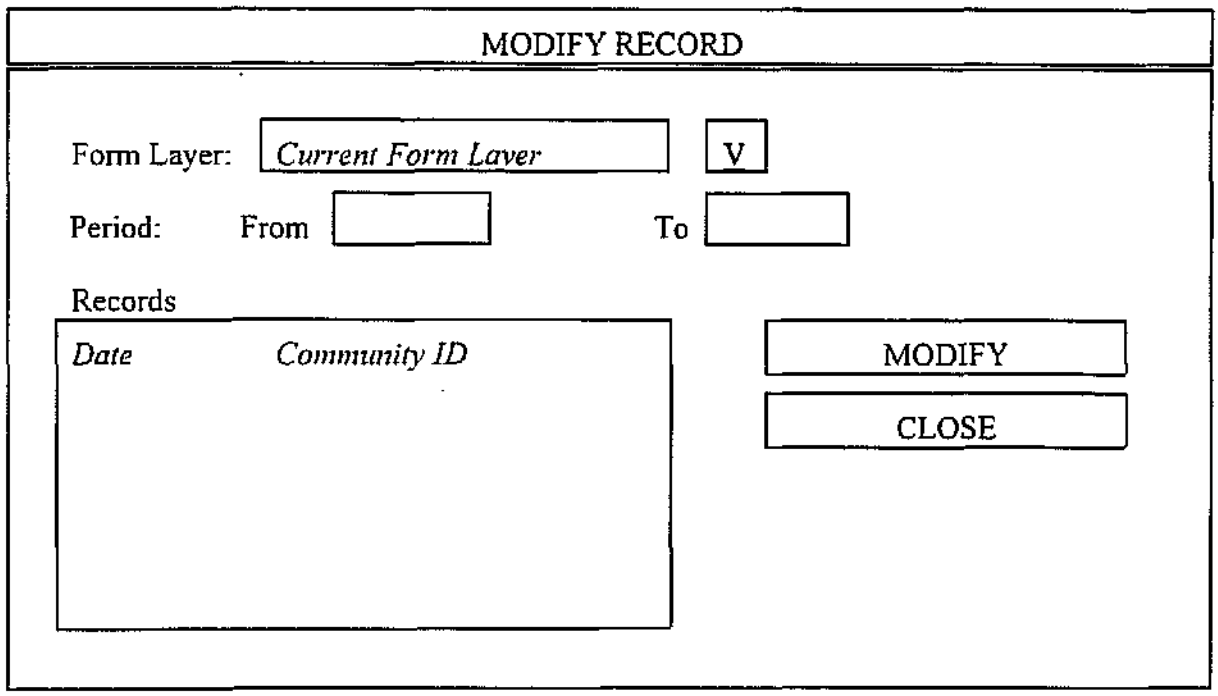
The 'Form Layer' field is defaulted to the type that was originally selected, but may be changed using the combo box provided. The user may manually select one or several records on the list box for approval. By marking the 'Select All' check box, all records are automatically selected.

Selecting 'VIEW/MODIFY' brings up the options screen for the QS01 form. The user can now look at the selected record and decide whether the information entered is valid and if any changes are required, it can also be done. Clicking on 'APPROVE' results in all selected records being automatically approved, after receiving confirmation from the user. 'CLOSE' exits the screen and returns the user to the 'Select Data Form Layer' screen.

e. Modify Record

A level 2 user has the right to modify unapproved records. This is needed because after entering a form, he/she might discover that some information was entered incorrectly. A level 3 (or upwards) user has the right to modify both approved and unapproved records.

On selecting 'Modify Record' from the 'Select Data Form Layer' screen, and passing through the locality filter, the following screen is displayed:



The 'Form Layer' field is defaulted to the type that was originally selected, but may be changed using the combo box provided.

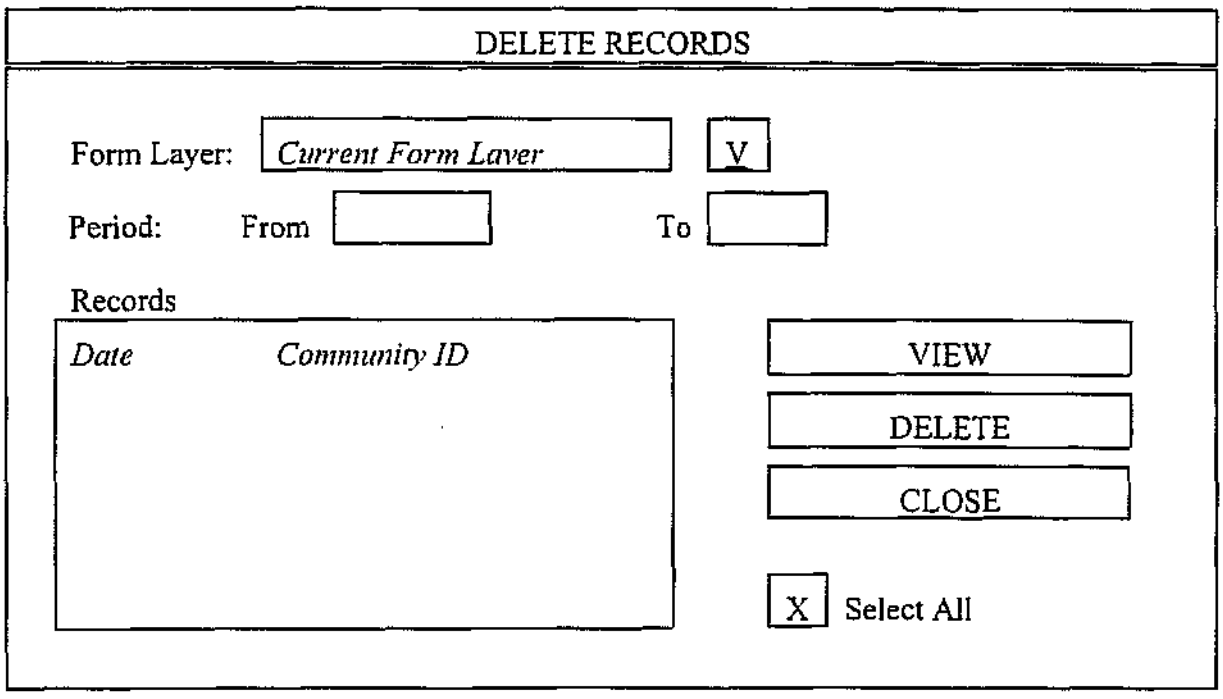
In the instance of a level 2 user, the list box will only contain unapproved records. A level 3 (or upwards) user will receive the complete list of approved and unapproved records. Should the user wish to narrow down the list of records, 'From' and 'To' dates can be entered in the 'Period' field. Only records falling in the selected period, will now be displayed.

To modify a record the user must select the appropriate record on the list box using the mouse, and then click on 'MODIFY'. Selecting 'MODIFY' opens the options screen for the QS01 from, allowing the user to select which section he/she wishes to modify. Both approved and unapproved records can be modified, but this function will not change the record's status. 'CLOSE' exits the screen and returns the user to the 'Select Data Form Layer' screen.

f. Delete Records

Both a level 2 user and a level 3 user has the right to delete unapproved records. This is needed because after entering a form, he/she might discover that the information they entered is completely wrong. A level 4 (or upwards) user has the right to delete both approved and unapproved records.

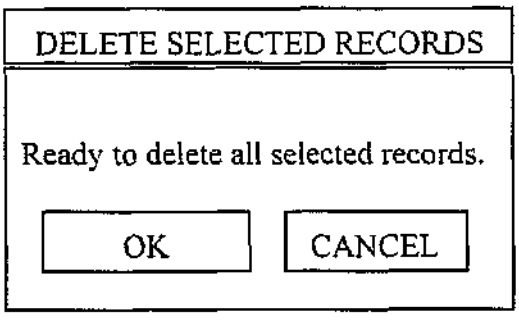
On selecting 'Delete Records' from the 'Select Data Form Layer' screen, and passing through the locality filter, the following screen is displayed:



'Form Layer' is defaulted to the type that was originally selected, but may be changed using the combo box provided.

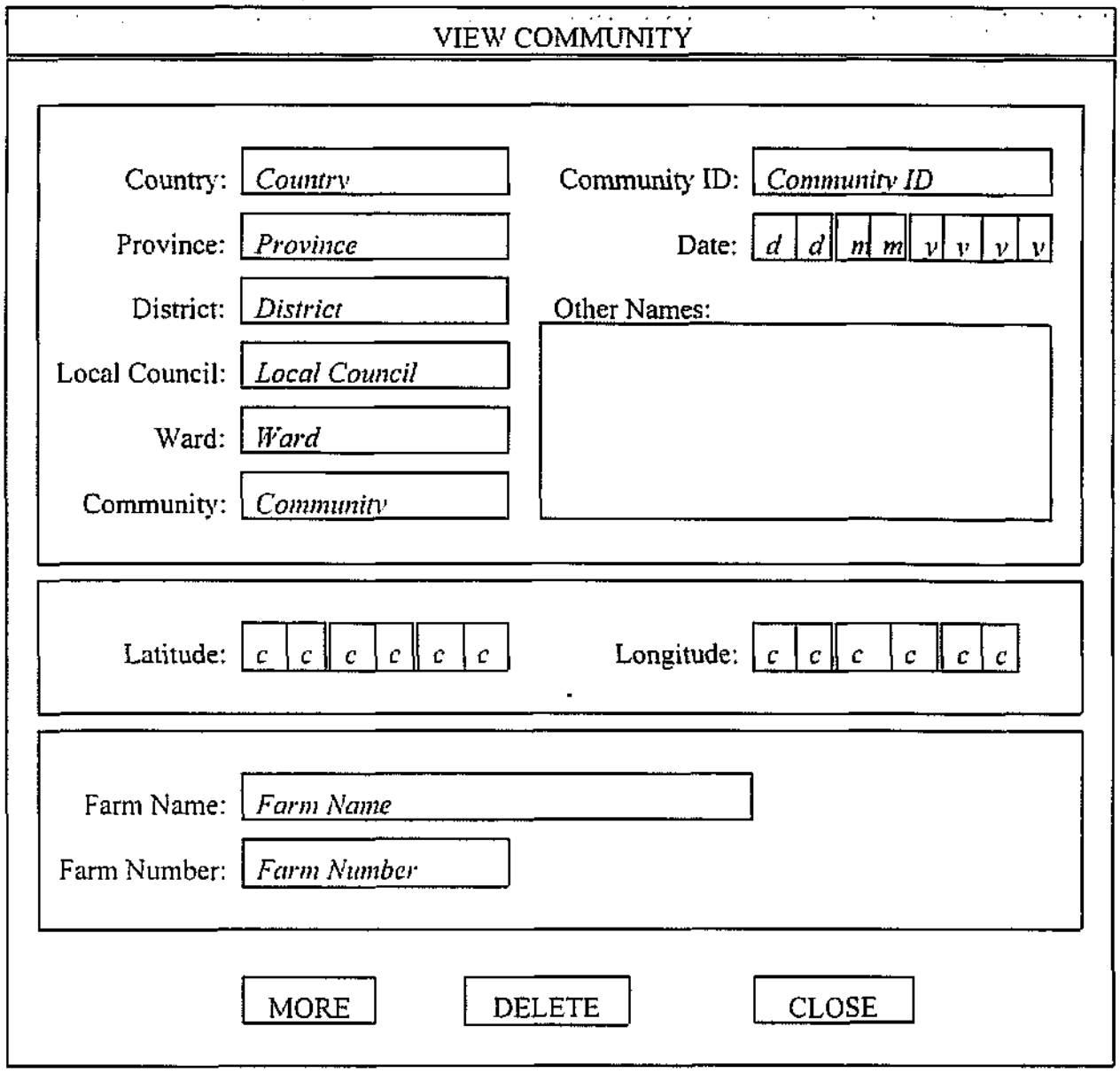
In the instance of a level 2/3 user, the list box will only contain unapproved records. A level 4 (or upwards) user will receive the complete list of approved and unapproved records. Should the user wish to narrow down the list of records, 'From' and 'To' dates can be entered in the 'Period' field. Only records falling in the selected period, will now be displayed.

The user may select one or several records for deletion. The 'Select All' check box. will mark all the records in the list for deletion. Clicking on 'DELETE', deletes all selected records after receiving confirmation from the user, through the following window:



Selecting 'OK' will delete the selected records, while 'CANCEL' will return the user to the 'Delete Records' screen.

Selecting 'VIEW' on the 'Delete Records' screen, opens up the 'View Community' screen, whilst 'CLOSE' exits the current screen and returns the user to the 'Select Data Form Layer' screen.



In the case of form 'QS01' selected as the current form layer and the user selecting 'MORE', the 'Options for form QS01' screen is displayed. This gives the user the opportunity to view the rest of the information captured in the selected data entry form for this community.

Clicking on 'DELETE', deletes the selected data entry form after receiving confirmation from the user. 'CLOSE' returns the user to the 'Delete Records' screen.

2.2.2.4 GIS

The GIS System is a graphical representation of some of the data available in the database. The GIS system links to the database through a community ID, the longitude and latitude of that community and the farm name on which it is located. The community ID will be a unique number allocated to a specific community.
A community is located under the following structure:

Country
Province
District
Local Council
Ward
Community

2.2.2.5 Reports

A number of predefined reports and user-defined reports exist. When a specific report is selected, the results are generated and the user has the option to either view the report on the screen or have a copy of the results printed. However, in the case of a level 1 user (any member of the public who has read only access rights), the option to print a report will be omitted. There is still no clarity on the exact reports that are required - a number of predefined reports are specified, but the users will be able to define reports as they become necessary. Reports can be generated for a specific community, or summary reports can be produced for a combination of communities.

a. Predefined Reports

The user can select any report from the following list of available reports:

- Community Core Data
- Basic Community Data
- Community Institutional Capacity
- Community Water Sources
- Community Water Bulk Supply Improvements
- Community Water Access Improvements
- Community Water Sources, Bulk Supply Improvements and Access Improvements
- Community's Evaluation of their Water Supply
- Community Access to Health and Sanitation
- Community's Evaluation of their Health and Sanitation Facilities
- Community Core Data Forms: Analysis of Data Quality and Age
- Unapproved Records List

b. User Defined Reports

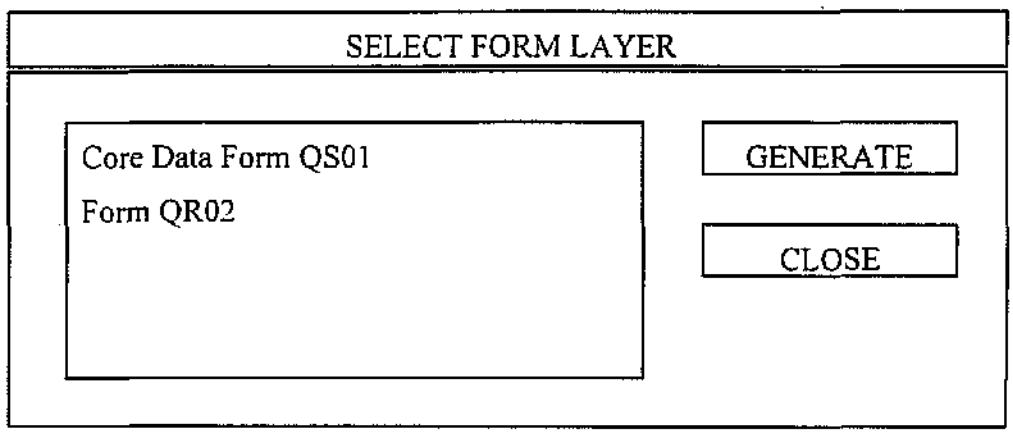
Selecting user defined reports will bring up a screen layout in which the user can select a number of parameters. According to the parameters selected, the appropriate report is generated. The user may also specify the sorting mechanism that he/she requires.

