

**WATER RESEARCH COMMISSION  
SANITATION RESEARCH STRATEGY**



**DECEMBER 2003**



## FOREWORD

*It gives me great pleasure to present to the sector the WRC research strategy which aims at supporting the provision of sanitation and hygiene education in South Africa. Access to water, the provision of sanitation and hygiene education are issues which are currently of high priority for our Government. The tasks of supplying water to every citizen by 2007 and the provision of sanitation for all by 2010 are extremely challenging. Meeting these ambitious and challenging tasks can be to a great extent facilitated by adopting innovative approaches and appropriate applicable solutions. The research strategy presented in this document aims to provide a supportive basis for achieving the above-mentioned challenging tasks in a successful and sustainable manner.*

*The research strategy focuses on the provision of basic sanitation and hygiene education, with an emphasis on the challenges facing our rural areas where issues are of critical importance due to the lack of resources and capacity. While the WRC recognizes the needs of the urban informal and peri-urban areas, these needs will be addressed under a separate research programme.*

*The strategy presented in this document is the culmination of a thorough consultative process. This included the identification of needs via a questionnaire survey addressing sanitation professionals in the sector, and two workshops attended by national stakeholders and local or regional representatives of Water Services Authorities and Service Providers. These processes have provided a wealth of information and knowledge, and have identified key issues requiring investigation.*

*Based on the outcomes of the above processes, the sanitation research strategy is attempting to address the key issues requiring research. The implementation of the research strategy will be done via a new dedicated research thrust which will address sanitation and hygiene education issues. The strategy will guide the topics and areas that the WRC aims to fund over the next few years through both solicited and non-solicited projects. It is envisaged that the sanitation research strategy forms a key step towards the provision of innovative and applicable solutions and knowledge which, in turn, allow the sector towards to achieve its challenging goal of sanitation provision for all.*

*The WRC aims to manage this strategic approach to sanitation research in a dynamic and inclusive manner and will welcome any ideas and constructive criticism which would enrich the strategy and allow the WRC to further update and upgrade the current strategy.*

*We wish to thank the sector for the committed and dedicated support that made this strategy possible and we hope that the knowledge created through the implementation of this strategy will improve the lives of many of our fellow South Africans.*



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# 1. INTRODUCTION

## 1.1 Background

The Water Research Commission in line with its mission and vision of becoming a global leader in providing innovative solutions to water and sanitation problems, intends to focus on sanitation research that can contribute long-term solutions to sustainable delivery of sanitation services at national and global levels. In the past, most of the research done focused mainly on providing tools for supporting the implementation of national water supply and sanitation policies. However, national policy and strategy operate within a very dynamic environment, thus resulting in a short lifespan for research outputs. Therefore, there is a need to develop a sanitation research strategy that addresses strategic sanitation issues that are not necessarily dependent on the national policy framework but have a broader perspective. This will enable the WRC to contribute to long-term knowledge building within the national and global sanitation arena.

Sanitation, safe water, hygiene promotion and awareness are vital for the improvement of health, poverty eradication and protection of the environment. During the World Summit for Sustainable Development held in Johannesburg in 2002, world leaders made a commitment to reduce the number of people without access to basic sanitation and hygiene services to 50% by 2015 and to ensure that all people have access to these services by 2025. The South African government has made its own target of clearing the national sanitation backlog by 2010.

In order to achieve the global and national sanitation targets, there is a need to invest in research capacity that can challenge conventional approaches that have failed to reduce the sanitation backlog. New approaches are required to accelerate sanitation service delivery. Currently, the South African government is making large capital investments in basic household sanitation infrastructure, however, there is lack of long term planning for operation and maintenance of these basic sanitation facilities. There is a need for research and information that will assist municipalities to integrate basic household sanitation services into their broader water service delivery package.

## 1.2 Purpose

This five-year sanitation strategic plan for research and knowledge management aims to provide the Water Research Commission and its sector partners with a strategic framework for sanitation research that will contribute to the sustainable delivery of sanitation services to all South Africans living in urban, peri-urban and rural areas. It also addresses research required to improve coordination and dissemination of information and advocacy within the sanitation sector.

