Evaluation of Sanitation Upgrading Programmes – The Case of the Bucket Eradication Programme

Report to the
Water Research Commission

by

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The following unpublished BEP case study reports which complement this report are available from Mr Jay Bhagwanat the Water Research Commission on request (jayb@wrc.org.za):

- Mangaung Municipality – BEP case study
- Sol Plaatje Municipality – BEP case study
- City of Matlosana – BEP case study
- Makana Municipality – BEP case study

The following publication complements this report:

- Tokologo Municipality Case study: Pilot implementation of the closed circuit wastewater sanitation system, WinSA Lesson Series May 2011, www.win-sa.org.za

EXECUTIVE SUMMARY

BACKGROUND

The majority of municipalities used the conventional waterborne sanitation system to replace buckets in urban formal settlements. This presented a challenge for municipalities servicing areas without bulk sewers and inadequate wastewater treatment capacity and in some cases the available water supply could not support the new waterborne sanitation systems. The bucket sanitation system was considered to be unhygienic and expensive to maintain and it violated the human dignity for the users and those responsible for collection and disposal of the human waste from bucket toilets.

In February 2005, the bucket sanitation backlog in formal townships was estimated at 252 254 buckets (DWAF, 2006). Former President Mbeki, in his state of the nation address of February 2006, set a target for the eradication of all pre-1994 sanitation buckets from the formal townships by December 2007. According to the Department of Water Affairs' close-out verification report of the bucket eradication programme (DWAF, 2009) between February 2005 and December 2007, the national government allocated a total of R1.8 billion for the eradication of all pre-1994 buckets from formal townships.

RATIONALE

This study was initiated to assess what worked and what did not work, to evaluate the extent of compliance of the bucket eradication programme (BEP) with sanitation policy principles and to assess the impact of the BEP on the quality of life for the beneficiary communities. There was a need to document lessons learned from the accelerated bucket eradication programme so that these lessons could inform the planning of future sanitation upgrading programmes for households that were still using the bucket sanitation system.

OBJECTIVES

- To evaluate the integration of sanitation policy principles in the implementation of the bucket eradication programme.
- To assess the integration of water conservation and water demand management strategies in the implementation of waterborne sanitation systems and consideration of water availability, wastewater treatment plant capacity and compliance with groundwater protocol.
- To evaluate the planning for O&M of sanitation facilities within the context of free basic sanitation services, household affordability and environmental sustainability.
- To assess household perceptions of the impact of the bucket eradication programme on the improvement in the quality of their lives.
- To evaluate the level of technical advice provided to municipalities by consulting engineers to assist them to implement technically and financially sustainable sanitation systems.
- To document best practice and highlight problem areas.

- To make recommendations for scaling-up good practice and initiatives necessary to rectify the identified problem areas.

METHODOLOGY

The study used five case study municipalities to conduct an in-depth evaluation of the bucket eradication programme. Survey questionnaires for deployed engineers and beneficiary municipalities were used to assess the role played by the deployed engineers in the implementation of the BEP. Focus group discussions were held with representatives of the beneficiary communities in the five municipalities to assess their perceptions of the impact of the BEP on the quality of their lives and workshops were used to solicit inputs from the relevant sanitation stakeholders. The study made use of secondary data to get a thorough understanding of sanitation service delivery in the selected case study municipalities and surveyed municipalities.

The scope of the study included the evaluation of the BEP and the broader aspects of sanitation service delivery in selected provinces that had the bulk of bucket sanitation backlog in February 2005. The study has focused on buckets which were eradicated between February 2005 and July 2009.

One of the limitations of the study was that it was not possible to interview all the relevant municipal officials and councillors due to the difficulty in securing appointments with them. The change in municipal councillors due to the 2011 Local Government elections also negatively affected the interviews of relevant councillors who participated in the implementation of the accelerated BEP.

KEY FINDINGS

The following key findings emanated from the study:

Extent of BEP compliance with sanitation policy principles

Ensuring access to basic sanitation services as a right – All case study municipalities complied with the sanitation policy principle of ensuring access to basic sanitation service as a right, they provided a 100% sanitation subsidy to registered indigents. However, they did not make any provision for meeting the special sanitation needs of physically disabled, frail and other vulnerable groups. A one-size-fits-all toilet was constructed for each household.

Integration of H&HE and user education into the BEP – Health & Hygiene Education and user education were neglected by four case study municipalities, they claimed that these components were not included the BEP budget. The lack of user education contributed to the problem of regular blockage of household toilets due to the use of inappropriate materials for anal cleansing and disposal of foreign materials into the toilets.

Community participation – Only one out of five case study municipalities engaged the beneficiary households in the selection of the sanitation technology option. One of the case study municipalities learned a costly lesson when it replaced buckets with VIP toilets without

consulting the beneficiary community. These toilets were rejected and vandalized by the angry beneficiary community which demanded waterborne sanitation facilities.

Financial sustainability – The decision to replace buckets with the waterborne sanitation system was not based on a thorough assessment of affordability of this higher level of service for municipalities and the beneficiary households. All the case study municipalities were concerned about the long-term financial sustainability of the waterborne sanitation system because the beneficiaries of the BEP were not paying for sanitation services except in one case study municipality where households who were not registered as indigent were paying for sanitation services. All five municipalities were facing a problem of increasing O&M costs for sewerage services because of high incidence of blocked drains and sewers which were caused by the use of inappropriate anal cleansing materials and disposal of foreign materials into the toilets.