2.2.2.6 Form Layer Control

Functionality is provided to print any of the questionnaires, at any time. Because of the flexibility of these questionnaires (see ***2.2.2.8 Look up Data Control***), it is necessary to generate a new form every time it is required. Certain default information also needs to be printed on these forms. If information has previously been entered on a specific community, default values on its locality, co-ordinates etc. is printed on the new questionnaires. The functionality to print a section of questionnaires. for eg. for all communities, in a specific ward. is also provided.

a. Select Form Layer

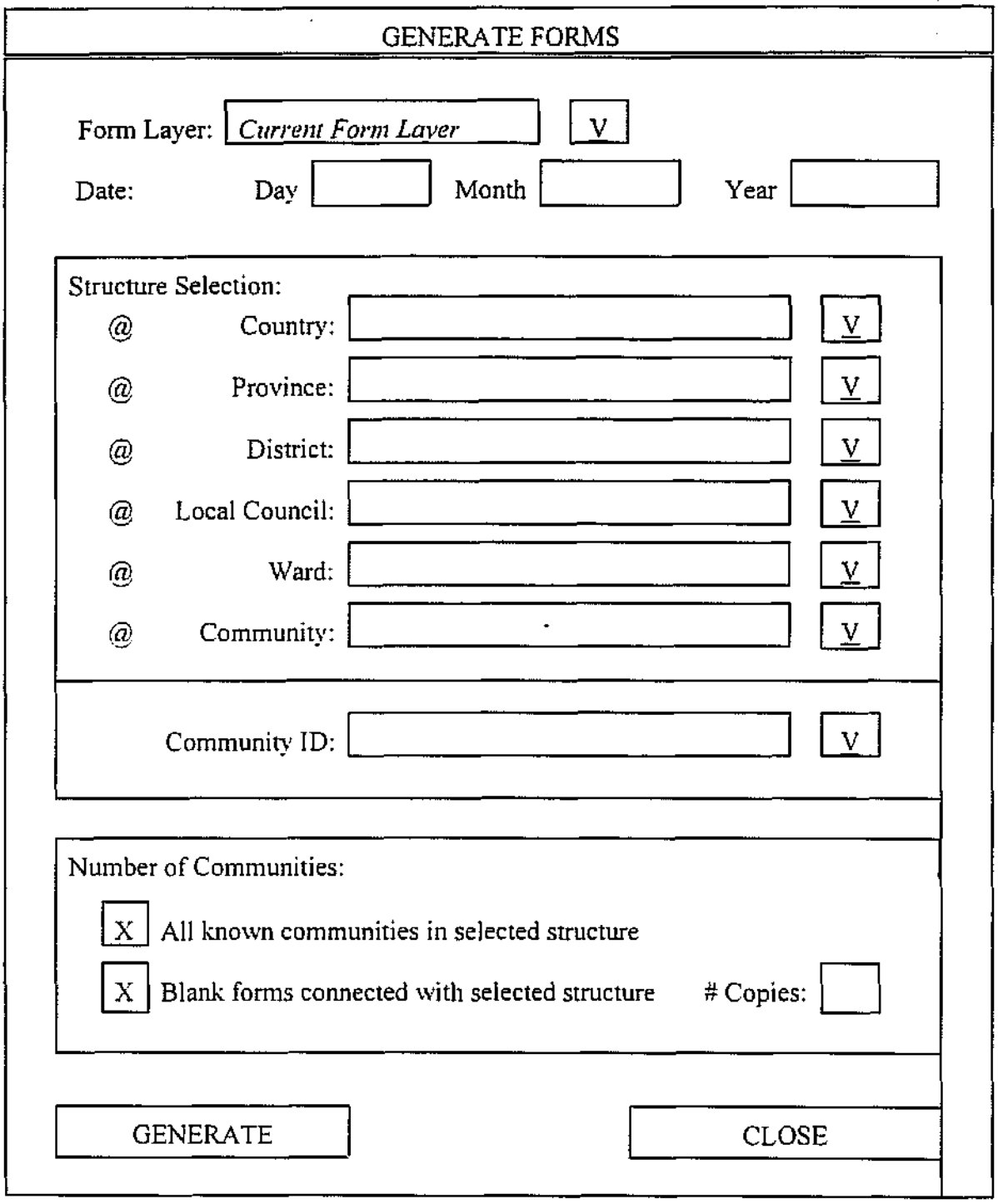
On selecting 'Form Layer Control' from the main menu, the following selection screen is displayed:



The large box is a list box containing a list of the type of data gathering forms available. The user must choose the type of form he wishes to produce and then select 'GENERATE'. Selecting 'CLOSE' allows the user to exit this screen and return to the main menu.

b. Generate Forms

Selecting 'GENERATE' on the 'Select Form Layer' screen results in the following screen being displayed:

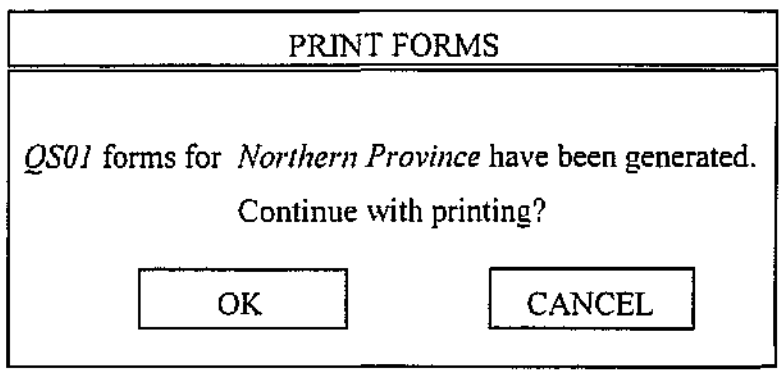


The 'Structure Selection' part of the screen gives the user the ability to set a filter defining which forms are required. Depending on the option control(@) selected, the level on which the locality structure is filtered out. is defined. Say for eg., the user wishes to print forms for all the communities in South-Africa located in the Northern Province. The option control for Province will be selected and the values for Country and Province will be filled in. Should the user want to print only one form for a specific community, he/she only needs to enter the community ID.

Together with printing forms for all known communities in the selected structure, the user may want to print a number of blank forms for possible new communities with the same selected structure. Using the check boxes (X) in the bottom part of the screen, the user can indicate whether this is required.

Selecting the 'GENERATE' button, will generate the required forms and bring up the 'Print Forms' window. Selecting 'CLOSE' will return the user to the main menu.

c. Print Forms



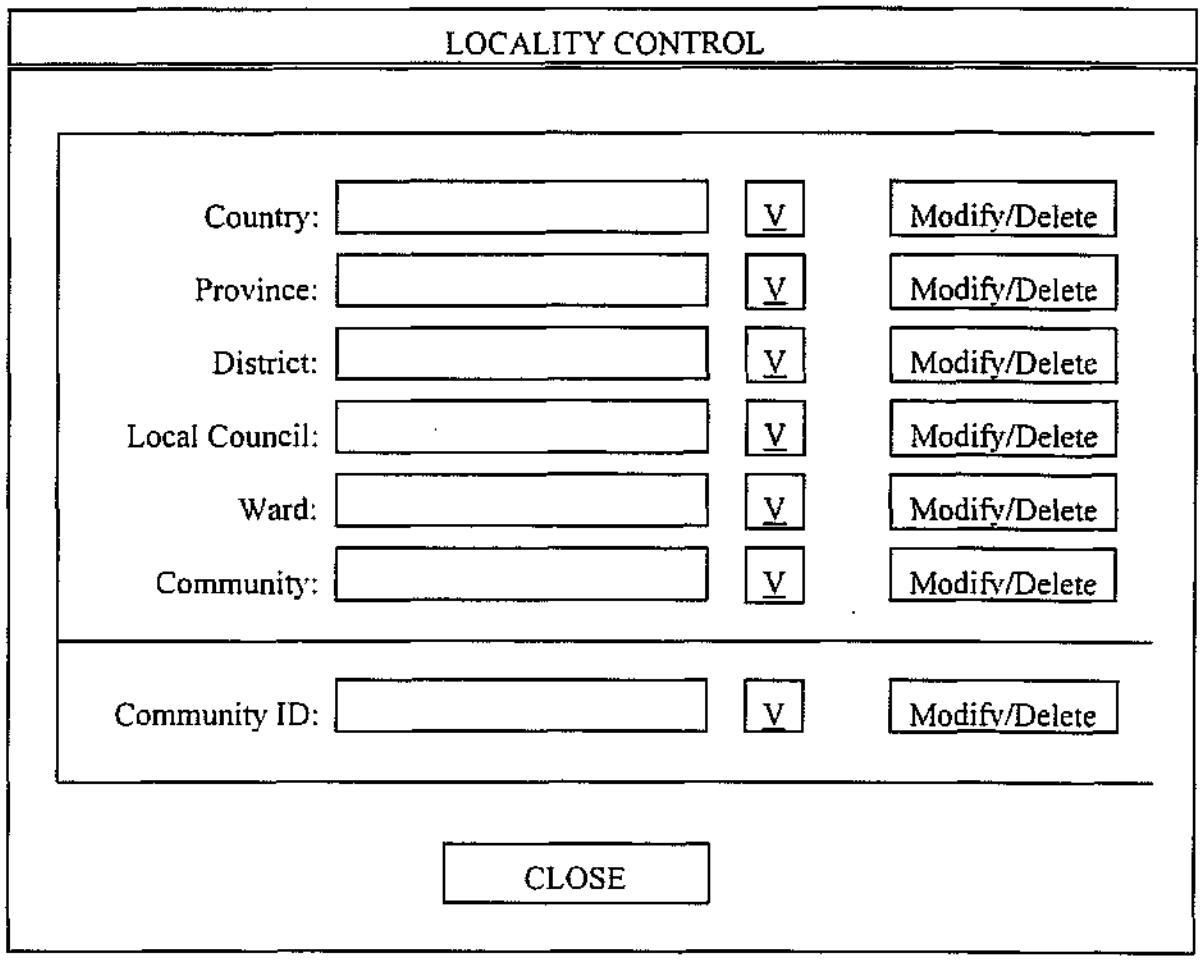
Selecting 'OK' will send the generated forms to the printer, while 'CANCEL' will return the user to the 'Generate Forms' screen. The 'Print Forms' window is generally known as a 'Confirmation Window'.

2.2.2.7 Locality Control

The system needs to be flexible in order to be able to adapt it to other provinces and even other countries. To allow for this, functionality to add or change locality information is introduced. This gives the user the opportunity to add new countries, attach provinces to these countries, districts to provinces, local councils to districts, wards to local councils and communities to wards. Specifically for the conditions in South Africa, where communities can still change to another ward or even to another province, the functionality to modify (or delete) the locality information, is provided.

a. Select Locality Level

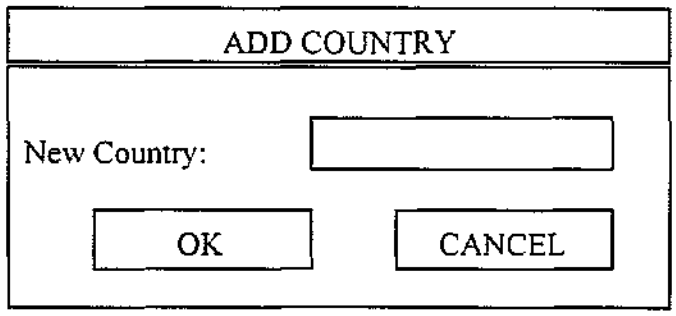
Selecting the 'Locality Control' button on the main menu, results in the following screen being displayed:



Clicking on any of the combo boxes (V), brings up a list of values matching the given criteria. This means, to select a value from the Province combo box, a value must already be selected for the Country field. The same goes when selecting a value for Local Council - a value is required for the District field, etc. Selecting any combo box, the user has two options. The one is to select an existing value and then click on the 'Modify/Delete' button. The other is to add a new value. Except for the current available values, the combo box list also contains an entry called 'Add New'.

b. Add Country

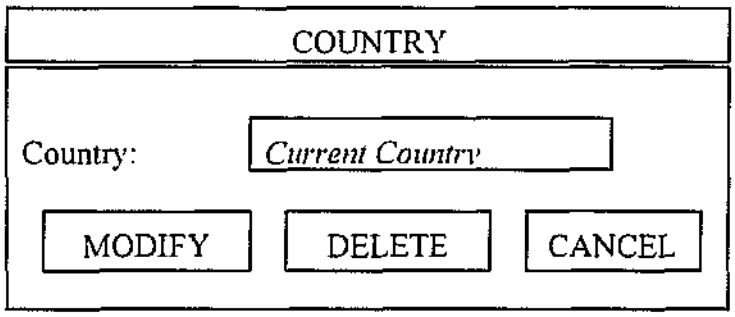
Selecting 'Add New' in the Country combo box, brings up the following window:



The user can now either add a new country by adding a name and selecting 'OK'. or he/she can return to the 'Locality Control' screen by selecting 'CANCEL'. Before a new record is successfully added to the system. it is tested for possible duplicates.

c,d. Modify and Delete Country

Should the user select an existing country from the combo box and clicks on the 'Modify/Delete' button. the following window appears:

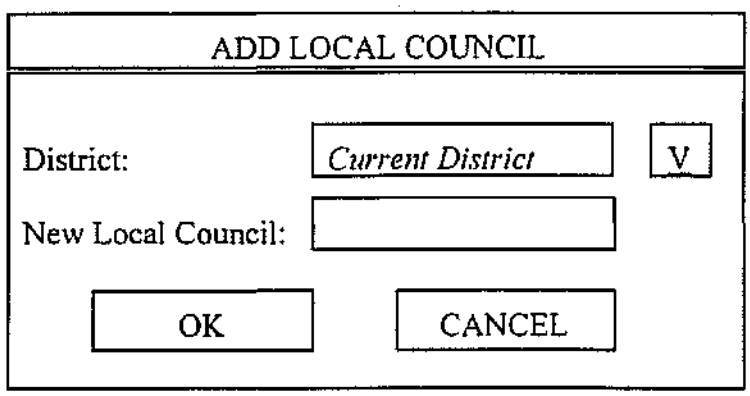


If the user wants to delete a country. he/she needs to select the 'DELETE' button. A country is only deleted after confirmation is received from the user. Before a country can be deleted. the system tests if there is any links still associated with it. Should such links exist. the system refuses the action and gives an appropriate message stating which links are still existing. Therefor. to delete a country. the user must first make sure that all links to that country for eg., all provinces in that country. are already deleted.

To change the name of a country. the user enters the new name in the 'Country' field and selects the 'MODIFY' button. All current links to the old name. is now updated with the new name. Clicking on the 'CANCEL' button. returns the user to the 'Locality Control' screen.

b. Add Province, District, Local Council and Ward

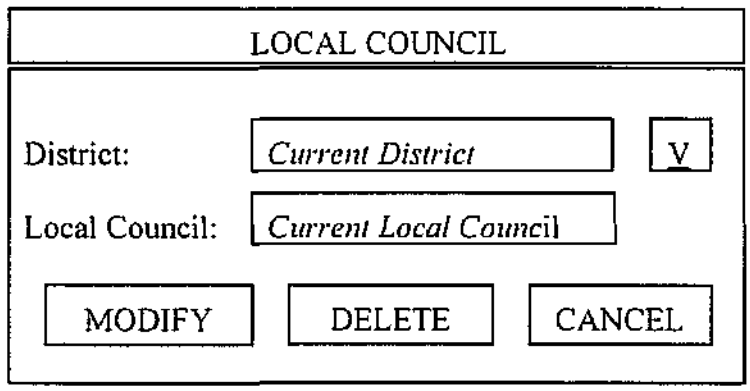
Adding new values and modifying and deleting current values for Provinces. Districts. Local Councils and Wards are handled in a similar matter. The only difference is that each of these fields are linked to its previous field. and that link can also change. For eg., the user selects the Local Council combo box. He/she decides to add a local council and selects 'Add New'. The following window appears:



The current district (selected in the district combo box in the 'Locality Control' screen) is displayed in the District field. The user can change the district by selecting another district (from the same province), from the district combo box on the 'Add Local Council' window. The user can now either add a new local council by adding a name and selecting 'OK', or he/she can return to the 'Locality Control' screen by selecting 'CANCEL'. Before a new name is successfully added to the system, it is tested for possible duplicates.

c,d. Modify and Delete Province, District, Local Council and Ward

If the user selects an existing local council from the 'Locality Control' combo box and clicks on the 'Modify/Delete' button, the following window appears:



If the user wants to delete a local council, he/she needs to select the 'DELETE' button. A local council is only deleted after confirmation is received from the user. Before the council can be deleted, the system tests if there is any links still associated with it. Should such links exist, the system refuses the action and gives an appropriate message stating which links are still existing. Therefor, to delete a council, the user must first make sure that all links to that local council for eg., all wards in that local council, are already deleted.

To change the name of a local council, the user enters the new name in the 'Local Council' field and selects the 'MODIFY' button. All current links to the old name, is now updated with the new name. To change the district in which the local council is situated, the user simply selects a new district from the district combo box and selects 'MODIFY'. Again all links to the current district is updated. Clicking on the 'CANCEL' button, returns the user to the

'Locality Control' screen.

b. Add Community

Adding new values and modifying and deleting current values for Communities are handled differently from the above. Before adding a new community, the user has the option to browse through a list of communities with similar criteria. He/she can now decide whether the community they are about to add, is in fact a new community or already exists in the system, but under a different name.

Unlike the previous locality levels, the community combo box can be selected without specifying the preceding levels. The only criteria required is the selection of a country. If the user is positive that the information appearing on the data entry form is correct, he/she can enter these locality levels. This would minimize the list of communities with similar criteria. If the user is not positive that the given information is correct or if any of the information is omitted from the data entry form, the user only needs to enter the information he/she is sure about, and then select 'Add New'.

For eg.. the user selects the Community combo box on the 'Generate Forms' screen. He/she decides to add a community and selects 'Add New'. The following screen appears:

ADD COMMUNITY

'Ward?' / 'Local Council?' / 'District?' / 'Province?' / Country

Community:

Latitude: Longitude:

Farm Name: V

Farm Number:

Communities with similar criteria:

Community Name *Community ID*

ADD NEW VIEW

Community ID:

Province: V

District: V

Local Council: V

Ward: V

Other Names: V Modify/Delete

Co-ordinates were obtained by:

@ Surveying

@ GPS

@ Read off map Scale:

@ Other Specify

The permanent feature or structure represented by the co-ordinates:

Feature:

Name:

DWA. Quaternary Sub-catchment No. :

Magisterial District: V

Old Administrative Authority:

OK CANCEL

The user can now either add a new community by adding the required details and selecting 'OK', or he/she can return to the 'Locality Control' screen by selecting 'CANCEL'. When the screen appears, the top line is defaulted to contain the locality levels that was entered by the user. Because the country level is compulsory, the top line will at least contain this level.

To add a new community the user first enters the community name. The system searches through all existing communities (with the same locality levels as set by the user), then displays communities with similar names in the *'Communities with similar criteria'* list box. The user can now select any community from the list box and click on 'VIEW'. This displays all known information on the selected community in the bottom part of the screen.

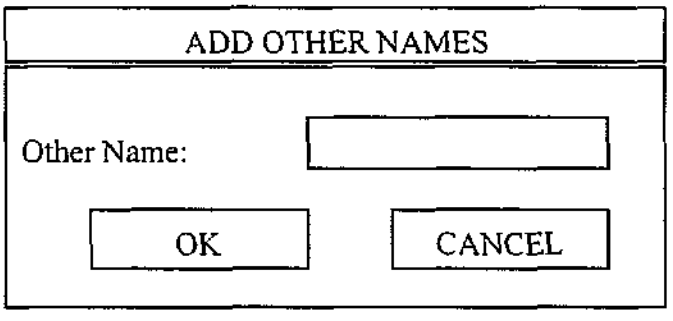
Upon entering the latitude or longitude of the new community, the information in the list box will change to contain all communities (with the same locality levels as set by the user) in the same pre-set interval of the given co-ordinates. Again the user can require more information on a specific community by selecting it and clicking on 'VIEW'.

Selecting the farm name from the combo box automatically displays the farm number and again changes the list of communities in the list box. It now displays a list of communities (with the same locality levels as set by the user) located on either the same farm or farms in the same pre-set interval area.

Using this list, the user makes absolutely sure that the community he/she is about to enter, is in fact a new community. The user can also use the list to derive the locality levels of a community in instances where these levels on the data gathering forms are incomplete.

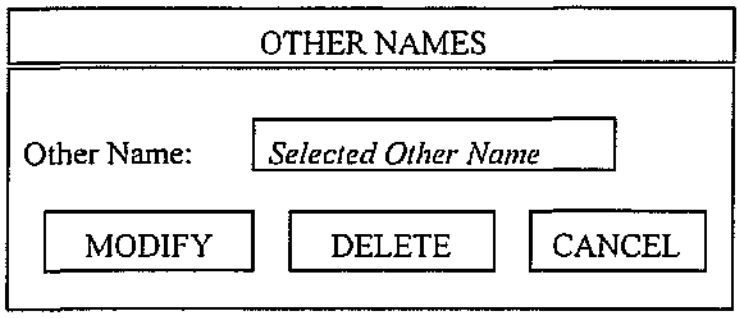
The 'ADD NEW' button is used to remove all existing information in the bottom part of the screen. The only information remaining is the preset locality levels. These fields contain the values selected by the user on the 'Locality Control' screen and are non-editable.