## 1.3 Scope of the Research Strategy

This strategy addresses the research required to assist the national government to achieve its goal of clearing the sanitation service backlog by 2010. It also identifies research that is essential to support planning for basic sanitation service delivery beyond 2010. The focus is on low cost and affordable sanitation technologies. The strategy does not address solid waste management. The strategy development process was guided by the following national sanitation sector goals:

### ❖ ***Access to sanitation for all (eradication of the sanitation backlog)***

The National Government has set a target of clearing the sanitation backlog by 2010; currently approximately 16.7 million people lack access to adequate sanitation services. However, accelerated delivery of services is hindered by a range of factors, such as lack of capacity and skills at the local government level and a low priority is given to sanitation by rural communities. South Africa has a very good policy framework for sanitation delivery; the problem lies in interpretation and implementation of

this policy by different sector players. Research is required to ensure a common understanding and implementation approach by all role-players.

#### ❖ **Improved Health**

The overall goal of providing sanitation services is to improve health and quality of life for all. There is a need to ensure that sanitation projects include health and hygiene because toilets alone without an effective health and hygiene education and awareness programme have no impact on the improvement of health. There is also a need to develop health indicators that can be used to monitor and evaluate the improvement in health.

#### ❖ **Sustainability of sanitation services**

The national sanitation policy is based on the principles of sustainability; i.e. the guiding policy principles are in line with the internationally accepted requirements for ensuring sustainable sanitation services. Sustainability means that the sanitation services and infrastructure continue to operate and meet the needs of the users over the planned life span. Sustainability has an environmental, institutional, financial, technical and social dimension. In order to achieve sustainability, the sanitation services provided should be based on true demand and users must show an appreciation of the value of the services.

##### ➤ *Environmental sustainability*

Provision of sanitation services should take into consideration protection of the environment against adverse impacts such as groundwater pollution emanating from seepage from pit latrines.

##### ➤ *Institutional and management aspects*

Sustainable sanitation service delivery requires an establishment of an institutional framework that supports the delivery of services.

##### ➤ *Technical sustainability*

For sanitation technology to be sustainable, it must be affordable and acceptable to the end users. Users must understand the technology and must have the capacity to operate and maintain their facilities with limited assistance from external agents, especially in remote rural communities.

##### ➤ *Financial sustainability*

This addresses two aspects, namely, capital investments in infrastructure for households without access to basic sanitation services and financial requirements for ongoing operation and maintenance including future infrastructure replacement costs.

##### ➤ *Social development aspects*

Access to adequate sanitation provides personal benefits to households in the form of improvement in health, privacy, convenience, safety and dignity. Sanitation also contributes to poverty alleviation by improving health of children and saving women's time so that they can participate in economic activities

## 2. METHODOLOGY

A multi-pronged approach was used to develop the strategy, namely, a national workshop of key stakeholders was convened to identify key strategic research themes necessary to ensure that the national sanitation sector goals can be achieved in a sustainable manner; a provincial workshop with provincial stakeholders was held to enable these stakeholders to identify specific research needs at the provincial and municipality levels; and finally, an electronic questionnaire was used to get more inputs from practitioners and other stakeholders who could not be part of the two workshops.

During the national workshop, key stakeholders such as DWAF, The Mvula Trust, European Union and DFID set the scene for the strategy development processes by presenting their views on strategic sanitation research needed to accelerate the delivery of sanitation services to all by 2010. This was followed by a brainstorming session to identify more research needs. The research issues identified by the participants were consolidated into research themes and research topics.

The provincial workshop brought together representatives from provincial and municipality levels. The focus of the workshop was the identification of research needed to support those responsible for implementing sanitation projects at local level. Provincial representatives presented their views on research gaps that must be addressed in order to support them in meeting the national goal of access to sanitation for all by 2010. The issues identified by the national workshop were used as a basis for further development of the strategy.