The user is now ready to add a new community. The new community ID is found by reading it of the list of unique numbers assigned to a specific district. The list of other names by which a community is known, is handled by a combo box. If the user selects 'Add New' in this combo box, the following window appears:



The user can now either add another name by entering a name and selecting 'OK', or he/she can return to the 'Add Community' screen by selecting 'CANCEL'. Before a new name is successfully added to the system, it is tested for possible duplicates. Should the user decide to correct or delete a entry in the list, he/she selects the relevant 'other name' from the combo

box and clicks on the 'Modify/Delete' button. The following window appears:



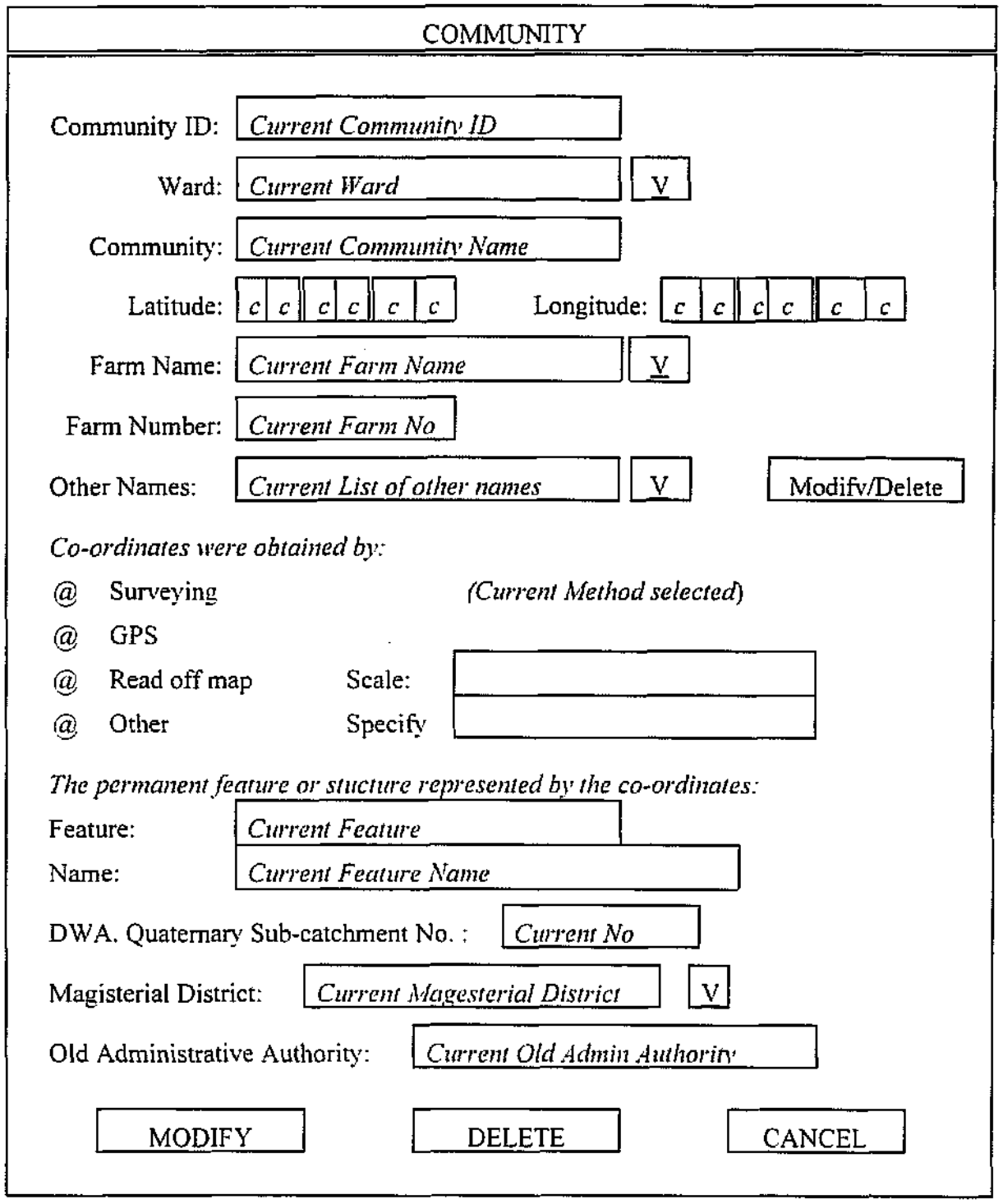
If the user wants to delete an 'other name', he/she selects the 'DELETE' button. An 'other name' is only deleted after confirmation is received from the user.
To change the name of the selected 'other name', the user enters the new name in the 'Other Name' field and selects the 'MODIFY' button. Clicking on the 'CANCEL' button, returns the user to the 'Add Community' screen.

Under the heading '*The co-ordinates were obtained by:* ', a list of currently available co-ordinate gathering methods is displayed. Only one of the methods can be selected at any time and therefor option controls(@) are used. A value for scale can only be entered if the user selects 'Read off map' as the method, and similarly a value for 'Specify' can only be entered if 'Other' is selected as the co-ordinate gathering method. This list is flexible, which means that the database administrator can either add other methods of co-ordinate gathering or delete currently available options.

Magisterial district can only be selected from the pre-set list available in the combo box. Information is entered for the rest of the fields and the user can select 'OK' to add the new community to the database.

c,d. Modify and Delete Community

To modify or delete a current community, the user can go about it in two ways. The first is to select the 'Modify/Delete' button next to the community combo box on the 'Locality Control' screen. This will modify or delete the currently selected community in the combo box. The second method is to directly add the relevant community ID to the 'Locality Control' screen's 'Community ID' field and select the 'Modify/Delete' button appearing next to it. In both instances, the following screen appears:



If the user wants to delete a community, he/she selects the 'DELETE' button. A community is only deleted after confirmation is received from the user. Before the community can be deleted, the system tests if there is any links still associated with the selected community. Should such links exist, the system refuses the action and gives an appropriate message stating which links are still existing. Therefor. to delete a community, the user must first make sure that all links with that community for eg.. all data entry forms entered for that community, are already deleted.

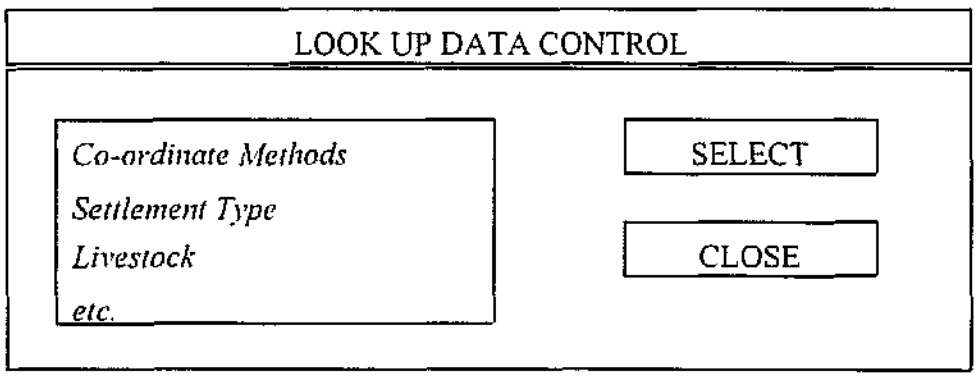
The user can change any fields of a community except for its' community ID. The ward in which a community is located, can be changed by selecting the new ward from the ward combo box. The user can also add other names for a community or modify and delete current names (see ***2.2.2.7b Add Community***'). The farm number field (which is non-editable) is linked to the farm name field. If the user selects another farm name, the farm number will automatically update to the related value. The user selects the 'MODIFY' button which will update the community information. Clicking on the 'CANCEL' button, returns the user to the 'Locality Control' screen.

2.2.2.8 Look up Data Control

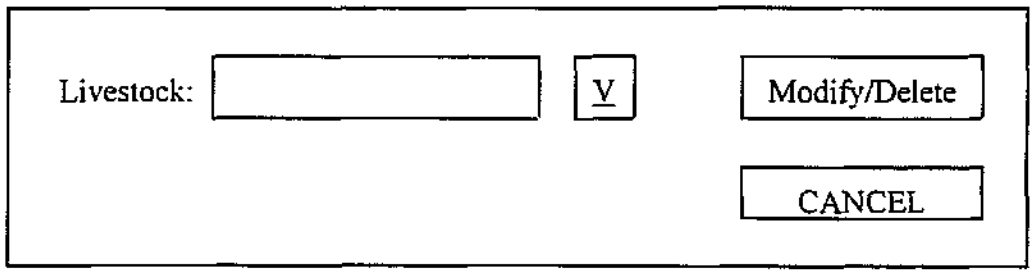
The form layers designed to gather the relevant information for the system, do allow for flexibility on certain questions. In some instances the option 'other' is allowed as a possible answer. In most of these cases, the user needs to specify what is meant by 'other'. Should the amount specified in 'other' exceed 5% of the total entries for that item, a new category needs to be added to that question. Only a level 5 user (possibly the system administrator) has access to this functionality. The need may also arise, for eg., to add new settlement types, modify services or delete certain skills or latrine types. This is also handled under look up data control.

a. Select Table To Modify

Selecting the 'Look up Data Control' button on the main menu, results in the following screen being displayed:



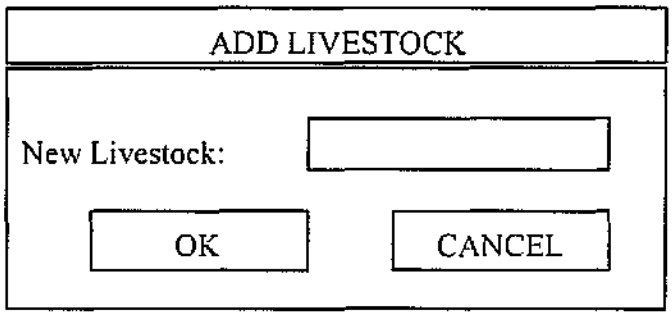
The list box contains the names of all the tables in the database used purely for look up purposes. Therefor, the information used to generate the different form layers can be modified from this screen. The user either decides which table needs to be updated and clicks on the 'SELECT' button, or decides to return to the main menu by selecting 'CLOSE'. Clicking on 'SELECT', with Livestock as current, brings up the following window:



Selecting the combo box, the user can either select an existing value and click on 'Modify/Delete', or select the top entry in the combo box, called 'Add New'.

b. Add Record

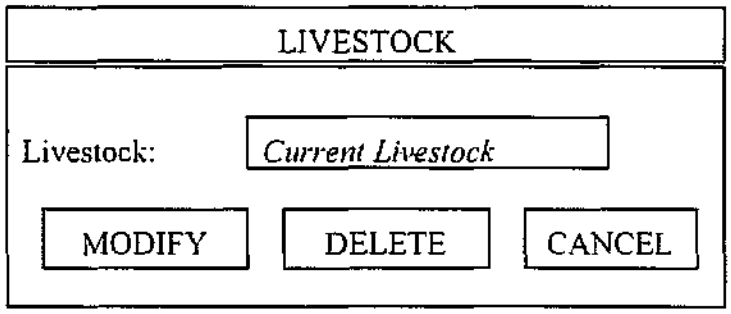
Selecting 'Add New' brings up the following window:



The user can now either add a new record by adding a name and selecting 'OK', or he/she can return to the 'Look up Data Control' window by selecting 'CANCEL'. Before a new name is successfully added to the system. it is tested for possible duplicates.

c,d. Modify and Delete Record

Should the user select an existing livestock from the combo box and clicks on the 'Modify/Delete' button, the following window appears:



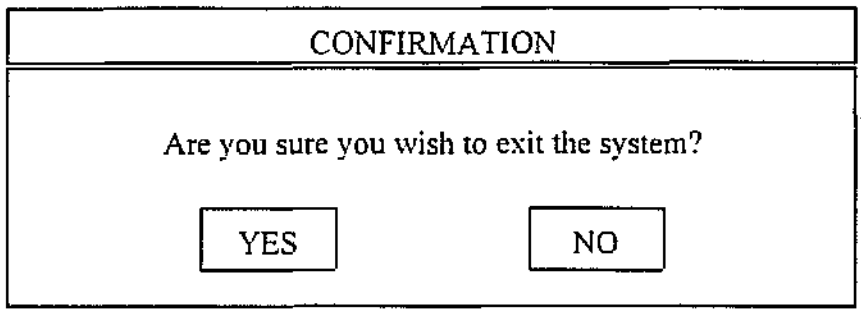
If the user wants to delete the current record, he/she needs to select the 'DELETE' button. The deletion of a look up table record, differs from deletions in the rest of the system. The data still linked to the current record, is transferred to the 'other' field. For eg., the user wants

to delete 'donkeys' from the forms. All previous entries on the amount of donkeys available, is now found under the 'other' option.

To change the name of a record, the user enters the new name in the 'Livestock' field and selects the 'MODIFY' button. All current links to the old name, is now updated with the new name. Clicking on the 'CANCEL' button, returns the user to the 'Look up Data Control' screen.

2.2.2.9 Exit

On selecting 'Exit', from the main menu, the following confirmation window is displayed:



YES - exits the system.
NO - returns the user to the main menu.

2.2.3 Menu Functions

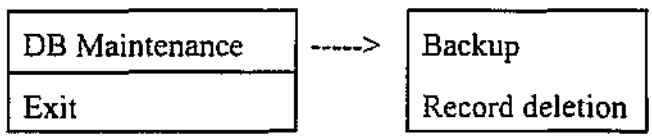
The top line of the system on the computer screen, consists of a menu bar. A more experienced user can use this menu bar to access all functions available in the system, while a less experienced user will mainly rely on the command buttons available on each screen and window.

The menu bar consists of the following options:

File	Data Form	Reports	Form Layer	Locality	Look up Data	GIS	Help

File

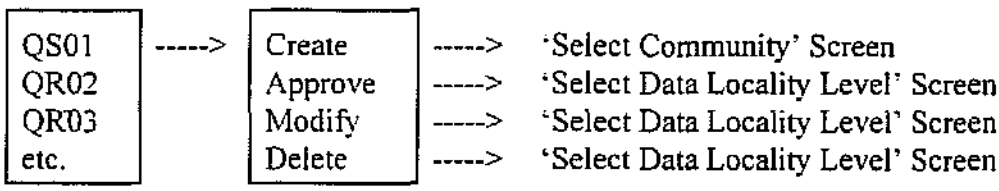
Selecting the File option, brings up the following menu bar:



Selecting 'DB Maintenance' gives the user (probably only level 4 or upwards) the ability to make backup copies of current data or to delete data records not required anymore.
Selecting 'Exit' returns the system to 'DOS'. This is only done once confirmation is received from the user.

Data Form

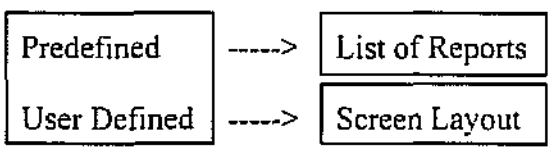
Selecting the Data Form option, brings up the following menu bar:



Selecting form layer 'QS01', results in another menu bar appearing. This bar contains all options available for the selected form layer. Continued selection of options, eventually results in the required screen appearing.
Only the options available under QR02 will appear when this form layer is selected, etc.

Reports

Selecting the Reports option, brings up the following menu bar:



Selecting 'Predefined' brings up a screen with a list of reports the user can select from.
Selecting 'User Defined' brings up a screen layout in which the user can set parameters.

Form Layer

Selecting the Form Layer option, brings up the following menu bar:

QS01 QR02 QR03 etc.	-----> 'Generate Forms' Screen

Selecting form layer 'QS01', results in the 'Generate Forms' screen appearing. The user can now generate and print a number of forms with certain set criteria.
The options available under QR02 will appear when this form layer is selected, etc.

Locality

Selecting the Locality option, brings up the following menu bar:

Add/Modify	-----> 'Locality Control' Screen

Selecting 'Add/Modify', results in the 'Locality Control' screen appearing. The user can now add a new locality, or modify or delete a current locality.

Look up Data

Selecting the Look up Data option, brings up the following menu bar:

Add/Modify	-----> 'Look up Data Control' Screen

Selecting 'Add/Modify', results in the 'Look up Data Control' screen appearing. The user can now select a specific table and add a new record, or modify or delete a current record

GIS

Selecting the GIS option, brings up the following menu bar:

GIS	-----> 'GIS' System

Selecting 'GIS', results in the 'GIS' system being activated.

Help

Selecting the Help option. brings up the following menu bar:

Online Help

By selecting 'Online Help'. the user can get more information on the screen or window he/she is currently working on. The online help explains to the user what the purpose of the screen or window is. what each button does. which fields are editable and which information is required.

2.2.4 Access Functions

Each user's login name is associated with certain access rights, thus allowing the user access to only that functionality available to his/her level of access. For each level of access, there is 2 possible access areas. Access rights of some users from different provinces are limited to information on that specific province. while other users' access rights includes information on the whole country. The following 5 access levels are provided:

Level 1 Read only. This is open to anyone and everyone as all data in the system is 100% public. This user logs on as guest and no password is required. A level 1 user has access to viewing and reading of all reports. However. a level 1 user will not have access to the printing of these reports. (Note: only approved data is used for reports.) (Access to level 1 only)

Level 2 Enter data for existing communities, but information entered into the system by a level 2 user is flagged as unapproved. A level 3 user is needed to approve this data. (Access to levels 1 and 2)

Level 3 Enter data for existing communities. but information entered by this user is automatically approved. A level 3 user has the power to approve a level 2 user's input as well as modify any data he/she has entered within a set period (say a month). (Access to levels 1. 2 and 3)

Level 4 Delete data. Add and maintain locality data. (Access to levels 1. 2. 3 and 4)

Level 5 System Administrator. Access to functionality at all levels. Responsible for backups and all system related queries and problems. Must be a person with computer background.

2.2.5 Mouse Functions

There is no functionality associated with the right and middle buttons of the mouse. Clicking the left button of the mouse executes the option on which the cursor is positioned. Instead of using the mouse, the user can also uses the tab. arrow and enter keys.

2.2.6 Report and Form Layouts

Attachment 1 contains a copy of the layer 1form.

2.3 Data Form Procedure

2.3.1 Generating Core Data Forms

Core data forms QS01, also referred to as form layer 1, are generated by selecting the 'GENERATE' option on the 'Select Form Layer' screen. These forms can be generated and printed by any level 2 or upwards user.

Blank forms as well as forms for existing communities, are all generated in a similar way. The only difference between these forms are that the one set will be blank and the other will have default values reflecting previously captured information. The forms for existing communities also have an unique number, the community ID, printed on top of each form.

The forms are sent out to the communities, filled in and returned to district level (or whichever level is responsible for electronic data capturing).

2.3.2 Capturing Core Data Forms

The completed forms received from the communities, are split into two sets. The first set contains forms with unique community ID's already printed on them. This means that data has previously been collected and captured for these communities. These forms are sent to level 2 or 3 users, who will enter the new data by selecting the existing community ID from the system.

The second set of forms have no community ID printed on them. The access level of the user responsible for adding new community information still needs to be decided. The relevant user will select a new community ID from the list allocated to that district. Should all the numbers already be taken, the user should apply for a new list of numbers. This list will probably be obtained from the central office for that specific province.

The relevant user either selects the rest of the locality information from the system or adds new locality levels if needed (see ***2.2.2.7 Locality Control***). The user now enters the new community information into the system (see ***2.2.2.7 b. Add Community***) The new community ID is written on top of the form and sent off to a level 2 or 3 user for electronic data capturing.

The forms captured by level 2 users are flagged as unapproved. Higher level users' forms are automatically approved.

2.4 Database Design

2.4.1 Technology

The system consists of two databases, namely a live production database with approved data and a test database, both having the same underlying structure. Each work station will reside on a server which replicates the complete database at all sub-levels of the country. The database is written in Oracle.

2.4.2 Table Layout

Attachment 2 (available from the author) contains a list of all the required tables. The tables are defined in terms of their column or field names and the data types and sizes of these fields. Each table name ends in either a 'L' or a 'D'. The table names with the 'L' suffix are the look up and locality tables. The tables with the 'D' suffix are the tables containing data on specific communities.

2.4.3 Table Relationships

Attachment 3 (available from the author) contains a list of all the relationships between tables. A relationship is a link between a record in one table and one or more records in another table. Relationships exist between look up and data tables, between data tables and between look up tables.

APPENDIX E

Database Reporting Procedures

DATABASE REPORTING PROCEDURES

1 Policy

A few basic reports will be defined by the in-house database development team as examples of the database's capabilities. Thereafter they are available to define reports as requested by users.

2 General

A number of predefined reports are available for selection. Individual user defined reports can also be created. Reports can be created from information abstracted from any data form or combination of data forms from any combination of layers of data forms.

When a report is requested the results are generated. The user then has the option to view the report on the screen or to request a printed copy of the results. If the user is a level one user, eg any member of the public, he will only have viewing rights, since having open access to printing reports could cause a serious waste of paper. For level 1 users therefore the print option will be omitted.

Reports can supply data as basic data or merged data. Basic data reports generate information at community level. Merged data reports are generated by combining data from a number of communities and thereby producing summary reports.

Reports can also generate information as raw data or as enhanced data. Raw data reports are generated from data extracted directly from the data gathering forms. Enhanced data reports are generated by processing the data and may include some interpretation of the resulting processed data. Enhanced data reports also include graphical outputs.

Many reports are based on the latest recorded data for the particular communities being examined but reports showing trends over time are also available.

Reports are generated by country, province, district, local council, ward, DWAF catchment, DWAF sub-catchment, DWAF tertiary catchment, DWAF quaternary catchment etc as requested by the user. When reports are requested for a high level structure, that is for a province rather than for a ward the report will be generated in blocks down to the lowest level of structure asked for.

To make reports easy to interpret, sorting of the data may be specified, with the sort key depending on the user or the use to which the report is to be put. Any output parameter up to 4 levels may be specified as the key for sorting. For example, a simple report requesting the following information: community name, map number, farm name, farm number and letters, population and number of livestock units for a province listed without the province being divided into districts etc can be sorted by:

- community name, or by

map number, or by

farm name, or by

farm letters (primary sort) and farm numbers (secondary sort), or by

population (ascending or descending), or by

livestock units (ascending or descending).

All applicable reports will aggregate numbers. For example, in the report on population and livestock units listed by community for a province, the report will end with a statement of the total population and the total number of livestock units.

Reports are generated for printing on A4 size paper. Orientation may be portrait or landscape format. Subject to limitations which may be imposed by the selected printer, the database supports a large number of fonts most of which are scalable.

Example of an enhanced data report:-

Community's Evaluation of their own Water Supply

Key: 0 = no data 1 = very bad 2 = bad 3 = adequate 4 = good

Community Name	Popul-ation	Sources (Avg 2)	Improve-ments (Avg 2)	Water Quality (Avg 3)	Access (Calc)	Quality of Data (Calc)	Lowest Rating	Overall Rating	Highest Rating

Sort by: Primary Lowest rating (ascending)

Secondary Overall rating (ascending)

Tertiary Highest rating (ascending)

Possible example of a graphical output: plot of community population against overall evaluation by the community of its own water supply with a best fit straight trend line drawn through the individual points for each community.

3 Entry to Reports Screen

When this screen is selected the system first checks if you are a level 1 user. If you are it displays a warning "you have no printing rights only viewing rights" with the option to continue or to escape. If you are any other level of user the system checks if a printer has been selected.

If no printer has been selected the system will tell you and alow you to continue or select a printer as you choose.

If a printer has been selected, the selected printer will be displayed. Thereafter the user may continue or select another printer.

4 Predefined Reports for Core Data Questionnaire

4.1 Community Core Data

4.2 Basic Community Data

4.3 Community Institutional Capacity

4.4 Community Water Sources

4.5 Community Water Bulk Supply Improvements

4.6 Community Water Access Improvements

4.7 Community Water Sources, Bulk Supply Improvements and Access Improvements

4.8 Community's Evaluation of their Water Supply

4.9 Community Access to Health and Sanitation

4.10 Community's Evaluation of their Health and Sanitation Facilities

4.11 Community Core Data Forms: Analysis of Data Quality and Age

4.12 Unapproved Records List

APPENDIX F

Project Applications

Preliminary Handling Procedures

PROJECT APPLICATIONS: Preliminary Handling Procedures

1 Data to be entered

1.1	Community/communities name(s), position(s) and details	
1.2	Application Sector	
1.3	Application date	
1.4	Application to	their reference number
1.5	Application from	their reference number
1.6	Brief project title	
1.7	Funds applied for	
1.8	Details of project	
1.9	Status of project	application received recommended for approval/rejected approved and under construction completed

2 Actions Required

2.1 When application is received
Check community and sector.
Is the project already on the data base?
Yes: inform applicant
No: enter information

2.2 When data is being entered
Is the project being entered for information only?
Yes: record details only and take no further immediate action
No: assign task of producing recommendation report

2.3 Produce guidelines for producing a recommendation report

2.4 When recommendation report has been received
Record change in application status.
Now "Rejected", "Referred Back - Additional Information Required" or "Recommended for Approval"

2.5 When application has been "Rejected"
Record change in status
Record reason for rejection: a) no community need being met; b) community/ institution to be advised to raise loan capital; c) priority low; d) alternative proposal required, RDP criteria not met
Inform applicant of rejection and reason

2.6 When application has been "Referred Back - Additional Information Required"
Record change in status
Record reason for referral a) more information required on sustainability of the resource; b) environmental impact report required

2.7 When application is "Approved"
Record change in application status
Inform applicant, ask for implementation programme and cash flow statement

2.8 When project is "Complete"
Record change in status
Arrange for O&M and cost recovery records to be kept and summary records to be posted to the database

3 Reporting and Screen Viewing Facilities Required

These will include various reports on current project applications and their current "Status"

We have noted Mr Fred van Zyl's proposal to use the database for empowering the Provinces with respect to decision making. The intention is to use a forum setting with projected images from the database view screens to help in this participative process.

Once a projects status has changed from "Recommended for Approval" to "Approved" additional special reports related to moneys committed, predicted cash flows and actual cash flows will be required

APPENDIX G

Implementing the Project Pilot Study

1 Who are we?

We are from the Development Services Group in the CSIR. We are a small group of 22 people who spend our lives working with communities to help them upgrade their own water supplies. This is our first project where we want to work with you and the Department of Water Affairs to see how we can get existing schemes working better.

23 Who is paying us for being here?

What we are doing now is a little project and a research organization called the Water Research Commission is paying us. Where we help communities to build their own new schemes, the communities still have to pay us. But on this pilot study project you will not be paying us for being here and working with you.

3 What are we here for? (General Background)

We are here to work with you on an information project.

The purpose of this project is tom make sure that you have the information you need to make your water supply scheme reliable and to look after your sanitation and hygiene needs.

We will also be looking at what information the Department of Water Affairs needs from you to help you maintain your water schemes and develop new ones. The RDP Office may also use some of the information.

The Department of Water Affairs has promised that it will support communities who have good water committees. It will also support communities who are working hard to build up good water committees.. It sill help them to make their existing schemes reliable. Making existing schemes more reliable is a very important objective of developing this information system..

The project will not help communities "jump the queue" for new water supply schemes.

By this I mean when it comes to spending money on new schemes this project will help the Department of Water Affairs and the RDP tp know how much money is needed to build adequate water supply schemes for all and to know which communities need money most.

But this will only happen when lots of communities in Northern Province ware giving the Department information gathered from projects like this one. Then it will help them to spend money where it is needed most.

Therefore, they do not want any of us to use this project to pressurise them into spending money on new projects for one particular community just because that

community is supplying information to the Department. If this happened, another community with even greater needs would be deprived of its new water scheme.

In the meantime, as a result of communities, DWAF, and the CSIR working together, existing schemes will become more reliable and the day when all communities have an adequate water supply will happen sooner.

4 What are we here for? (Specific objectives)

To find out from you what information you need to operate, look after, and manage your water scheme. We also want to understand what you need to know about sanitation and hygiene education.

To give you hands-on training in collecting and keeping information about your water supplies, and about sanitation and health issues.

This training will help you to manage your water supplies through recording:

a) how equipment is working,

b) how much water the community is using

c) what is happening to the money collected from the community to operate and maintain the scheme which supplies you with water, and

d) in some cases, how the amount of water available for the community to use is changing. This is especially important at the beginning of a drought.

Equally, it will help you communicate with the Department of Water Affairs so that when you have a problem you cannot sort out yourself, they will be able to help you. In this way:

a) if your water supplies are currently unreliable, the Department should be able to help

b) if the water is going to run out they will have early warning so that you can sit down with them and plan what must be done, and,

c) in the longer term, it will help you to become much more involved in planning and decision making with the Department of Water Affairs and thus to be a part of the efforts to ensure that all communities have adequate water supplies as soon as possible.

APPENDIX H

Notes on Data Gathering Forms

NOTES ON DATA GATHERING FORMS

1 Introduction

Attached are 4 layers of data gathering forms. The forms are for gathering data for the Water Supply and Sanitation Database. Layers 2 and 4 are not complete. Each of these two layers currently comprises sample forms from which larger sets will be developed to cover more topics than are included at present.

2 Layer 1: The Core Data Form

Layer 1 comprises one form.

The purpose of this form is to gather core data on each community. It addresses the following issues:

* basic community data like where the community is located, its population and the availability of general services in the vicinity of the community,

* the communities institutional capacity, skills capacity, training courses completed by community members, and the availability of operation and maintenance materials to help the community manage its own water supply and sanitation facilities,

* information on the community's water sources, existing improvements to the community's bulk water supply, water access improvements, and the community's access to health and sanitation facilities,

* finally the form contains the community's own evaluation of their water supply, and of their health and sanitation services.

The form has been drawn up in a manner that allows the communities themselves to supply almost all the data, with just a few items having to be supplied by a technical specialist with some knowledge of the area.

By and large this core data form contains data which will not change rapidly. The current thinking therefore is that once completed it will only require complete updating once every three years. In between, if a significant investment is being planned for a community or a group of communities it will be advisable to obtain a complete update before the investment is finalised and a further partial update after completion of the project. Other partial updates should be considered after other paradigm shifts in a community's circumstances.

Data from these forms will be used to assist provincial and national level planners to:

* prioritise investment in an equitable and transparent manner,

* set coverage targets, and

* monitor whether these targets have been met or not from the view point of both hardware delivery and service acceptability

Data from the forms will also assist project facilitators plan the implementation of individual projects.

3 Layer 2: Quarterly Monitoring Reports

Layer 2 comprises a set of forms.

The sample forms attached address the following issues:

* water usage and unaccounted for water,

* system and equipment faults and breakdown report, and

* operation and maintenance cost recovery and money balance sheet

All these forms have been designed so that communities can gather the data themselves after relevant capacity building and training where necessary.

The forms have been set-up to monitor monthly periods but have been organised so that communities only submit the data to the data capturing teams quarterly. The data capturing teams then have three months in which to give feedback to the communities from the data gathered.

It is envisaged that two additional quarterly monitoring forms will be required to address the following issues:

* an availability of water at source form to record stream and river flows, dam capacity levels, ground water levels and rainfall records, as applicable, and

* a cash flow and money balance form to be used during the implementation of capital projects only.

Use of these forms will assist:

* communities to monitor their own operation and maintenance effectiveness,

* district level maintenance support groups to plan and monitor the effectiveness of their policies in helping communities improve the reliability of their schemes,

* all levels, from community households to national level monitors and auditors:
  - to get an overview of the effectiveness of the implementation of all aspects of operation and maintenance strategies, and likewise
  - to receive early warning of any failures in the system caused by institutional delivery, equipment failures, drought, etc

They can also be used generally to look at the reliability and effective life of different types of equipment.

Use of the investment and money balance sheet from this layer combined with the core data form from layer 1 will assist national and regional planners to budget and to evaluate different investment strategies.

4 Layer 3: Major Water Supply or Sanitation Breakdown Report

Layer 3 comprises a simple postcard.

The purpose of this postcard is to record any major interruption in a community's water supply or sanitation system. It is only to be used when an event occurs which necessitates a speedier action than can be provided by the quarterly system and equipment faults and breakdown report.

This postcard has been designed to be easily completed by communities.

The postcard will be used by communities to obtain timely assistance from the nearest support structure to restore their water supply or sanitation service after a major interruption.

5 Layer 4: Water Supply and Sanitation Services "Hardware" Data Forms

Layer 4 comprises the largest set of forms.

The purpose of these forms is to record some basic details of each significant item of "hardware" making-up a community's water and sanitation system. The forms also indicate where more detailed information can be found. A draft list of "hardware to be covered by these forms follows:

* water sources
  - springs
  - streams/rivers
  - weirs
  - dams
  - dug wells
  - boreholes

* pumps
  - borehole piston*
  - borehole progressive cavity*
  - borehole other
  - all submersible*
  - centrifugal*
  - mixed and axial flow*

* motive power and ancillaries
  - electric motor - AC*
  - electric motor - DC
  - handpump actuator
  - internal combustion engines*
  - solar - heat engine
  - solar - PV
  - windmill
  - gearbox
  - belt drive
  - electrical generator
  - storage batteries
  - switchgear
  - control panel

* water treatment plants

* water carriers
  - pipelines*
  - canals*

* intermediate storage
  - reservoirs

* special ancillaries
  - water meters
  - float control valves
  - pressure control valves

The attached sample forms are marked with an *.

These forms are not designed for communities to fill in. They are designed rather to become part of the O&M information package supplied by consultants, NGOs or equipment suppliers to help communities manage their schemes. In many cases, special effort will have to be made to acquire this information for existing hardware.

Apart from being useful to O&M planners and implementors at all levels the data on

these forms will also be useful to planners, consultants and NGOs involved in evaluating current coverage levels and in the upgrading of existing schemes

6 Outstanding Issues Which Must be Addressed

6.1 Introduction

The issues addressed in this section are informed by:

* a review of the expressed needs for data which was recorded during project planning meetings mainly with DWAF Northern Province staff

* internal informal discussions between CSIR project team members, and

* thoughts on the need for standardisation, in the broadest sense, of terms and concepts used in a project which is to communicate with the National Information Project and other national databases such as the National Groundwater Database.

6.2 Water data-sets not included previously:

* water quality,

* water demand, and

* water resource availability.

6.3 There is a need to draw up notes to assist data gatherers and reporters to complete the different data gathering forms. These notes should include definitions of core terms and concepts.

6.4 Section 3 anticipates a need for capacity building and training to enable communities manage and monitor their water supply and sanitation schemes. A flexible training programme which does not discourage community initiative needs to be developed to cover this need. Initial thoughts suggest the training should cover:

* money management including bookkeeping procedures,

* equipment and water source caretakers duties, and

* record keeping procedures.

When money management and bookkeeping procedures are being considered it must be remembered that many communities are far from banks and as a result not all moneys are lodged with a bank before being spent.

APPENDIX I

The Core Data Form

WATER SUPPLY & SANITATION DATABASE :
GUIDELINES ON FILLING IN THE CORE DATA FORM QS01

0. GENERAL

The form is divided into 8 sections. The sections are as follows:

1 **Basic Community Data**

2 **Institutional Capacity**

3 to 5 **A Brief Overview of the Community's Water Sources, Bulk Supply Improvements and Water Access Improvements**

6 **The Community's Evaluation of their Water Supply**

7 **A Brief Overview of the Community's Access to Health and Sanitation**

8 **The Community's Evaluation of their Health and Sanitation Facilities**

The filling in of the form should be a combined effort involving an outside interviewer with at least an understanding of water, sanitation and health issues, office bearers of a democratically elected institution within the community, a wide sample of community members representative of all sections of the community. The bulk of it is to be completed in the village at a public meeting. Where actual figures are required, the first choice should be to involve the community in establishing accurate figures. For example, refer the guidelines for establishing the profile of the population. Where doing this is not practical, figures should be obtained from or checked with the most reliable source and the final figures presented to the community for their comments and approval. The community's advice with respect to the most reliable source of information should also be elicited.

Some of the questions in this form have been taken from a questionnaire (FORM B) developed by the Department of Water Affairs and Forestry and their Consultants to assess the water and sanitation requirements of communities in all the provinces of South Africa. These questions are followed by an accuracy code. Use the following scale to fill in this code:

4: Absolute accurate data,
3: Data obtained from a seemingly reliable source,
2: Data estimated on site,
1: Data estimated from maps and a general knowledge of the area, and
0: Data estimated with no knowledge of the area.

These accuracy codes are asked for in sections 1.10, 1.12 and 2.12.

When making an appointment with a community to complete a form at a later date it is often useful to leave copies of the core data form and of the census form IF11 with the community requesting that they examine it and complete as much as possible before you return. Take care that this is only done when the appointment has been made in a relaxed atmosphere and when you have had an opportunity to give a brief description of the project to at least a few members of the community.