The research themes identified are based on the views of National Sanitation Task Team members, Provincial Sanitation Task Team members, National Sanitation Sector Training Forum, Development Bank of Southern Africa, water boards, NGOs, municipalities, donor agencies and sanitation specialists. The strategy development processes also drew from international experience. The research issues identified by the workshop participants and the electronic survey questionnaire were consolidated into the research themes and topics listed in Appendix A

From these processes and interactions, the following priority programmes have been identified:

- Knowledge/information management and advocacy;
- Institutional and management aspects of sanitation service delivery;
- Health and Hygiene improvement
- Technical sustainability of sanitation services
- Financial sustainability
- Social development aspects
- Institutional sanitation service provision ( schools, clinics, shops, etc)

### **3. RESEARCH PROGRAMMES**

The list of research topics identified by the sanitation sector stakeholders have been consolidated into the following strategic research programmes. The research topics under each programme are divided into two categories, namely, short term (high priority research that must be funded within 1 to 2 years and medium to long term research which must be undertaken within 3 to 5 years).

#### **3.1. Programme 1: Knowledge/information management and advocacy**

A review of national and international literature shows that a lot of research has been done to address the major issues that are responsible for the poor progress in the eradication of sanitation backlog. Effective dissemination of available knowledge and information remains a major challenge for the sanitation sector. There is also a need for strong advocacy for adoption of best practice by those responsible for planning and implementing sanitation projects. Therefore, there is an urgent need for the development of effective strategies for improving access to relevant sanitation literature for those responsible for policy making and implementing projects on the ground. Promotion and adoption of best practice requires a strong well targeted advocacy campaign.

### *Objective*

The overall aim of research under this programme is to improve dissemination of sanitation research information and to develop effective mechanisms for promoting implementation of best practice by the sector role-players.

### *Outputs/Deliverables*

- User-friendly research outputs suitable for the different target groups, i.e. from decision makers to community based organizations.
- Knowledge management strategy
- Tools for advocating for best practice
- Models for the establishment of sanitation resource centres

The following important research topics must be addressed to meet the objectives of this programme

### **Short term**

- Development of a sanitation knowledge/ information dissemination strategy including appropriate distribution channels, for example, the concept of sanitation resource centres.
- Preparation of sanitation best practice guidelines
- Development of strategy for promoting application of research, this research should address the whole process from research topic identification to dissemination, advocacy, and the integration of new knowledge into human resource development initiatives within the sanitation sector.

### **Medium to long term**

- Documentation of indigenous knowledge that is applicable to sanitation and hygiene promotion

## **3.2. Programme 2: Institutional and management aspects of sanitation service delivery**

Delivery of sustainable sanitation services requires cooperation between several national, provincial government departments and municipalities. The national sanitation policy sets a framework to be followed by all sector partners; however, turning the policy into practice remains a challenge for municipalities that have a constitutional responsibility for ensuring that all South Africans have access to services. Most of the constraints to accelerated delivery of service are due to capacity problems at provincial and municipality levels. Appropriate management models are required to ensure that sanitation service delivery is sustained beyond the implementation of infrastructure projects. Institutional sustainability depends on good relationship between Water Service Authorities, private sector partners and civil society. Research is necessary to investigate the suitability of the current institutional arrangements for sanitation delivery. Integrated approach to the planning of services is another major problem and the concept of cooperative governance is not being effectively implemented by the sector partners. There is a need to evaluate the national sanitation programme at regular intervals to capture the lessons and experiences of successes and failures. This information is necessary to ensure that policy makers, decision makers and implementing agents can make the necessary changes to ensure sustainable services.

### *Objective*

The main objective of this research programme is to develop institutional models, tools and guidelines that will support the improvement of delivery of sanitation services and to review the progress in the delivery of sanitation services on a regular basis.

### *Outputs/Deliverables*

- Guidelines for the implementation of the national sanitation policy and evaluation of the impacts of the sanitation policy;
- Sanitation service delivery models;
- Models for Public/Private /Community Partnership;
- Guidelines for integrated development planning;
- Sanitation sector M&E system and sector KPIs;
- Models for sector regulation at national, provincial and municipality levels
- Capacity building models for local government institutions
- Guidelines for integrating environmental health management, sanitation and hygiene promotion at district level
- Assessment of the sustainability of the national sanitation programme.

*Research issues to be addressed under this programme include the following:*

#### **Short term**

- Development of guidelines for the implementation of the national sanitation policy and protocols for evaluating policy;
- Models for supporting municipalities to improve their planning and ability to deliver sustainable sanitation services, i.e. how they can integrate IDP/WSDP/BP processes;
- Determination of institutional and management capacity required to achieve the 2010 target for access to sanitation for all;
- Development of sanitation sector M&E system including the testing of appropriate sector key performance indicators;
- Evaluation of the national sanitation programme;
- Development of detailed guidelines for integrating environmental health management, sanitation and hygiene promotion at district level; focus should be on funding flow and clear definition of roles and responsibilities.

#### **Medium to long term**

- Assessment of the impact of the sanitation policy on health, economy, environment, and social development;
- Development of models for sector regulation within the context of the Water Services Act including sanitation model by-laws for municipalities;

### **3.3. Programme 3: Health and Hygiene Improvement**

This programme addresses health and hygiene issues that are central to the achievement of the national sanitation goal of improved health and quality of life for all. It is now widely accepted that water and sanitation infrastructure cannot lead to meaningful improvement of health and hygiene without an effective health and hygiene promotion and education programme.

#### *Objective*

The main objective of this programme is to support integration of health and hygiene into the delivery of water and sanitation in order to ensure that these services lead to maximum health benefits for the beneficiary communities.

#### *Outputs/Deliverables*



- Assessment of the linkage between lack of sanitation, cholera infection and HIV/AIDS
- Better understanding of the mode for the spread of cholera and recurrence of cholera outbreaks;
- Indicators for measuring impacts of sanitation and hygiene on health;
- Models for public/private partnerships in the promotion of health and hygiene awareness;
- Integration of cultural and traditional practices into health and hygiene education;
- Models for community based health and hygiene education and promotion.

The following research topics will be addressed under this programme:

### **Short Term**

- Investigation of the linkage between poor sanitation and HIV/AIDS and possible linkage between the high incidence of cholera outbreaks and prevalence of HIV/AIDS infection;
- Exploration of modes for the spread of cholera in South Africa and recurrence of cholera outbreaks;
- Development of indicators for measuring health improvement and assessment of the use of proxy indicators; this should include evaluation of the impact of health and hygiene in the creation of a demand for sanitation;

### **Medium to long term**

- Assessment of the impact of sanitation services, health and hygiene education at a household level (disaggregated research , i.e. not national statistics)
- Development of models of community based approaches for long term health and hygiene education promotion;
- Exploration of models for using public/private sector partnerships in the promotion of health and hygiene awareness, especially the hand-washing campaign of WASH;
- Integration of cultural and traditional practice into health and hygiene education programmes

## **3.4. Programme 4: Technical sustainability of sanitation services**

This programme addresses research that is necessary to ensure technical sustainability of sanitation services. A range of sanitation technology options must be explored and adapted to be more appropriate so that they meet the needs of users and are amenable to affordable operation and maintenance by the users. It also investigates environmental issues that must be taken into consideration to ensure that sanitation service delivery does not compromise environmental integrity.

### *Objective*

To develop tools, procedures and guidelines that will guide those responsible for implementing projects in their selection of appropriate sanitation technologies that are social, environmental and financial sustainable.

### *Outputs/Deliverables*

- Standards for appropriate sanitation technology options for different types of settlements
- Tools for assessing the quality of toilets constructed, with special reference to the superstructure;
- Guidelines for greywater management in settlements with on-site dry sanitation systems
- Models for re-use and recycling of greywater
- Guidelines for sludge management, i.e. cost-effective disposal and treatment of pit sludge in peri-urban and rural areas;

- Design specs for hand-washing facilities and geotechnical specs for practitioners;
- Guidelines/tools for assisting households to monitor the safety of their toilets, e.g. danger signs for slope failure;
- Alternatives for increasing the lifespan of pit latrines;
- Evaluation of environmental sustainability of the different sanitation technologies for addressing the sanitation backlog.