After completion and typing up, a copy should be taken to the community. Communities should know that they are welcome to submit corrections when they see inaccuracies.

Please make full use of "comment" areas on the form to add additional information which will give outside planners a better understanding of the community's services and overall situation.

Community ID: This is a unique number given to each community by the Department of Water Affairs and Forestry. It comprises 8 characters as follows: a 2 digit number indicating what province the community is in, 4 characters indicating the quaternary water catchment area within which the community falls and three numbers allocated so that there are no "repeats" within a quaternary . The province numbers are: 01 W Cape, 02 E Cape, 04 Free State, 05 KwaZulu/Natal, 06 N West, 07 Gauteng, 08 Mpumalanga and 09 Northern.

The Box below the Community ID: Gives a full locality description of the community. The data is a repeat of the data found in lines 1.1 to 1.6 inclusive.

0.1 Give the date on which the interviewer completed the form at a meeting with community members regardless of when omitted items such as the 1:2 000 map number asked for in section 1.12.

0.2 Give the full name including title of the interviewer facilitating the completion of the form and sufficient information about the company he works for to allow for him/her to be contacted if need be.

0.3-0.5 Give details which facilitate giving knowledge of the environment in which the form was completed and which facilitates future contact. For example: for 0.3 give the name of a person present at the meeting who is easily contacted and willing to serve the community + the number of people present, for 0.4 give a description of how to contact the person and for 0.5 give full details of a contact telephone number followed by the word "Messages only" if the person neither lives or works at the contact number.

0.6 Only complete when a small section of the form is revised after the original data has been captured.

1. BASIC COMMUNITY DATA

1.1 Country: South Africa.

1.2 Province: Fill in the relevant name; eg Northern Province.

1.3 District: Fill in the name of the district as per the most recent subdivision of the provinces. **Note:** these districts are not the same as the old Magisterial Districts.

1.4 Local Council: Fill in the full name of the communities local council. This name and the ward number filled in below are to correspond to where community members **permanently** resident in the village voted in the 1996 local elections.

1.5 Ward: Fill in the ward number as described above

1.6 Community: Fill in the name of the **immediate** village as it appears on the 1:50 000 map including hyphenated prefixes such as "Ha", "Ga" and "Ka". **Do not** fill a name associated with a cluster of villages even if they form one community.

1.7 List all the names by which the community has been known: Again as mentioned above do not fill in the names of communities which comprise more than one village. If a village is commonly known by a

name other than that on the map start with that name as the first alternative name. If there is any confusion about prefixes please fill in the name again without its hyphenated prefix and with other used prefixes. Only fill in a farm name here if the community is commonly called by the original farm name: the farm name and number is filled in below under 1.8.

1.8 Farm Name: Fill in the name of farm on which most village infrastructure is built. If a significant part of the village extends on to another farm add the words "*et al*".

Farm Number: Fill in the number of the farm corresponding to the name filled in above. Note: when the farm numbers are being entered in a database it is most useful to enter the number and letters in separate fields for sorting purposes.

1.9 Co-ordinates: Fill in the co-ordinates of the village in degrees: **Latitude** first followed by the **Longitude.** It is good practice to choose a permanent structure such as a school, a post office, a police station, a shop, the chief's house etc for these co-ordinates.

1.10 The co-ordinates were obtained by:

Fill an "X" in the appropriate box and the additional details if relevant. This section also asks you to fill in an accuracy code to describe the quality of the information. Details of the accuracy codes are given under 1.12.

1.11 State the permanent feature or structure represented by the co-ordinates:

Only fill in these two questions if the village co-ordinates filled in in 1.9 actually correspond to a particular feature.

1.12 General Information:

The questions in this section are similar to a group of questions which appear on a Department of Water Affairs and Forestry form known as FORM "B" As per that form this section ask you to indicate the accuracy of the information that has been filled in. Refer page 1 for details of the required accuracy codes.

Width: Fill in the average width of the village in kilometres to one decimal place. **Note:** The width of the village multiplied by its length is to equal the total built up area of the village. The length and width of the village plus the ratio between them may be used to estimate the cost of distributing water within the community.

Length: Fill in the total length of the village in kilometres to one decimal along its long axis. When the axis of the village is not a straight line fill in the total distance travelled when one passes from one end of the village to the other.

Max elev: The height in metres above MSL of the ground at the highest stand in the village (even if it is not yet built on). This figure may be used to estimate the cost of supplying water to the community. The max elevation combined with the min elevation may be used to estimate the cost of distributing the water within the community.

Min elev: The height in metres above MSL of the ground at the lowest stand in the village (even if it is not built on yet).

Orderly: Fill in the percentage of stands in the community which is laid out in a grid.

Erratic: Fill in the remaining percentage indicating the percentage of sites not laid out in a strict grid.

Stand formal: Fill in the number of stands laid out formally in the community. A number of them will be equal in area.

Std informal: Fill in the number informal stands in the community. Informal stands will tend to differ in size and may even have some grazing/agriculture land between them.

Avg size: Fill in the average size of both the formal and informal stands in square metres. Note: the number of stands of each class multiplied by their corresponding average sizes added together should equal the width of the community multiplied by its length converted to square metres.

Water source: Fill in the distance in kilometres from the edge of the community to its most distant significant water source of supply. Note: it is **the distance from its source** of supply that is to be filled in not the distance from its storage reservoir.

Elev above: Fill in the maximum difference in elevation in metres between the above source and the maximum elevation in the community. Enter a **negative** number **if** the source is situated above the community.

Land owned: Fill in the percentages of the land used by the community which is public land (include tribal land) and which is privately owned.

Map 1:2 000: Fill in full 1:2 000 map number corresponding to the co-ordinates entered in section 1.9. This number is very useful for sorting and for locating a community on a 1:50 000 map. **Note:** When the full number is not known please fill in as much detail as possible and at least fill in the 1:50 000 map number.

Map 1:50 000: Fill in the name of the map.

Population: Fill in the current population of the community. **This is one of the most important items of data on the entire form with respect to checking the adequacy of a water supply.** It is therefore strongly recommended that the "HOUSEHOLD BY HOUSEHOLD CENSUS FORM IF11" is used to establish this figure as accurately as possible.

Avg growth: Fill in the best estimate of the annual percentage rate at which the community is growing. If in doubt fill in your lower estimate.

1.13 DWAF Quaternary Sub-catchment No.: The 3rd to 6th characters of the community ID

1.14 Magisterial District: Corresponding to the boundaries existing before the 1996 local elections.

1.15 Old Administrative Authority: Fill in the relevant name of the old TBVC "state", "self governing territory", or "separate" urban black administration or state "not applicable" if area is part of the old "white" RSA.

1.16 Tribal Authority: Fill in local tribal "authority".

1.17 Settlement type: Place an "X" in the box which best describes the community. **Rural Dense Settlement** refers to formally laid villages with a population in excess of 1 500 with little or no industry. **Rural Village** refers to less formally laid out communities usually with larger stands around which there is a some grazing and/or agriculture lands which form a significant asset for the majority of the population.

1.18 A hectare (ha) is equal to 10 000 square metres

Total area: Fill in the area of all the lands used by the village including land for grazing, agriculture, public institutions, commercial/industrial enterprises and residential. When grazing land is shared with another village include a fair proportion of these shared lands. The total area should equal the some of the other areas included in this section.

Grazing: Land usually used by livestock.

Agriculture: Land often used for growing crops, vegetables or trees.

Public institution: Land for schools, clinics, administrative offices and playing fields.

Commercial/industrial: Shops and factories.

Residential: Land on which the houses are built.

1.19 Total no of stands: Should equal the sum of the following three categories.

Some **new** undeveloped stands indicates population growth whereas **old** vacant stands may indicate population decline.

1.20 Number of households: Should equal the number of occupied stands. The total population usually equals between 5 and 7 times the number of households.

1.21 Population: As indicated in section 1.12 this is a very important figure and should be obtained by a household by household census. **There are forms available for this.**

Total: Should equal the sum of all the following categories.

Pensioners: Include all people of aged 60 or over who are not working.

Unemployed work seekers: People who have left school and are looking for work.

People in paid employment: People who work locally or nearby and live in the village.

Self employed: Formal sector shop owners, full-time farmers, doctors, etc

Informally employed:	People working informally or casually part-time. Examples: people selling fruit and vegetables bought from a wholesaler part-time farmers, crafts people, etc.
Migrant workers:	People not living in the village but still returning every weekend or for frequent holidays.
Housewives:	Women who fully occupied in bringing up a family and are not looking for work.
Children:	All those still at school or under 16 years of age.

1.22 How were the household population figures obtained?

Fill an "X" in the box which best describes how the figures for the population were obtained.

1.23 List the numbers of cattle (cows), goats, donkeys, sheep and other livestock that are owned by the community. Other livestock includes pigs and game animals kept by the people such as ostriches and impala. Do not include dogs, cats or chickens.

1.24 Availability of other services.

This section lets us know how developed your village is with respect to other things besides water and sanitation. It helps us to know the difficulties you have in operating your water supply scheme on a day to day basis: how far do you have to go to get diesel for your engine driven pump or how far do you have to go to put money in the Water Committee's bank account.

If the service is available in your village, as well as writing down its name, **write down 0 (zero) in the distance column.** If there are a number of shops in the village write down the number and a few words to describe them. For example; there are five shops in the village; write down: "5 (4 general stores and a bottle store)".

2. COMMUNITY INSTITUTIONAL CAPACITY

2.1 Fill an "X" in the appropriate box to let us know whether or not there is a Water, Sanitation or general Development Committee in the village. If there is, next fill in the name of the Committee.

The rest of this section asks for information to help people from outside the village to make contact with your Committee. Fill in the name of a person who is easy to contact and who is respected and trusted by the Committee as being a reliable person. The contact person can be a member of the Committee, but if it is easier to contact one of the school teachers or the local chief, for example, perhaps you would like to give their name and details instead?

If the streets in your village do not have names describe how best to get to the contact person's house and/or where he/she works.

For the postal address it is best to give a PO Box number from which the letters are collected often and which is owned by a person or institution known and respected by the Committee. (Perhaps you should fill in the usual postal address used by the Committee?)

Please fill in full details of the contact telephone number followed by the words "Messages only" if the contact person neither lives nor works at the number. Examples of telephone numbers:

Central reservations	(0020) ask for Mashamba 66
Dialling procedure Z	(0152-892) ask for Vuyani 32
Dialling procedure Y	(0152-312) (Gravelotte) ask for 1404
Dialling procedure X	(0152) (Mooketsi) 525813

(Note when there is no reply from a Y or Z exchange it is worth trying 0020 and asking to be put through to the exchange and number required)

2.2 When was the Committee formed? Fill in the year and the month.

2.3 Does the Committee have a constitution? Fill an "X" in the appropriate box. If your committee has a constitution perhaps the Committee would like to give a copy to the person interviewing you?

2.4 Is DWAF aware of the village committee? Fill an "X" in the appropriate box.

2.5 Is the committee registered as a section 21 association? Fill an "X" in the appropriate box. (A section 21 association is a company that has been formed to provide a service but does not seek to make a profit).

2.6 Is the Committee registered as a closed corporation? Fill an "X" in the appropriate box. (A closed corporation is a small company with limited liability).

2.7 Give the names of the Office Bearers.

For this section please give all the details asked for. We ask whether people are "Mr" or "Mrs" to see how many of the Committee's office bearers are ladies. We ask for the first names to make it easier to talk to people and initials and surnames so that we can address people more formally and so that one person does not get confused with another.

2.8-2.9 These questions let us know how active and lively your Committee is.

2.10 Is the Village Committee affiliated to an umbrella forum? Fill an "X" in the appropriate box and if the answer is yes also fill in the name of the forum. Examples would be a local civic association or a broader development forum which is active in a number of communities.

2.11 Asks how many **willing** community members there are with skills that may be useful in upgrading or looking after the village water supply or sanitation facilities. Please list the numbers in each category. Possible categories not listed: engine mechanics, electricians, pump installation specialists, borehole drilling.

2.12 Are community members willing to contribute their labour to facilitate the implementation of water or sanitation upgrading projects? Fill an "X" in the appropriate box.

2.13 This is a section where community members who have completed specific courses in the fields of community water supply, management, health care or hygiene, operation or maintenance can fill in the details. Use the following availability codes:

0	(zero)	no longer lives in the village,
1	(one)	has a full time job doing work which is not related to the course,

2 (two) has a full time job doing work which is related to the course,
3 (three) has a part time job but may be available to do this type of work part time, and
4 (four) is available to do this type of work full time.

2.11 Does the community have manuals or other information packs for maintenance and repairs of engines, pumps, pipework, plumbing, etc? If so, give details:

It is important to let us know about any details you have got as this will make it easier for us to get further details. Remember an important aim of this project is to **find out from you what information you need to operate, look after, and manage your water scheme.** So even if you do not have manuals let us know any of the following information you have for each item.

Boreholes: unique number, diameter and depth, level of water, who drilled it and when.
Pumps: unique number, make, model number, speed revs per minute, who installed it and when.
Engines/motors unique number, make, model number, kW rating, speed revs per minute, who installed it and when.
Reservoirs position and size.
Water meters position, make, type, model number and size.

2.12 Level of **management** support provided by different institutions.

In each row fill in one or more "X's" as appropriate.

The left hand column "None" is for institutions which are currently giving you insufficient or no support. The next four columns give you the opportunity to state which institutions need additional capacity to give the community the support it requires for a reliable service. Remember the Water and Sanitation White Paper says communities will have to pay for the services of these institutions; so select the institutions which you think can give you the best value for your money after their capacity has been increased. Not more than two "X's" should be filled in in each of these four columns.

As an alternative to filling in any of the first five columns fill in the "Necessary support" column to indicate an institution which currently gives the community significant support and which, the community thinks, does not require additional capacity.

Below, by way of an example, of a possible answer to the queries asked in this section. The accuracy codes have been filled in as follows: a *4* when the community had full knowledge of the institutions, their ability and potential; a *3* when the community had good contact with the institution but does not feel it is fully qualified to comment on its potential; a *2* when the community lacked full exposure to the institution in question but was making a considered judgement and a *1* when the community lacked any real exposure to the institution but was making it best judgement after a brief discussion with the interviewer.

Institution	Insufficient	<------ Additional Capacity Required ------->				Necessary	Acc
	or None	Operation	Maintenance	Managerial	Cost Recovery	support	Code
Community		*X*		*X*	*X*		*4*
Tribal						*X*	*4*
Local Council			*X*	*X*			*2*
Dist. Council	*X*						*2*
Water Board	*X*						*1*

DWAF						*X*	*3*
Other	*X*		*X*				*2*

Specify other if such support exists: *Train local people to maintain equipment at ward and LC level*

3-5 WATER SOURCES, WATER BULK SUPPLY IMPROVEMENTS AND WATER ACCESS IMPROVEMENTS

Sections 3 to 5 have been designed to record where communities get their water from (section 3 "Water Sources"), what improvements exist to bring the water closer to peoples homes (section 4 "Water Bulk Supply Improvements") and what outlet points exist from which people can collect their water (section 5 "Water Access Improvements").

In each section there is one set of places to fill in sources and improvements which are associated with water supplies that are available to the whole community (the "public" column) and a second set to fill in improvements installed by households, community groups, institutions or commercial companies for their own use (the "other" column).

The purpose of each of these sections, 3 to 5, is to record sources and improvements which are **currently in use or temporarily broken down. Do not include abandoned items when filling in numbers in these sections.** Do however describe abandoned sources and improvements in the comments areas below each section.

It is also very useful to use these comment areas to give ownership details of the improvements filled in in the "other" columns in each section. These ownership details would say whether the improvements were owned by private households, by a community group such as a garden group, by an institution such as a school or a clinic or by a company such as a mine or a big commercial farm.

It is important that these comments are filled in at the bottom of the correct section and repeated if they apply to more than one section, as it is likely that people will print out single sections of these forms depending on their interests and what they are going to do with the information. This also explains why we have asked about hand pumps twice, once in the section 4, "Bulk Supply Improvements" and again in section 5, "Access Improvements". Likewise we asked about "harvested rain water" in section 3, "Water Sources", and then again when we ask about "rain tanks" in section 5, "Access Improvements".

Note: The whole of section 6, "Community's Evaluation of Their Water Supply", allows the community to describe how things are working, so comments on reliability, how far people have to walk for water etc are to be entered in section 6 and not in sections 3 to 5.

All the items to be filled in sections 3 to 5, in except the item labelled "imported" in section 3, refer to sources and improvements which are within the community, very close by or have been developed for the community being interviewed. When a community also receives water from outside the "imported" item in section 3 should be filled in and the source named in the comments area. In the comments area please also fill in the number of households which get their water from this imported source.

A useful comment that can be entered in the "comments" area of section 5 is how many of the "house connections" and "yard taps" are "unauthorised".

The items described in sections 3 and 4 are well-known to most people but you may have difficulty with some of the items listed in section 5 so let us describe these for you.

House connections:	A house connection is where the water pipes are brought inside the house and there is at least one tap in the house.
Yard taps:	Is where there is a tap in a yard which is mainly used by the household living in that yard
Rain water tanks:	Tanks used for storing water that runs off the roof of a house or an institution like a school or a clinic.
Dist storage units:	Distributed storage units are special tanks usually placed in a households yard which get re-filled automatically through a special fitting which allows water into the tank slowly at a fixed speed or get re-filled manually by a water bailiff.
Shared standpipes:	Are yard taps in a households yard but the **household has agreed to share that yard tap** with a number of other households nearby.
Public standpipes:	Taps installed out in the street.
Attended water kiosks:	A place where **you go** and buy water from a person selling it.
Community dispensers:	These are like water kiosks except that they are open all the time because when you go there to buy water you put money or a coupon into a slot in the dispenser without anybody having to serve you.

6. COMMUNITY'S EVALUATION OF THEIR WATER SUPPLY

This section is broken up into 4 parts so that communities can evaluate and report on each of the four main features of their water supply separately. These four features are:

the water sources:	**where** the water comes from; is there plenty of water at these sources?
the bulk supply improvements:	**how** is the water brought closer to peoples homes; are the pipes and pumps big enough?
the quality of the water:	**what** sort of water it is; is it healthy and does it taste and look good?
access improvements:	**how close** has the water been brought to peoples homes?