The following research topics will be addressed under this programme:

### **Short term**

- Standardization of appropriate sanitation technology options/solutions for different settlement types, especially, dense informal settlements;
- Greywater management options for dense settlements with on-site dry sanitation systems and development of models for recycling and re-use of greywater;
- Development of effective tools for monitoring and control of quality of toilets;
- Evaluation of the use of pit additives to increase the lifespan of ventilated improved pit toilets;
- Evaluation of low flush sanitation technologies and wider promotion of urine diversion sanitation systems;
- Investigate the degree of use of the groundwater protocol by project implementing agents in sanitation delivery;
- Development of geotechnical specs for practitioners;
- Design specs for hand-washing facilities for different settlement types;
- Guidelines/tools for assisting households to monitor the safety of their toilets and identify danger signs of slope failure;
- Analysis of Environmental Impact Assessment (EIA) reports for sanitation projects to determine the degree of compliance with the National Environmental Management Act;
- Analysis of EIA reports for RDP housing development projects with waterborne sanitation to assess whether environmental and financial sustainability issues were addressed;
- Evaluate long term impacts of on-site sanitation on the environment;
- Explore technology options for re-usable toilet superstructure that can reduce the cost of building a new toilet when the pit is full.

### **Medium to long term**

- Development of viable sanitation service level up-grading scenarios, based on affordability to consumers, focusing on bucket eradication;
- Sludge management: Cost effective disposal and treatment of pit sludge in peri-urban and rural areas, including exploration of low tech desludging options;
- Treatment of pit contents and dangers associated with seepage;
- Design specs for toilet superstructures which incorporate a private washing area; this include assessment of social acceptance of communal facilities;
- Exploration of lessons learned from the implementation of intermediate levels of sanitation service with special reference to condominial system and urine diversion systems;
- Investigate technology options for building on-site dry toilets that will last for 20-30 years instead of 5-10 years, for example, options for movable top superstructure;
- Investigate options for community based waste management
- Investigation of technologies and philosophies for delaying the sludge build-up in pit latrines

### **3.5. Programme 5: Financial sustainability**

This programme addresses capital investments in infrastructure for households without access to basic sanitation services and financial requirements for ongoing operation and maintenance including

future infrastructure replacement costs. In order to achieve operational sustainability, the service providers must assess the demand and listen to the views of communities. This will ensure that the level of sanitation service provided can be sustained by the users.

### *Objective*

The main objective of research under this programme is to develop models, tools and guidelines that will enable managers to provide financially viable sanitation technology solutions for communities and to make provision for both capital investments and operation and maintenance costs for the different sanitation technology choices.

### *Outputs/Deliverables*

- Real cost of the sanitation subsidy;
- Models for subsidy allocation and best practice case studies;
- Assessment of the impact of sanitation subsidy and its effectiveness
- Credit finance options for household sanitation improvement programmes
- Financial models for free basic sanitation and operation and maintenance of on-site sanitation services focusing on technology choice, funding arrangements, institutional requirements and household contributions);
- Ways of including and management of waterborne sanitation within the FBS policy and impacts on the water and sanitation sector and also determination of financial costs, technical requirements and O&M issues;
- Cost benefit analysis of investing in sanitation infrastructure for all
- Methods of apportioning equitable share for prioritizing water and sanitation;
- Innovative ways for using the equitable share to ensure access to services for the poor;
- Best practice for allocating sanitation subsidy to local levels.

The following research topics will be addressed under this programme:

### ***Short term***

- Financial models for free basic sanitation service provision and operation and maintenance costs of on-site sanitation services focusing on technology choice, funding arrangements, institutional requirements and household contribution;
- Development of an overall costed strategy for meeting the 2010 target of eradication of the sanitation backlog;
- Analysis of financial resources available to municipalities and their ability to comply with the legislative requirements;
- Assessment of the real cost of sanitation subsidy
- Assessment of the impacts of sanitation subsidy and its effectiveness;
- Investigation of ways for including and managing waterborne sanitation within the Free Basic Sanitation policy and its impact in the sector;
- Investigation of innovative ways for using the equitable share to reach the poor and also methods for allocating sanitation subsidy at local level ( urban vs. rural or metro vs. district municipality);
- Investigation of different models for subsidy allocation and best practice case studies;
- Exploration of credit finance options for household sanitation improvement programmes.

### ***Medium to long term***

- Development of revenue streams for different levels of sanitation service provision. Some municipalities are exploring higher levels of service in the belief that this will generate revenue

to offset the cost of service provision, for example septic tanks with a fee payable for desludging. Real costs of providing such a level of service must be assessed.

- Cost benefit analysis of investing in sanitation infrastructure for all;
- Detailed costing of comparative cost of localized waste treatment package plants versus linkage to conventional reticulated systems.

### **3. 6. Programme 6: Social development aspects**

This programme addresses research needed to ensure that the social development objectives are achieved. The focus is on empowerment of men and women at the project level through job creation and skills development. Sanitation projects should also contribute to the improvement in local economic development and poverty eradication.

#### **Objective**

To support people centred development approaches, i.e people's needs should be at the centre of sanitation and hygiene promotion programmes. Sanitation infrastructure must be accepted and owned by households and local people must acknowledge the need for hygienic practice and positive impacts to their health and quality of life.

#### **Outputs/Deliverables**

- Methodology for promoting active participation of women and men in technology choice, O&M and management of sanitation services;
- Contribution of sanitation projects to development of SMMEs,
- Improvement in rural livelihoods and poverty eradication;
- Best practice case studies for advocacy and marketing of sanitation
- Gender mainstreaming in the sanitation sector

The following research topics will be addressed under this programme:

#### ***Short term***

- Exploration of methods for promoting active participation of women and men in the selection of sanitation technology, O&M and management of sanitation services;
- Development of a model for community prioritization of projects using the sustainable livelihood approach. This approach recognizes that while communities have needs they also have resources or assets and this provides a positive framework for defining achievable outcomes;
- Assessment of the contribution of sanitation projects to the development of SMMEs, improvement in rural livelihoods and poverty eradication;
- Investigation of the interaction between household and community management of sanitation facilities and sustainability;
- Best practice case studies of advocacy and marketing of sanitation.

#### ***Medium to long term***

- Development of clear strategies and guidelines for advocacy and marketing of sanitation services;
- Integration of local cultural and social context in gender mainstreaming within the sanitation project planning and implementation;
- Assessment of the impact of sanitation services, health and hygiene education programmes on the health and quality of life for people living with HIV/AIDS;

- Assessment of the feasibility of integrating sanitation delivery with income generation, for example, desludging of pits and septic tanks or use of urine from UDS as a fertilizer for crops;
- Identification of entrepreneurial development support and skills required by entrepreneurs within the sanitation sector;
- Development of a framework for linking sanitation delivery programmes with broader small business training initiatives.

### **3.7. Programme 7: Sanitation service provision for institutions (schools, clinics, shops, etc)**

This programme deals with research needed to ensure efficient delivery of sanitation services to public institutions such as schools, clinics, shops etc. The focus is on operation and maintenance , institutional responsibilities and regulatory framework. It also addresses the integration of sanitation, health and hygiene into the school curriculum.

#### **Objective**

The main objective of research under this programme is to provide tools/guidelines and regulatory framework for ensuring that public institutions provide adequate sanitation services that are not detrimental to the health and dignity of the users.

#### **Outputs/Deliverables**

- Models for management, operation and maintenance of institutional sanitation facilities;
- Integration of sanitation, health and hygiene into the school curriculum;
- Regulatory framework for institutional sanitation;
- Schools as a focus for long term sustainable sanitation service delivery.

The following research topics will be addressed under this programme:

#### ***Short term***

- Exploration of models for management, operation and maintenance of institutional sanitation facilities with special reference to schools;
- Best practice guidelines for integration of sanitation, health and hygiene into the school curriculum.

#### ***Medium to long term***

- Development of guidelines for a regulatory framework for school sanitation
- Investigation of innovative approaches for using schools as a focus for long term sustainable sanitation service delivery

## **4. CONCLUSION**

This strategy document reflects the research needs that have been identified by a wide range of stakeholders representing national and provincial government departments that are responsible for sanitation service delivery, municipalities, waterboards, NGOs, Development Bank of Southern Africa, donor agencies and sanitation professionals. The strategy focuses on research that is required in order to support the achievement of the goal of eradication of sanitation backlog by 2010.

## 5. APPENDICES

### APPENDIX A: Report on research themes and topics identified by the stakeholders

The research themes identified are based on the views of National Sanitation Task Team members, Provincial Sanitation Task Team members, National Sanitation Sector Training Forum, Development Bank of Southern Africa, water boards, NGOs, municipalities, donor agencies and sanitation specialists. The research issues identified by the workshop participants and the electronic survey questionnaire have been consolidated into the research themes and topics listed in the following section.