It is essential when this section is being filled in that the community's evaluation is recorded and not the interviewers. However it is equally important that the interviewer checks with the community what feature of their water supply they are discussing and fills out the correct part of the form. There is no use filling in "shortages most days" in 6.1, the SOURCES part, when the source is a large dam and the shortages the community are talking about are caused by the pipelines being too small and it is the capacity column of part 6.2, the BULK SUPPLY IMPROVEMENTS part, which should be filled in.

6.1 SOURCES

This section is the most difficult general section for communities to answer accurately since the community is often not sure whether water quantity problems are the result of poor system design, the

condition of plant, the methods used to operate the plant or if they are really caused by a shortage of water at source. Please try to establish the true cause of water shortages, if any, and only fill in the top two squares if the SOURCE's shortages columns if it really appears that the sources are indeed the cause of any water shortages experienced by the community. Also, make full use of the comments area to fill in a short descriptive summary of the final thinking of the community members present.

6.2 BULK SUPPLY IMPROVEMENTS

As hinted in section 6.1. when communities are asked about the capacity of the IMPROVEMENTS supplying them with water they can report *capacity* shortage problems caused by at least three different main categories:

* shortages due to system design *capacity* problems such as the capacity of the pump or of the reticulation pipework,
* shortages due to operational problems such as the pump operator not keeping water in the reservoir because he goes home early or because it is very difficult because of the small size of the reservoir, and
* shortages due to the water committee purposely operating the pump for a limited time each day or actually turning off the water at various times during the day to save money.

If a community reports any *capacity* problems it is important that the interviewer finds out as accurately as possible the cause of the *capacity* problem with respect to both the main category and the more specific details. These cause should be recorded in the comments area.

Communities normally have no difficulties about reporting on *reliability* problems but again the interviewer should find out as much detail as possible and record these details in the comments area.

6.3 WATER QUALITY

Fill an "X" in each of the three boxes which best describe how the community evaluates the quality of the water available in the village and in the comments area record the reasons given by the community for any negative comments. If the interviewer has the details of any analytical tests that have been carried out on the quality of the water available in the village he/she can discuss these tests **after** getting the community's evaluation first. Only make changes to the community's evaluation with the community's full support.

6.4 ACCESS

Communities usually need help in answering questions about how far people have to walk to collect water and tend to think the distances are further than they actually are. The best way for the interviewer to assist a community in answering the questions related to access reasonably accurately is for him/her to walk or drive around the village with a few members of the community to gauge how many households live within 200m of a water supply point. Record this number as the number of households having adequate access. Then the remaining households will be the number having to walk more than 200m.

To estimate the average distance walked by households who have to walk more than 200m, try to **find out accurately** how far the household furthest away from water has to walk. Then, **in the worst case,** the average distance that these families will have to walk is half the distance walked by the furthest family plus 100m. If the worst household's case is an isolated case then the average distance walked by all households will be closer to 200m and a **rough estimate** should be made to establish the correct figure.

Steep gradients mainly refers to instances where people have to take care when fetching water to stop themselves from slipping because of the sloping ground where they are walking. To a lesser extent it can refer to instances where people have a continuous up hill haul when carrying water back to there houses. Such cases should not be regarded as steep gradients unless the difference in level between the water collection point and the persons house is at least 30m.

Additional comments are likely to centre around communities reporting that the time they spend collecting water is made longer through have to queue at a handpump or standpipe when they go to fetch. If such comments are made it may be worthwhile checking whether the queues are mainly due to there being to few access points or mainly due to lows flows at the available access points. If the main cause is low flows at the access points this should also be recorded in the comments area of section 6.2.

7. ACCESS TO HEALTH AND SANITATION

7.1 to 3 Questions 7.1, 2 and 3 centre around how aware communities are about health inspectors visiting their communities. Hence although the actual information is important we would prefer if communities were not pressed too hard for this information as blanks can then be interpreted as meaning the health inspector's visits are not very effective. Communities should however be encouraged to follow up the issue themselves if they are unaware of who their health inspectors is and how often he/she visits the community.

7.4 The list of different types of latrine presented in section 7.4 is comprehensive to allow the form to be used for both rural and urban communities and to encourage developers to offer a wider range of options when presenting feasibility studies to communities. However in rural areas most households with latrines have either basic pit latrines or ventilated pit latrines. The second type, as its name suggests, can be distinguished from a basic pit latrine because it has a vent pipe which allows smells to escape out into the air above the toilet. Apart from this basic difference pit latrines may be poorly built and poorly looked after or they can be well built so that they do not collapse during a wet rainy season and well looked so that they are hygienic and pleasant to use. Make use of the "comments" area, 7.9, to briefly describe the general state of the toilets in the community.

Although practically all sanitation in the rural areas is "on site sanitation" without sewer pipes to take waste products away to be treated, some institutions (schools and clinics for example) and a few higher income families do have some form of "wet" sanitation, as distinct from pit latrines which are classified as "dry" sanitation. The commonest types of wet sanitation in the rural areas are "full flush WC's with a septic tank, aqua privies with a low flush flushing system and in a few cases aqua privies without any flushing system. To learn more about these systems you can get a copy of the "Water and sanitation handbook for community leaders" written by the Palmer Development Group free from the Water Research Commission by writing to PO Box 824, PRETORIA 0001 or by telephoning (012) 330-0340.

7.5 Fill in the number of households without any type of latrine.

7.6 Fill in the number of households with provision for hand washing next to their latrines. Currently there are very few households with such facilities. By asking the question it is hoped to encourage the practice to improve hygiene and health standards.

7.7 & 8 Again these questions are being asked to encourage communities to consider their current practices.

In most cases the answer to question 7.7 will be "no" but will not cause a direct health problem in most communities where the water usage is low. However if there are any signs of pools of water in household yards this should be recorded in the comments area, 7.9. Washing water can be used beneficially to water fruit trees etc.

In most cases the answer to 7.8 will be yes. We are not looking for any fancy waste collection systems in the village but are enquiring if such wastes are buried a little bit away from the houses and if public areas are kept free of litter. If this is not case throughout the village, an "X" should be placed in the "NO" box and a brief explanatory note entered in the comments area, 7.9.

8. COMMUNITY'S EVALUATION OF THEIR HEALTH AND SANITATION FACILITIES

Communities should be encouraged to obtain the help of their local clinic to answer sections 8.1, 2 and 3 but they should still discuss all the questions at a general meeting of the community. It is important that the answers to questions 8.5 and 6 reflect the response of the wider community and not just medical personnel or the members of the water/development committee.

8.1 & 2 Both of these sections refer to children under 5 years of age. Question 8.2 exists because often the records at the local clinic cover more than one village and the figures for each village are not kept separately. The query about underweight children is asked because the most frequent cause is malnutrition which, in some cases, can be lessened through the provision of adequate water supplies for community gardens and, to a lesser extent, for livestock watering.

8.3 to 6 These sections refer to the whole village. With respect to question 8.3 we have had indications that a helper who has some medical knowledge and can translate the names of the sicknesses in the local language helps the community to answer this question well and to discuss it importance relative to their water supplies and hygienic issues. This in turn helps the community to give thoughtful replies to questions 8.5 and 6.

COMMUNITY ID | 0 | 9 | A | 9 | 1 | C | 0 | 0 | 3 |

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Lemana Village/Ward Two/Elim ... Vuwani LC/Northern District/Northern Province/South Africa

WATER SUPPLY & SANITATION DATABASE : CORE DATA FORM QS01

0. GENERAL

0.1 Date : Year : 1996 ..... Month : JUN ..... Day : 26 .....

0.2 Name of interviewer : Jay Bhagwan, CSIR, Pretoria .....

0.3 Name of respondent : *Mr Claude Ramaru* .....

0.4 Street address of respondent : .....

.....

0.5 Contact telephone no : .....

0.6 Revision Date : Year : ..... Month : .....Day : .....

1. BASIC COMMUNITY DATA

1.1 Country : *South Africa* .....

1.2 Province : *Northern Province* .....

1.3 District : *Hlanganani* .....

1.4 Local Council : *Elim.Tshitale-Hlanganani.Levubu-Vuwani* .....

1.5 Ward *Two (NEV2)* .....

1.6 Community : *Lemana/Ha-Ramaru* .....

1.7 List all the names by which the community has been known:

1 : Shihlobyeni ..... 4 : .....

2 : Ha-Ramaru ..... 5 : .....

3 : Ramaru ..... 6 : .....

1.8 Farm Name : Waterval .....

Farm Number : 45LT .....

1.9 Co-ordinates in Degrees

Latitude: | 2 | 3 | 1 | 1 | 0 | 8 | Longitude: | 3 | 0 | 0 | 3 | 3 | 2 |

1.10 The co-ordinates were obtained by:

Surveying		Accuracy Code: 2
GPS		
Read off map	X	Scale : 1:50 000 .....
Other		Specify : .....

1.11 State the permanent feature or structure represented by the co-ordinates (e.g. school, post office, police station, shops, chief's house, etc)

Feature : .....

Name : .....

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1.12 General Information

Width	: ..... km	Length	: ..... km	Accuracy	: .... code
Max elev	: ..... m	Min elev	: ..... m	Accuracy	: .... code
Orderly	: ..... %	Erratic	: ..... %	Accuracy	: .... code
Stand formal	: 328 ..... no	Std informal	: ..... no	Accuracy	: .... code
Avg size	: ..... m^2	Avg size	: ..... m^2	Accuracy	: .... code
Water source	: 0,89 ..... km	Elev above	: ..... m	Accuracy	: .... code
Land public	: 100 ..... %	Land private	: 0 ..... %	Accuracy	: .... code
Map 1:2 000	: *2330AA 17 C1*	Map 1:50 000	: RATOMBO 1990 Part Rev		Name
Population	: 2337 ..... No	Avg growth	: 4 ... % annual	Accuracy	: .... code

1.13 DWAF Quaternary Sub-catchment No. : A91C .....

1.14 Magisterial District : Hlanganani .....

1.15 Old Administrative Authority : Gazankulu .....

1.16 Tribal Authority : Elim-Shirley-Njhakanjhaka .....

1.17 Settlement type:

Urban Industrial		Urban Informal Residential	
Urban Commercial		Rural Dense Settlement	
Urban Low Density Residential		Rural Village	X
Urban High Rise		Rural Scattered	
Urban High Density Residential		Commercial Farmland	

1.18 Total area : ..... ha public institution : ..... ha

grazing : ..... ha commercial/industrial : ..... ha

agriculture : ..... ha residential : ..... ha

1.19 Total no of stands : 328 ..... no of new undeveloped stands : .....

No of occupied stands : ..... no of old vacant stands : .....

1.20 Number of households : 328 .....

COMMUNITY ID | 0 | 9 | A | 9 | 1 | C | 0 | 0 | 3 |

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1.21 Population:

Total	:	2337
Pensioners	:	*162*
Unemployed work seekers	:	191
People in paid employment	:	248
Self employed (eg shop owners, full-time farmers, doctors, etc.)	:	28
Informally employed (eg hawkers, part-time farmers, crafts, etc.)		39
Migrant workers (returning every weekend or frequent holidays)	:	1
Housewives	:	253
Children	:	1415

1.22 Population/household estimates have been based on:

Census (Year .....)		House-to-house survey	*X*
Health Records		Community estimate	
Cost Recovery Records		Outsider Estimate	
Other		Specify :	

1.23 List the numbers of livestock owned by the community.

Cattle	:	Goats	: .....
Donkeys	:	Sheep	: .....
Other	:	Specify :	.....

1.24 Availability of other services

Service	Name and/or Place	Distance (km)
Primary school	*Shihlobyeni High Primary*	..... *0*
Clinic	*Shihlobyeni Clinic*	..... *0*
Public telephone	.....	.....
Shops	*Two: Mabidi General Dealer and the Nkanyangi Cafe*	..... *0*
Post boxes	.....	.....
Secondary school	*Lemana High School*	..... *0*
Diesel pump	.....	.....
Tarred road	*At Elim Hospital*	..... *5*
Grid electricity	*Yes*	..... *0*
Bank	*Louis Trichardt*	..... *40*
Police station	*Waterval*	..... *4*

COMMUNITY ID | 0 | 9 | A | 9 | 1 | C | 0 | 0 | 3 |

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2. COMMUNITY INSTITUTIONAL CAPACITY

2.1 Is there a Village Water/Sanitation/Development Committee? YES [X] NO [ ]

Name of Committee : Shihlobyeni Civic Association .....

Contact Person : Mr HT Nkanyangi (Separate Water Committee to be formed) .....

Street address : .....

.....

Postal address : PO Box 317, Elim Hospital, 0960 .....

.....

Telephone no : .....

2.2 When was the Committee formed? Year : ..... Month : .....

2.3 Does the Committee have a constitution? YES [ ] NO [ ]

2.4 Is DWAF aware of the village committee? YES [ ] NO [ ]

2.5 Is the committee registered as a section 21 association? YES [ ] NO [ ]

2.6 Is the Committee registered as a closed corporation? YES [ ] NO [ ]

2.7 Give the names of the Office Bearers :

Office	Mr/Mrs	First Name & Initials	Surname
Chairperson			
Secretary			
Treasurer			

.....

..... *Separate water committee in the process of being formed this month* .....

.....

.....

.....

2.8 a. How often are Committee meetings held? : .....

b. How many people attend Committee meetings? number of men : .....

number of women : .....

2.9 a. Besides water, sanitation and health, are any other community concerns discussed at Committee meetings?

YES [ ] NO [ ]

b. If YES specify: .....

2.10 Is the Village Committee affiliated to an umbrella forum? YES [ ] NO [ ]

If yes name the forum: .....

COMMUNITY ID | 0 | 9 | A | 9 | 1 | C | 0 | 0 | 3 |

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2.11 In each of the following categories how many community members possess skills and are interested in making themselves available to assist the community in upgrading or looking after their water supply or sanitation facilities?

SKILL	Number	SKILL	Number
building	 8	Foreman	.....
plumbing	 3	pump caretaker	 7
pipe laying	 0	other	.....
bookkeeping	 1	specify :	.....

2.12 Are community members willing to contribute their labour to facilitate the implementation of water or sanitation upgrading projects?

YES [X] NO [ ]

2.13 Record of community members who completed courses in the fields of water supply, management, health care or hygiene, operation or maintenance

Person Trained Mr/Mrs First Names Surname	Availability Code	Date Recorded yyyy/mm/dd
Name of Course	Duration days	Date Completed

2.13 continued

Person Trained Mr/Mrs First Names Surname	Availability Code	Date Recorded yyyy/mm/dd
Name of Course	Duration days	Date Completed

2.14 Does the community have manuals or other information packs for maintenance and repairs of engines, pumps, pipework, plumbing, etc? If so, give details:
None . . . . . .

2.15 Level of **management** support provided by different institutions

Institution	None	<------- Additional Capacity Required ------->				Necessary support	Acc Code
		Operation	Maintenance	Managerial	Cost Recovery		
Community	X						
Tribal		X	X	X	X		
TLC				X			
DC	X						
TRC						X	
Water Board	X						
DWAF		X	X	X			
Other							

Specify other if such support exists: . . . . . .

COMMUNITY ID | 0 | 9 | A | 9 | 1 | C | 0 | 0 | 3 |

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3 WATER SOURCES

SOURCE	Number Public	Number Other	SOURCE	Number Public	Number Other
springs	....	....	harvested rain water	....	...
streams	... *1*	....	imported	... *1*	...
hand dug wells	....	....	other	....	...
boreholes	... *9*	....	specify :		

Comments : Imported water comes from the Middel Letaba Dam. Other records show a total of 11 boreholes .....

4 WATER BULK SUPPLY IMPROVEMENTS

IMPROVEMENTS	Number Public	Number Other	IMPROVEMENTS cont	Number Public	Number Other
weirs	....	....	genset powered pumps	....	...
dams	... *1*	....	electric grid powered pumps	... *9*	...
water treatment plants	....	....	bulk pipelines	....	...
handpumps	....	....	reservoirs	... *3*	...
solar powered pumps	....	....	other	....	...
engine driven pumps	....	....	specify :		

Comments : .....

.....

5. WATER ACCESS IMPROVEMENTS

DOMESTIC	Number Public	Number Other	DOMESTIC cont	Number Public	Number Other
house connections	....	....	other public	.....	xxxx
yard taps	.. *50*	....	specify :		
rain tanks	....	....	other private	xxxx	....
dist storage units	....	....	specify :		
shared standpipes	....	....	INST AND INDUSTRIAL		
public standpipes	... *9*	....	number	....	....
attended water kiosks	....	....	LIVESTOCK		
community dispensers	....	....	dipping tanks	... *1*	....
hand pumps	....	....	drinking troughs	....	.....
dug well: no hand pump	....	....	AGRICULTURAL		
protected spring	....	....	number	....	....

Comments : The public standpipes are not working at present but the system is currently being upgraded by a private consultant being employed by councillors or the previous TLC .....

COMMUNITY ID | 0 | 9 | A | 9 | 1 | C | 0 | 0 | 3 |

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6. COMMUNITY'S EVALUATION OF THEIR WATER SUPPLY

6.1 SOURCES

Critical shortages		*Shortages*	
sources dry up every year		shortages at source most days	
sources dry up most years	X	shortages at source most dry seasons	X
sources dry up occasionally		sources good most of the time	
sources rarely dry up		sources good nearly all the time	
not sure		not sure about the sources	

Any other comments on source shortages : Some boreholes dry up regularly especially during winter . . . . . .

. . . . . .

6.2 BULK SUPPLY IMPROVEMENTS

Capacity		*Reliability*	
shortages nearly all the time		breaks down for long periods	X
shortages at peak periods only		breaks down often for short periods	
generally delivers enough water		breaks down occasionally	
always delivers enough water	X	is generally reliable	
not sure		not sure	

Any other comments : When pumps break down it takes 3-4 months to get them repaired by DWAF . . . . . .

. . . . . .

6.3 WATER QUALITY

Taste		*Colour*	
very bad		very bad	
bad		bad	
just ok		just ok	
good	X	good	X

The water is generally healthy YES [X] NO [ ]

Give reasons for negative comments : . . . . . .

. . . . . .

. . . . . .

6.4 ACCESS

COMMUNITY ID | 0 | 9 | A | 9 | 1 | C | 0 | 0 | 3 |

Community / Ward / Local Council / District / Province / Country

Lemana Village/Ward Two/Elim ... Vuwani LC/Northern District/Northern Province/South Africa

6.4.1 No of households for whom access is adequate (ie within 200 m) : 100

6.4.2 No of households who have to walk more than 200 m : 228

What is the average distance walked by these households : ..... 400 m

How many also have to descend/climb steep gradients : 0

6.4.3 Any additional comments on access : *Current access is very poor but the system is being upgraded by a private consultant employed by the councillors or the previous TLC* .....