#### 1. Knowledge/information dissemination strategy and advocacy

- Development of a knowledge/ information dissemination strategy
- Promotion of the implementation of sanitation best practice
- Investigation of the concept of sanitation resource centres
- Development of procedures for lesson learning and assessment of the impact of this process
- Capturing of indigenous knowledge
- Advocacy for best practice
- Development of mechanisms for getting research into application- this research should address the whole process from research topic identification to dissemination, advocacy, and how this should be integrated into human resource development initiatives

#### 2. Sustainability

##### *Environmental sustainability*

The following research gaps must be addressed:

- Analysis of Environment Impact Assessment reports to determine their compliance to the National Environmental Legislation
- Analysis of all RDP housing development projects with waterborne sanitation to assess whether EIA studies were undertaken before the projects were implemented; this should address both environmental and financial sustainability of these projects
- Evaluate adherence to the ground water protocol
- Geotechnical issues- development of specs for practitioners
- Evaluation of long term impacts of on-site sanitation on the environment

##### *Financial sustainability*

The following research needs were identified under this category:

- Analysis of financial resources of municipalities and their ability to comply with the legislative requirements
- Detailed costing of comparative cost of localized waste treatment package plants versus linkage to conventional reticulated systems
- Determination of revenue streams for different levels of sanitation provision. For example, some municipalities are exploring higher levels of service in the belief that this will generate revenue to offset the cost of service provision, particularly where

they accept that a sanitation service must include the cost of hygiene and sanitation promotion beyond the time frame of a sanitation infrastructure project. Some municipalities are exploring septic tanks with a fee payable for desludging with limited understanding of the real costs of providing this level of service.

- Assessment of the real costs of the sanitation subsidy;
- Different models for subsidy allocation, processes and best practice case studies
- Credit finance options for self-help household sanitation improvement programmes
- Cost benefit analysis of investing in sanitation (value for money, are we spending public money wisely?)

### *Technical sustainability*

The following research gaps must be addressed in order to ensure technical sustainability of sanitation projects:

- Standardization of appropriate sanitation technology options/solutions;
- Appropriate sanitation technology options for dense settlements;
- Improvement of the quality control for toilet construction;
- Development of viable up-grading scenarios, based on affordability to consumers, especially in terms of the bucket eradication programme;
- Greywater management in dense settlements where waterborne sewage and on-site disposal are not feasible;
- Models for recycling and re-use of greywater;
- Sludge management: cost-effective disposal and treatment of pit sludge in peri-urban and rural areas;
- Integration of social and technical aspects of sanitation service delivery;
- Treatment of pit contents and dangers associated with seepage;
- Evaluation of the use of pit additives;
- Low flush sanitation technologies and wider promotion of urine diversion systems
- Design and impact on sustainability
- Investigate the degree of the use of the groundwater protocol by project implementing agents in sanitation delivery;
- Design specs for hand-washing facilities for different settlement types;
- Design specs for toilet superstructures which incorporate a private washing area
- Exploration of low tech desludging options;
- Exploration of lessons learned in implementing intermediate levels of sanitation service. How are condominal systems managed? How are UDS systems managing the removal of desiccated waste;
- Building of on-site dry toilets that will last for 20-30 years instead of 5-10 years, options for movable top structures;
- Assess the feasibility of integrating on-site sanitation options, e.g. urine diversion with income generation activities;
- Development of methods for community based waste management

### **3. Social development aspects**

The following issues must be addressed to ensure social sustainability:

- Promotion and facilitation of active participation of women and men in decision making on technology choice, location of toilets, O&M requirements and management processes;
- Special measures must be put in place to ensure that poor and other disadvantaged groups are not excluded from benefiting from sanitation projects;

- Taking culture and context into consideration and incorporation of community priorities and preferences in the sanitation project planning process;
- Health and hygiene education and awareness programmes should focus on women, men and children in order to promote use and proper maintenance of the sanitation facilities.
  - Contribution of sanitation project implementation to the development of SMMEs
  - Sanitation and rural livelihoods/poverty eradication
  - Gender issues- women's involvement in H&H and decision making
  - Opportunities for SMME involvement in desludging of pits and septic tanks;
  - Identification of entrepreneurial development support and skills required by entrepreneurs within the sanitation sector;
  - Develop mechanisms for linking sanitation programmes with broader small business training.
  - Advocating for change versus marketing: are they mutual exclusive?
  - Development of clear strategies and guidelines for advocacy and marketing;
  - Best practice case studies of advocacy and marketing for sanitation services