7. ACCESS TO HEALTH AND SANITATION

7.1 What is the name of the local health inspector? : Miss Joyce Moeti .....
Where is he/she based?
How far is this place from the community? : 0 ..... km

7.2 How long does he/she spend in the community? : 260 ..... days/year

7.3 Are the visits regular? YES ☐ NO ☐

7.4 List the number of typical latrine types currently used in the community:

TYPE	HOUSEHOLD	SCHOOL	CLINIC	PUBLIC
Full flush WC with conventional	.....	.....	.....	.....
Full flush WC with small bore sewers	.....	.....	.....	.....
Full flush WC with septic tank	.....	*2*	.....	.....
Aqua privy with flush	.....	.....	.....	.....
Aqua privy without flush	.....	.....	.....	.....
Ventilated composting latrine	.....	.....	.....	.....
Ventilated pit latrine (VIP)	.....	.....	.....	.....
Sealed pedestal pit latrine	.....	.....	.....	.....
Basic pit latrine	*295*	.....	*1*	.....
Bucket latrine	.....	.....	.....	.....
Other	.....	.....	.....	.....

Specify other : .....

7.5 State no households without toilets of any type : 33

7.6 State no households with provision for hand washing next to latrines : 0

7.7 Does the community have separate facilities available for the disposal or re-use of washing water?

YES ☐ NO ☒ *X*

7.8 Non-sanitary wastes are disposed of hygienically YES ☐ NO ☒ *X*

7.9 Comments : .....
.....

COMMUNITY ID | 0 | 9 | A | 9 | 1 | C | 0 | 0 | 3 |

Community / Ward / Local Council / District / Province / Country

Lemana Village/Ward Two/Elim . . . Vuwani LC/Northern District/Northern Province/South Africa

8. COMMUNITY'S EVALUATION OF THEIR HEALTH AND SANITATION FACILITIES

8.1 Children under 5 years of age

How many live in the community : 460

How many are underweight : 75

How many die each year : 8

Specify the common causes of death : Malnutrition .....

.....

8.2 Total population to which the figures in 8.1 refer : .....

8.3 Does the community experience the following diseases?

serious diarrhoea	YES	X	NO	
cholera	YES		NO	X
typhoid	YES		NO	X
hepatitis A	YES		NO	X
polio virus	YES		NO	X
bilharzia	YES	X	NO	
malaria	YES		NO	X
skin diseases	YES	X	NO	
stomach worms	YES	X	NO	
"blue baby" syndrome (excess nitrates)	YES		NO	X
mottled teeth (excess fluorides)	YES		NO	X
bad eye infections	YES		NO	
other water related such as	YES		NO	

8.4 When are health problems worst. During summer [X] winter [ ]

8.5 Is the community satisfied with its sanitation facilities YES [X] NO [ ]

8.6 Generally, how much is each household willing to pay for improvements?
R 10-00/mth .....

APPENDIX J

Community Quarterly Monitoring Reports

WATER SUPPLY & SANITATION DATABASE : FORM QR01
QUARTERLY WATER BALANCE AND USAGE REPORT

COMMUNITY ID | 0 | 9 | | | | | | | |

Community name : ..... Year : .....

Month 1) : .....2) : .....3) .....

1) WATER BALANCE		m^3 for mth	*M/E*		USED LOCALLY	m^3 for mth	*M/E*
A	Imported supply	.....	....	H	Domestic	.....	...
B	Local supply			I	Institutions	.....	...
C	Total supply		N/A	J	Industrial	.....	...
D	Used locally	.....	....	K	Livestock	.....	...
E	Exported			L	Irrigation	.....	...
F	Total used		N/A	M	Other		
G	Unaccounted for		N/A	N	Total used locally		N/A

2) WATER BALANCE		m^3 for mth	*M/E*		USED LOCALLY	m^3 for mth	*M/E*
A	Imported supply	.....	....	H	Domestic	.....	...
B	Local supply			I	Institutions	.....	...
C	Total supply		N/A	J	Industrial	.....	...
D	Used locally	.....	....	K	Livestock	.....	...
E	Exported			L	Irrigation	.....	...
F	Total used		N/A	M	Other		
G	Unaccounted for		N/A	N	Total used locally		N/A

3) WATER BALANCE		m^3 for mth	*M/E*		USED LOCALLY	m^3 for mth	*M/E*
A	Imported supply	.....	...	H	Domestic	.....	...
B	Local supply			I	Institutions	.....	...
C	Total supply		N/A	J	Industrial	.....	...
D	Used locally	.....	...	K	Livestock	.....	...
E	Exported			L	Irrigation	.....	...
F	Total used		N/A	M	Other		
G	Unaccounted for		N/A	N	Total used locally		N/A

Recorded by : .... Date : .....
C = A + B F = D + E G = C - F N = (H + I + J + K + L + M)
M = Metered readings E = Estimated figure

WATER SUPPLY & SANITATION DATABASE : FORM QR02
QUARTERLY O & M MONEY BALANCE REPORT

	1) MONEY INC & BALANCE	R - c		MONEY SPENT	R - c
A	Starting balance	. . . . .	I	Imported bulk water	. . . . .
B	Cost Recovery Income	. . . . .	J	Caretakers (O & M) wages	. . . . .
C	Other Inc?		K	Administration Wages	. . . . .
D	Total available	. . . . .	L	Electricity, fuel and/or oil	. . . . .
E	Total money spent		M	Service and repairs	. . . . .
F	Calculated balance	. . . . .	N	Normal spares	. . . . .
G	Current actual balance		O	Equipment theft costs	. . . . .
H	Unaccounted for		P	Transport	. . . . .
	Cost recovery %		Q	Other miscellaneous	
	Debit age ratio		R	Total money spent	

	2) MONEY INC & BALANCE	R - c		MONEY SPENT	R - c
A	Starting balance	. . . . .	I	Imported bulk water	. . . . .
B	Cost Recovery Income	. . . . .	J	Caretakers (O & M) wages	. . . . .
C	Other Inc?		K	Administration Wages	. . . . .
D	Total available	. . . . .	L	Electricity, fuel and/or oil	. . . . .
E	Total money spent		M	Service and repairs	. . . . .
F	Calculated balance	. . . . .	N	Normal spares	. . . . .
G	Current actual balance		O	Equipment theft costs	. . . . .
H	Unaccounted for		P	Transport	. . . . .
	Cost recovery %		Q	Other miscellaneous	
	Debit age ratio		R	Total money spent	

	3) MONEY INC & BALANCE	R - c		MONEY SPENT	R - c
A	Starting balance	. . . . .	I	Imported bulk water	. . . . .
B	Cost Recovery Income	. . . . .	J	Caretakers (O & M) wages	. . . . .
C	Other Inc?		K	Administration Wages	. . . . .
D	Total available	. . . . .	L	Electricity, fuel and/or oil	. . . . .
E	Total money spent		M	Service and repairs	. . . . .
F	Calculated balance	. . . . .	N	Normal spares	. . . . .
G	Current actual balance		O	Equipment theft costs	. . . . .
H	Unaccounted for		P	Transport	. . . . .
	Cost recovery %		Q	Other miscellaneous	
	Debit age ratio		R	Total money spent	

Recorded by : . . . . . Date : . . . . . .

D = A + B + C F = D - E H = F - G R = I + J + K + L + M + N + O + P

WATER SUPPLY & SANITATION DATABASE : FORM QR03
QUARTERLY SYSTEM AND EQUIPMENT FAULTS AND BREAKDOWN REPORT

COMMUNITY ID | 0 | 9 | | | | | | | |

Community name : . . . . . Year : . . . . . .

Month 1) : . . . . . 2) : . . . . . 3) . . . . . .

ITEM OF PLANT	NUMBER	DESCRIPTION OF PROBLEM	F/B	DATE

ITEM OF PLANT	NUMBER	F/B DATE	REPAIR DATE	ANY COMMENTS

Recorded by : . . . . . Date : .....

F = Item of plant or equipment is faulty. It is working but something is wrong.
B = Item of plant or equipment is broken. It does not work at all. Page :.....of .....

APPENDIX K

The Water Or Sanitation Major Interruption Report Card

WATER OR SANITATION FAILURE REPORT CARD : FORM RC01

ID CODE	S	O	A	N	P	R												

Community name : .....

Dear sir/madam there has been a major interruption to our:

Water supply system ☐ Sanitation system ☐

The following item of plant is broken: .....

Plant item number ..... Date it broke .....

Description of the problem : .....
.....
.....
.....

Compiled by : ..... Date : .....

POSTCARD

From ..... **To**

..... Community Water Supply and Sanitation
..... Department of Water Affairs and Forestry
..... Private Bag X576
..... GIYANI 0826
..... Rep. of South Africa

APPENDIX L

Hardware Data Forms

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF01
BOREHOLE PUMP INSTALLATION: PISTON TYPE

ID CODE | S | O | A | | | | | | | | | | | | | | |

Community name		Installation name	
Ownership		Water: main use	
Location: Longitude		Latitude	
Borehole ID numbers			
Pump manufacturer		Pump model	
Pump agent		Nearest branch	
Minimum acceptable internal well diameter (mm)			
No of pumps: Duty		Standby	
Pump ID numbers			
Date installed		Design running hrs/day	
Duty point Q (ℓ/min)		Dif head H (m H_2O)	
Input power P (kW)		Pump efficiency η%	
Cylinder diam (mm)		Cyl max stroke (mm)	
Cyl operat stroke (mm)		Suc strainer type	
Ops freq (cycles/min)		Vol efficiency η%	
Power source		Power transmission	
Installation drg no		Performance curve no	
Column diam (mm)		No of columns (x 3 m)	
Column connections			
Cylinder material		Valve seal material	
Column material		Rods material	
Mass of all below ground components empty (kg)			
Mass of all below ground components full of water (kg)			
Comprehensive parts list available from pump agent and at site (Y/N)			
Installation and maintenance manual avail from agent and at site (Y/N)			
Lift gear at site (Y/N)		Lift beam at site (Y/N)	
Full maintenance tool kit available from/at			

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF02
BOREHOLE PUMP INSTALLATION: PROGRESSIVE CAVITY TYPE

ID CODE | S | O | A | | | | | | | | | | | | | | |

Community name		Installation name	
Ownership		Water: main use	
Location: Longitude		Latitude	
Borehole ID numbers			
Pump manufacturer		Pump model	
Pump agent		Nearest branch	
Minimum acceptable internal well diameter (mm)			
No of pumps: Duty		Standby	
Pump ID numbers			
Date installed		Design running hrs/day	
Duty point Q (ℓ/min)		Dif head H (m H_2O)	
Input power P (kW)		Pump efficiency η%	
Operating rpm			
Foot valve type		Suc strainer type	
Power source		Power transmission	
Installation drg no		Performance curve no	
Cylinder diam (mm)		Drive shaft diam (mm)	
Column diam (mm)		No of columns (x 3 m)	
Column connections			
Stator material		Rotor material	
Column material		Drive shaft material	
Mass of all below ground components empty (kg)			
Mass of all below ground components full of water (kg)			
Comprehensive parts list available from pump agent and at site (Y/N)			
Installation and maintenance manual avail from agent and at site (Y/N)			
Lift gear at site (Y/N)		Lift beam at site (Y/N)	
Full maintenance tool kit available from/at			

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF03
SURFACE MOUNTED PUMP INSTALLATION: CENTRIFUGAL PUMPS

ID CODE | S | O | A | | | | | | | | | | | | | | | |

Community name		Installation name	
Ownership		Water: main use	
Location: Longitude		Latitude	
Water source		Source ID number	
Treated/Untreated		Pump manufacturer	
Pump type		Pump model	
Pump agent		Nearest branch	
No of pumps: Duty		Standby	
Pump ID numbers			
Date installed		Design running hrs/day	
Duty point Q (ℓ/min)		Dif head H (m H,O)	
Input power P (kW)		Pump efficiency η%	
Operating rpm		Suction lift (m)	
Foot valve type		Suction strainer type	
Power source		Power transmission	
Installation drg no		Performance curve no	
Suction diam (mm)		Delivery diam (mm)	
Suc flange rating (kPa)		Del flange rating (kPa)	
Impeller diam (mm)		No of stages	
Casing material		Impeller material	
Shaft material			
Mass of complete pump and baseplate (kg)			
Comprehensive parts list available from pump agent and at site (Y/N)			
Installation and maintenance manual avail from agent and at site (Y/N)			
Lift gear at site (Y/N)		Lift beam at site (Y/N)	
Full maintenance tool kit available from/at			

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF04
BOREHOLE AND OTHER PUMP INSTALLATIONS: SUBMERSIBLE PUMP

ID CODE | S | O | A | | | | | | | | | | | | | | |

Community name		Installation name	
Ownership		Water: main use	
Location: Longitude		Latitude	
Borehole ID numbers			
Pump manufacturer		Pump model	
Pump agent		Nearest branch	
Minimum acceptable internal well diameter (mm)			
No of pumps: Duty		Standby	
Pump ID numbers			
Date installed		Design running hrs/day	
Duty point Q (ℓ/min)		Dif head H (m H_2O)	
Input power P (kW)		Pump efficiency η%	
Operating rpm			
Foot valve type		Suc strainer type	
Motor rating (kW)		Phases and voltage	
Installation drg no		Performance curve no	
Cylinder diam (mm)		Number of stages	
Column diam (mm)		No of columns (x 3 m)	
Column connections			
Pump casing material		Motor shroud material	
Column material		Motor/pump seal mat'l	
Mass of all below ground components empty (kg)			
Mass of all below ground components full of water (kg)			
Comprehensive parts list available from pump agent and at site (Y/N)			
Installation and maintenance manual avail from agent and at site (Y/N)			
Lift gear at site (Y/N)		Lift beam at site (Y/N)	
Full maintenance tool kit available from/at			

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF05
SURFACE MOUNTED PUMP INSTALLATION: MIXED & AXIAL FLOW PUMPS

ID CODE | S | O | A | | | | | | | | | | | | | | |

Community name		Installation name	
Ownership		Water: main use	
Location: Longitude		Latitude	
Water source		Source ID number	
Treated/Untreated		Pump manufacturer	
Pump type		Pump model	
Pump agent		Nearest branch	
No of pumps: Duty		Standby	
Pump ID numbers			
Date installed		Design running hrs/day	
Duty point Q (ℓ/min)		Dif head H (m H_2O)	
Input power P (kW)		Pump efficiency η%	
Operating rpm		Suction strainer type	
Power source		Power transmission	
Installation drg no		Performance curve no	
Delivery diam (mm)		Del flange rating (kPa)	
Impeller diam (mm)		No of stages	
Casing material		Impeller material	
Shaft material			
Mass of pump complete (kg)			
Comprehensive parts list available from pump agent and at site (Y/N)			
Installation and maintenance manual avail from agent and at site (Y/N)			
Lift gear at site (Y/N)		Lift beam at site (Y/N)	
Full maintenance tool kit available from/at			

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF06
WATER SUPPLY CARRIER: PIPELINE

ID CODE | S | O | A | | | | | | | | | | | | | | | |

Community name		Pipeline name	
Ownership			
Pumping or gravity?		Pipeline length (m)	
Start: Longitude		Start: Latitude	
Water source		Source ID number	
Treated/Untreated		Water: main use	
End: Longitude		End: Latitude	
Water delivery point		Del ID number	
Start: Elevation		End: Elevation	
Pipe OD max (mm)		Pipe OD min (mm)	
Pipe ID max (mm)		Pipe ID min (mm)	
Pipeline capacity (ℓ/s)		Max ops press (kPa)	
Pipe material		Pipe standard	
Pipe class max		Pipe class min	
Date laid			
Type of joints		No of outlets	
Pipeline route marker interval (m)			
As built plan drawing number			
As built pipeline design data diagram drawing number			
Drawings produced by		Branch office at	
Drawings available at site (Y/N)			
General care and maintenance manual available at site (Y/N)			
Full maintenance tool kit available from/at			

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF07
WATER SUPPLY CARRIER: CANAL

ID CODE | S | O | A | | | | | | | | | | | | | | |

Community name		Canal name	
Ownership		Canal length (m)	
Start: Longitude		Start: Latitude	
Water source		Source ID number	
Treated/Untreated		Water: main use	
End: Longitude		End: Latitude	
Water delivery point		Del ID number	
Start: Elevation		End: Elevation	
Maximum width (mm)		Minimum width (mm)	
Maximum depth (mm)		Minimum depth (mm)	
Canal capacity (ℓ/s)		Channel avg slope	
Canal shape		Canal lining	
Date constructed		Number of crossings	
Type of joints		Number of outlets	
As built plan drawing number			
As built longitudinal section, with sections. drawing number			
Drawings produced by		Branch office at	
Drawings available at site (Y/N)			
General care and maintenance manual available at site (Y/N)			
Full maintenance tool kit available from/at			

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF08
POWER SUPPLY TO PUMP OR GENERATOR: IC ENGINE

ID CODE | S | O | A | | | | | | | | | | | | | | | |

Community name		Installation name	
Ownership		Driven item of plant	
Location: Longitude		Latitude	
Plant ID numbers			
Engine manufacturer		Engine model	
Engine agent		Nearest branch	
Engine capacity (cc)		Number of cylinders	
No of engines: Duty		Standby	
Engine ID numbers			
Date installed		Design running hrs/day	
Operating rpm		Power @ op rpm (kW)	
Fuel type		Fuel consumpt (ℓ/hr)	
Fuel tank size (ℓ)		Oil sump size (ℓ)	
Cooling type		Starter type	
Air filter type and size		Oil filter type and size	
Fuel filt type and size		Power transmission	
Installation drg no		Performance curve no	
Oil change interval (hr)		Service interval (hr)	
Rpm indic fitted (Y/N)		Run meter fitted (hr)	
Engine fixed/mobile?		Mass of engine (kg)	
Engine installed in well ventilated room (Y/N)			
Comprehensive parts list available from engine agent and at site (Y/N)			
Installation and maintenance manual avail from agent and at site (Y/N)			
Lift gear at site (Y/N)		Lift beam at site (Y/N)	
Full maintenance tool kit available from/at			

WATER SUPPLY & SANITATION DATABASE : EQUIPMENT DATA FORM DF09
POWER SUPPLY: AC ELECTRIC MOTOR

ID CODE | S | O | A | | | | | | | | | | | | | | |

Community name		Installation name	
Ownership		Driven item of plant	
Location: Longitude		Latitude	
Plant ID numbers			
Motor manufacturer		Enclosure type	
Motor agent		Nearest branch	
Power rating (kW)		Operating rpm	
No of motors: Duty		Standby	
Motor ID numbers			
Date installed		Design running hrs/day	
Frame size		Mounting: foot/flange	
Phases and voltage		Full load current (A)	
Installation drg no		Power transmission	
Run meter fitted (hr)		Mass of engine (kg)	
Motor installed in well ventilated room (Y/N)			
Motor parts list available from agent and at site (Y/N)			
Installation and maintenance manual avail from agent and at site (Y/N)			
Lift gear at site (Y/N)		Lift beam at site (Y/N)	
Full maintenance tool kit available from/at			

APPENDIX M

Community Internal Data Gathering
And
Water And Sanitation Facility Management Forms

COMMUNITY WATER SUPPLY AND SANITATION: BULK WATER METER DAILY LOG BOOK: FORM 1F01

Community Name: ..... **Meter Description:** .....

Caretaker Name: ..... **Month:** ..... **Year:** ..... **Meter No:** .....

Day	Date	Time	Meter Reading m^3		Water Delivered m^3	
From end of previous page:						
	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					
	15					
	16					
SUM for 1st half of month:						

Day	Date	Time	Meter Reading m^3		Water Delivered m^3	
From end of previous column						
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					
	30					
	31					
SUM for 2nd half of month:						
SUM for 1st half of month:						
SUM for whole month:						

COMMUNITY WATER SUPPLY AND SANITATION: CASH BOOK: FORM IF02

Community ID: ..... **Community Name:** ..... **Month/Year:** .....

BACKGROUND		CASH IN (+)					CASH OUT (-)					CASH BALANCE		
			Amount		Transfer			Amount		Transfer				
Date	Description	Cat	R	c	R	c	Cat	R	c	R	c	R	c	✓✓
Totals and balance from previous page:		....			.....		....			.....				
Running totals :		....			.....		....			.....		.....		

DONE BY: Signed: ..... NAME: .....**NOTE:** Start month with previous page totals = 0

CHECKED BY: Signed: ..... NAME: ..... This Month: Page ..... of ..... pages

COMMUNITY WATER SUPPLY AND SANITATION: BANK ACCOUNT BOOK: FORM IF03

Community ID: ..... **Community Name:** ..... **Month/Year:** .....

BACKGROUND		INCOME IN (+)					EXPENDITURE OUT (-)						BANK BALANCE		
			Amount		Transfer			Cheque	Amount		Transfer				
Date	Description	Cat	R	c	R	c	Cat	No.	R	c	R	c	R	c	✓✓
Totals and balance from previous page:		------			---------- -		------	----------			----------				
Running totals :		------			---------- -		------	----------			----------		---------- ---		

DONE BY: Signed: ..... NAME: ..... **NOTE:** Start month with previous page totals = 0

CHECKED BY: Signed: ..... NAME: ..... This Month: Page of pages

COMMUNITY WATER SUPPLY AND SANITATION:
SUMMARY MONEY BALANCE BOOK: FORM 1F04

Community Name: .....

Month/Year: .....

CAT	CASH		BANK		SUB TOTAL		TOTALS	
	R	c	R	c	R	c	R	c
STARTING BALANCES								
A					----------			
INCOME								
B								
C								
SUM					----------			
D	TOTAL AVAILABLE							
MONEY SPENT								
I								
J								
K								
L								
M								
N								
O								
P								
Q								
E/R					----------			
F	CALULATED BALANCE							
CURRENT ACTUAL BALANCES								
G					----------			
H	CHECK BALANCES ARE EQUAL?!							

DONE BY: Signed: ..... NAME: .....

CHECKED BY: Signed: ..... NAME: .....

COMMUNITY WATER SUPPLY AND SANITATION: BANK STATEMENT RECONCILIATION BOOK: FORM IF05

Community Name: ..... **Month/Year:** .....

Outstanding Cheques		
No	**R - Amount - c**	
Total:		

Outstanding Income		
Date	**R - Amount - c**	
Total:		

BANK STATEMENT RECONCILIATION		
Description	**Amount**	
	R	**c**
Month end balance ex form IF03		
+ outstanding cheques total		

SUB TOTAL:		
- outstanding income total		

SUB TOTAL:		
*+ reconciling income total		

SUB TOTAL:		
*- reconciling expenditure total		

FINAL AMOUNT:		
BANK AMOUNT:		

AMOUNTS AGREE?!		

NOTE: * Remember these reconciling amounts must be transferred to the current FORM IF03

*Reconciling Income			
Date	**Cat**	**Description**	**R - Amount - c**
	C	Interest received	
		Total:	

*Reconciling Expenditure			
Date	**Cat**	**Description**	**R - Amount - c**
	Q	Interest paid	
	Q	Bank charges	
		Total:	

DONE BY: Signed: ..... NAME: .....

CHECKED BY: Signed: ..... NAME: .....

COMMUNITY WATER SUPPLY AND SANITATION: INDIVIDUAL USER METER READINGS AND PAYMENT RECORD: FORM IF06

Community: .....Consumer: ..... Account Number: .....

Date	Doc No	Reading m^3	Water Used m^3	Invoice	Owing	Payments	Remarks
From previous page:			From previous page:				
Recorded by:	PRINT NAME:			Signature:			Page Number:

COMMUNITY WATER SUPPLY AND SANITATION: INDIVIDUAL USER METER READINGS AND INVOICING RECORD: FORM IF07

Community: _____

Consumer: _____ **Account Number:** _____

Date	Reading m^3		Water Used m^3		Invoice Number	Invoice Amount	
			Meter reading from previous page				
Recorded by	(PRINT NAME):					Page No:	

..... WATER COMMITTEE

TYPE 1: COST RECOVERY BOOK

REG No: .....

RECORD OF PAYMENTS RECEIVED

YEAR: 19.....

AC No	FAMILY'S FULL NAMES MR/MRS FIRST MIDDLE LAST	MNTH CHRG	OWE JAN	PAYMENTS DURING MONTH												YEAR TOTALS
				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
TOTALS FROM PREVIOUS PAGE			A													
			B													
YR TOTAL		A	TOTAL PAYMENTS													
			BTOTAL CHRG LIVE ACS													
			C RECOVERY %													

WORKINGS: DONE BY: Signed: ..... NAME: ..... Date: 19..... / ..... / .....

NOTES:

A / B x 100 = C CHECKED BY: Signed: ..... NAME: ..... Date: 19..... / ..... / .....

OWE JAN this year: Calc from last year's figures: for each family =
(MNTH CHRG) x (no of mnths AC is open) + (OWE JAN) - (YEAR TOTAL)

This Year: Page ..... of ..... Pages

..... WATER COMMITTEE

TYPE II: COST RECOVERY BOOK

REG No: .....

RECORD OF PAYMENTS RECEIVED

YEAR: 19..... MONTH: .....

		A	B	C	D	E	F	G
AC No	FAMILY'S FULL NAMES MR/MRS FIRST MIDDLE LAST	MONEY OWING beginning of month	WATER SALES previous month	SUB-TOTAL	PAYMENTS during month	ADJUSTMENTS + or -	MONEY OWING end of month	AGEING RATIO
TOTALS FROM PREVIOUS PAGE								
PAGE TOTALS F								

COMMUNITY WATER SUPPLY AND SANITATION:
PUMP STATION DAILY LOG BOOK: FORM IF10

Community Name: ....
Pump station Name: ....
Equipment Type: ....
Caretaker Name: ....
Month: .... **Year:** .... **Page:** ......

Day - Date	Time	Meter Reading m^3		Action - Comment

WATER SUPPLY & SANITATION DATABASE : GUIDELINES ON FILLING IN THE HOUSEHOLD BY HOUSEHOLD CENSUS FORM IF11

1 Introduction

The number of households in a village plus the number of people in the village and an approximate economic profile is one of the first things planners want to know before they answer a communities demand for any development of infrastructure in an area. This is true whatever the project: the upgrading of the water supply, a sanitation project, a clinic, etc, etc. So it is very useful for a community to do such a household by household survey to know how many households there are in their village and the composition of the individual households when the government department's or private company 's official comes to do a feasibility study for a project.

It can also be very useful for the village Development Forum or Water Committee itself if they want to introduce cost recovery to look after an existing water supply scheme or collect money to show a Government Department official how interested they are in upgrading their existing water supply scheme.

2 The danger of double counting

When visiting a household first ask the household head or person being interviewed to tell you **the total number of people living in the household** including migrant workers. After that try and make sure the separate entries for pensioners, unemployed work seekers etc add up to that total. This is important because many households wish to enter the same person under two categories which causes double counting. For example they may wish to enter a housewife both as a housewife and as an unemployed person seeking work or as a person in paid employment. In all cases, including cases of older children who have left school, we would prefer people to be entered in the earlier categories provided it truly reflects what the person is actually doing but always allow the householder to make the final choice.

3 Spaces at the top of each page

Place the name of the community in the space provided **on the top of each page** otherwise when you have hundreds of these sheets you will not which sheet belongs to which community.

If the community ID number is known enter it on at least a few of the sheets also. The community ID is a unique number given to each village by the Department of Water Affairs and Forestry. It is made up of 8 characters as follows: a 2 digit number indicating what province the village is in, 4 characters indicating the quaternary water catchment area within which the village falls and three numbers allocated so that there are no "repeats" within the quaternary. If the community does not know its ID maybe you can ask DWAF.

Again the date on which the information is gathered is important so this date should be entered on each sheet.

4 The household head's full names

In section 2 we wrote generally about filling in the numbers on the form. To get the most value out of the information and to be sure you know later exactly which household was visited it is very useful to write down the household head's title, **Mr or Mrs**, and full names, **first middle and last in that order** on the form as requested.

5 Spaces at the bottom of each page

Again it is always useful to have the name of the village member(s) who went around the households, or a group of households in a larger village, asking the questions and writing down the numbers of people living in each household and the names of the household head. **Thus village member(s) doing the survey should sign their name to say they have done the work carefully and then print their name, Mr/Mrs first middle and last,** so that everyone knows who they are.

The page numbers serve two purposes: one they let us know when a page is missing but two they can be useful in knowing in what order the information was collected and thus make it easier to see if a household has been missed out. **Initially each village member going round the households should number his/her own sheets. Then afterwards the village committee/forum official managing the census can check that the whole village has been counted (and only been counted once!) before renumbering all the sheets** in a sensible order and **signing and recording his/her name on the bottom of at least the first few** in the same way as the village member(s) who filled in the forms.

6 Adding the numbers up on each page and carrying forward the totals

If a village wants to know their population straight away then the village member(s) doing the survey or the village committee/forum official checking the forms should add up the numbers on each page and carry forward the totals. If not we will do these sums after the village has handed in their forms.

COMMUNITY WATER SUPPLY AND SANITATION: HOUSEHOLD BY HOUSEHOLD CENSUS: FORM IF11

Community ID: .....Community Name: ..... Date: Day/Mth/Yr: .....

No	Household Head Full Names Mr/Mrs First Middle Last	Pensioners	Unemploy -ed work seekers	People in paid employment	Self employ- ed	Informally employed	Migrant Workers	Housewives not counted elsewhere	Children	Total	Comments
	B/F									0	
1		-	-	-	-	-	-	-	-	0	
2		-	-	-	-	-	-	-	-	0	
3		-	-	-	-	-	-	-	-	0	
4		-	-	-	-	-	-	-	-	0	
5		-	-	-	-	-	-	-	-	0	
6		-	-	-	-	-	-	-	-	0	
7		-	-	-	-	-	-	-	-	0	
8		-	-	-	-	-	-	-	-	0	
9		-	-	-	-	-	-	-	-	0	
0		-	-	-	-	-	-	-	-	0	
1		-	-	-	-	-	-	-	-	0	
2		-	-	-	-	-	-	-	-	0	
3		-	-	-	-	-	-	-	-	0	
4		-	-	-	-	-	-	-	-	0	
5		-	-	-	-	-	-	-	-	0	
6		-	-	-	-	-	-	-	-	0	
7		-	-	-	-	-	-	-	-	0	
	C/F	??	??	??	??	??	??	??	??	??	0 Horizontal check

DONE BY: Signed: ..... NAME: .....

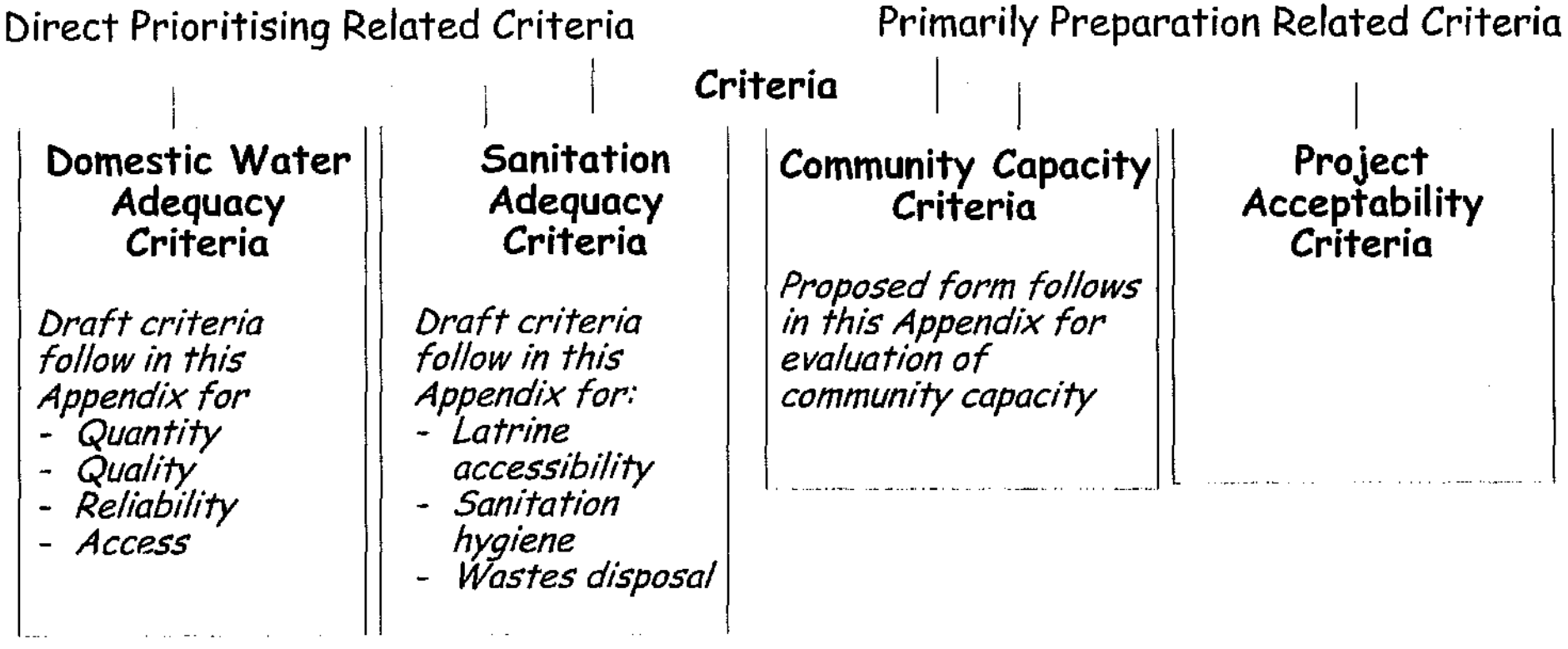
CHECKED BY: Signed: .....NAME: ..... Page of pages

APPENDIX N

Proposed Capital Projects
and
Crisis Relief Work

Prioritising and Participative Decision-Making Framework

Proposed project prioritising and participative decision-making framework



DRAFT DOMESTIC WATER ADEQUACY CRITERIA

WEIGHTING		1.67	1.39	0.83	1.11
ADEQUACY	RANK CODE	QUANTITY	QUALITY	RELIABILITY	ACCESSIBILITY
Critical under provision	20	<10 ℓ/cap.day	Any microbial parameter > 2x max allowable limits or > 4 parameters >2 x max allowable limits or any parameter >4x max allowable limits	Occasional outages of more than 1 month long	>800 m or > 100 m descent
Severe under provision	15	10 to 15 ℓ/cap.day	All microbial parameters ≤ 2x max allowable limits and max 4 parameters >2 x max allowable limits and all parameters ≤ 4x max allowable limits	Occasional outages of more than 2 weeks long	max 800 m & max 100 m descent
Poor provision	10	15 to 20 ℓ/cap.day	All microbial parameters ≤ max allowable limits and all parameters within max of 2 x max allowable limits	Occasional outages of more than 3 days long or more than 12 outages per year	max 400 m & max 65 m descent
Acceptable provision	5	20 to 30 ℓ/cap.day	All microbial parameters within max allowable limits	Fewer than 12 outages per yr	max 200 m & max 40m descent
Improved provision	3	30 to 50 ℓ/cap.day	All parameters within max allowable limits	Fewer than 6 outages per yr	10% yard taps & max 150 m
Desirable provision	2	50 to 80 ℓ/cap.day	All parameters within max allowable limits and max 2 parameters outside desirable limits	Fewer than 2 outages per yr	50% yard or house taps & max 100 m
High level provision	1	>80 ℓ/cap.day	All parameters within desirable limits	Basically always available	90% yard or house taps & max 100 m

DRAFT SANITATION AND HYGIENE ADEQUACY CRITERIA

WEIGHTING		1.85	1.85	1.3
ADEQUACY	RANK CODE	LATRINE ACCESSIBILITY	SANITATION HYGIENE	WASTES DISPOSAL
Critical under provision	20	More than 10 households per latrine	> 25% latrines not cared for or excreta visible close to homes	>25% of households store uncovered non-sanitary wastes <50m from homes or in an unhygienic manner
Severe under provision	15	Up to 10 households per latrine	>25% latrines inadequate (no pedestal seal or vent pipe.. Structure inappropriate)	>10% of households store uncovered non-sanitary wastes < 50 m from homes or in an unhygienic manner
Poor provision	10	Up to 2 households per latrine	>50% latrines without any provision for hands washing	Sanitary wastes disposed of in deep pits or sealed digesters by no provision for desludging. Other wastes disposed of in covered shallow pits
Acceptable provision	5	At least 75% of households have a latrine	<50% latrines without provision for hands washing	Sanitary wastes disposed of in deep or sealed pits or digesters, as site conditions require, with provision for desludging at regular intervals. Other wastes disposed of in deep pits.
Desirable provision	2	Every household has a latrine	All latrines have adequate provision for hands washing	All non-biodegradable solid wastes removed from homes regularly. All polluting liquid wastes removed from site by sewers.