#### **4. Health/Hygiene improvement**

- Investigation of the linkage between lack of sanitation and HIV/AIDS;
- Linkage between cholera and HIV/AIDS ;
- Investigation of the spread of cholera;
- Evaluate the impact of health and hygiene education in the creation of a demand for sanitation;
- Assess the user friendliness, efficiency, effectiveness and degree of usage of the existing sanitation M&E systems;
- Investigate the ease of integration of DWAF M&E system into local government systems, i.e. integration of all components of sanitation into the DWAF M&E system;
- Development of indicators for measuring health improvement and assessment of the use of proxy indicators;
- Models for implementing community based approaches to long term Health and Hygiene Education promotion;
- Improvement of the quality of H&H education;
- Exploration of models and ways of using public/private sector partnership in the promotion of health and hygiene awareness;
- Integration of cultural and traditional practices into health and hygiene education
- Comparison of the actual institutional arrangements for health and awareness education in sanitation projects in relation to the roles and responsibilities as stipulated in DWAF and Department Health guidelines.

#### **5. Institutional and management issues**

- Guidelines for the implementation of the national sanitation policy;
- Sanitation policy and strategy- Evaluation of the implementation of policy (what are we trying to achieve? Toilet building or health improvement?)
- Partnership models: investigate the incentives for promoting partnerships (including community partnerships);
- Investigation of different service delivery models for sanitation including community management model;



- Development of support models for the consolidated capacity building grant for local government;
- Risk management for ensuring quality of toilets constructed;
- Integration of basic sanitation services into the municipal package of services;
- Assessment of institutional support models that have worked in other developing countries for application to South Africa;
- Investigate the effectiveness of WSDPs as a planning tool and how it can be improved to serve as an effective planning and monitoring tool;
- Models to support the municipalities to improve their planning and ability to deliver sustainable sanitation services, for example, how they can integrate IDP/WSDP/BP process;
- Clear definition of roles and responsibilities for all key stakeholders including NGO's;
- Assessment of the effectiveness of the institutional arrangements for sanitation service delivery;
- Long term planning for basic sanitation service provision beyond the 2010 and impacts of free basic sanitation;
- Determination of institutional and management capacity required to achieve the 2010 target
- Establishing the real long term costs of the sanitation policy on the water services sector institutions;
- Assessment of the impact of the sanitation policy on the environment;
- Development of protocols and procedures for evaluating policy;
- National Sanitation Sector Regulation: Development of models for sector regulation within the context of the Water Services Act;
- Improvement of sanitation model bye-laws for municipalities (rural and urban);
- Development of sanitation sector based M&E system (Backwards and forward looking monitoring);
- Identification and testing sanitation key performance indicators (KPIs).
- Sanitation policy lessons and experience from Africa and their relevance to South Africa;
- Development of innovative municipal procurement policies;
- What is really needed to manage and support the sanitation supply chain? Comparative costing of different supply options and considerations of trade offs;
- Integration of water and sanitation services into IDPs, generic guidelines for supporting this process based on Gauteng and Durban strategies';
- Development of detailed guidelines for integrating environmental health management, sanitation and hygiene promotion at district level; the guidelines should address the following:
  - i) funding flow (transfers from Provincial Health, given that environmental health is not a revenue-generating service for municipalities;
  - ii) clear definition of roles and responsibilities between municipalities and province; responsibilities between districts and LMs and between WSAs and WSPs;
- Evaluate the effectiveness and efficiency of current model of sanitation service management in accordance with Water Services Act and the Municipal Structures Act

## **6. Institutional sanitation service provision (schools, clinics, shops, etc)**

- Models for ownership, management and operation and maintenance of institutional sanitation services;
- Integration of sanitation, health and hygiene into the school curriculum;
- Roles and responsibilities for institutional sanitation (research???)
- Regulatory framework for institutional sanitation;
- School sanitation as a focus for long term sustainable sanitation service delivery

## APPENDIX B: LISTS OF PARTICIPANTS

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