Environmental sustainability – Only one case study municipality conducted a thorough assessment of water availability, capacity of water supply infrastructure and wastewater treatment capacity before taking a decision to replace buckets with waterborne sanitation system. Four case study municipalities received low average municipal Green Drop Scores (GDS) in the range of 0% to 52% and only one municipality received a score of 76% in the 2011 Green Drop assessment (DWA, 2011). The wastewater quality compliance ranged from 0% to 83% GDS for the five case study municipalities. The poor performance was attributed to the lack of technical skills, poor O&M and in some cases the wastewater treatment plants had already exceeded the design capacity. One of the case study municipalities was discharging non-compliant effluent from two of its plants because the wastewater treatment processes were compromised by high biological oxygen demand (BOD) wastewater from the abattoir and chicken industry which was discharged into municipal sewers without pre-treatment.

Integration of water conservation and water demand measures – Four case studies municipalities did not include water saving measures during the installation of waterborne sanitation systems. Only one case study municipality installed six litre cisterns in household toilets to save water.

Perceptions of the impact of the BEP by beneficiary households

The representatives of beneficiary communities who participated in focus group discussions in all five case study municipalities were satisfied with the waterborne sanitation facilities which were convenient and safe for use by the children. They believed that the quality of their lives had improved and their human dignity was restored because they were no longer subjected to the dehumanizing buckets. The representatives of beneficiary communities from the four case study municipalities believed that the health of their children and the entire community had improved as a result of the replacement of buckets with the waterborne sanitation facilities. The flies that used to breed in uncollected buckets were no longer a problem. The representatives of the beneficiary community from one case study municipality reported no improvement in the health of children and the rest of the community because 500

households were still using buckets which served as breeding ground for the disease spreading flies.

Use of innovative sanitation technologies

Tokologo Municipality was piloting the close circuit wastewater treatment and recycling sanitation system. Although there were problems of reliability with this system, the users were happy to have waterborne sanitation facilities. However, more research was required to resolve the technical problems associated with the technology such as the expected increase in salinity and its potential impact on the biological wastewater treatment processes.

Makana Municipality in partnership with Rhodes University successfully piloted the integrated algal pond system (IAPS) technology for the treatment of municipal sewage. They demonstrated that this low cost and robust wastewater treatment technology could produce effluents that were compliant with effluent discharge quality standards and it also produced algae which could be used in crop production.

The role of deployed engineers in the implementation of the BEP

The deployed engineers made a significant contribution to the acceleration of the eradication of the pre-1994 buckets from formal townships, but they played a limited role in influencing the municipalities in the choice of the sanitation technology options because a political decision was already taken to replace buckets with the waterborne sanitation system. They mentored junior technical officials to operate and maintain the new wastewater treatment works. A few engineers trained the plant operators on the requirements of the Blue Drop and Green Drop assessment programmes. It was not always possible to transfer technical skills in all municipalities because there were cases where there were no technically qualified municipal officials who could be trained to operate and maintain the new or upgraded wastewater treatment works.

Review of the financial performance of seven selected municipalities

A review of the financial performance of seven selected municipalities was conducted over a period of three years (2008-2010) which followed the eradication of the majority of buckets. The aim of the review was to identify trends in annual revenue, expenditure, bad debts, water and sewerage debtors which could impact on financial viability of these municipalities. The review highlighted the following:

- All selected municipalities experienced problems with revenue collection due to high unemployment levels, poor credit control and debt collection;
- Increasing dependency on equitable share, in 2 out of 7 municipalities the equitable share accounted for more than 40% of the total annual revenue in 2010;
- Low levels of expenditure on repairs and maintenance – All seven municipalities were spending less than 7% of their revenue on repairs and maintenance and five out of seven municipalities showed a reduction in expenditure for this component over the three years reviewed;

- Increase in water and sewerage debtors – Five out seven reviewed municipalities showed an increase in water debtors and sanitation debtors over the review period. Only one municipality showed a decrease in water and sanitation debtors during the three year period reviewed.
- Five out of seven reviewed municipalities were implementing stringent measures to improve revenue collection, credit control and debt recovery.

Problems associated with the sustainability of the accelerated BEP

The following aspects of the BEP compromised sustainability:

Political aspects

- The political targets and supply-driven approach to the implementation of the BEP overlooked the definition of sanitation as a service that goes beyond the provision of a toilet.
- Due to the political driven targets, the implementation of the BEP was not preceded by proper strategic sanitation planning.
- The key performance indicator for the BEP was the number of buckets replaced, there was no focus on the quality of toilets constructed, water availability and capacity of wastewater treatment works (WWTWs), affordability and availability of technical capacity to operate and maintain the new sewerage networks and wastewater water treatment plants.
- Due to the top-down nature of the BEP, there was no emphasis on Health &Hygiene Education (H&HE), user education and community involvement in the planning of the BEP at the local level. Limited emphasis was placed on appropriate sanitation technologies, socio-economic factors and environmental factors.

Institutional aspects

- The Municipal Technical Directors were forced to succumb to political pressure to replace buckets with waterborne sanitation systems under difficult technical, environmental and socio-economic conditions.
- Despite the government's huge investments in the eradication of bucket sanitation because this technology was considered to be unhygienic and a violation of human dignity, the case study municipalities were continuing to perpetuate the use of buckets in informal settlements without sanitation facilities.
- Weak national and provincial regulation and oversight of municipalities led to poor compliance with sanitation policy principles and other national norms and standards.
- The transfer of sanitation responsibility from the Department of Water Affairs (DWA) to National Department of Human Settlements (NDHS) created confusion on the institutional responsibility for sanitation regulation.
- During the implementation of the BEP, the government appointed private companies to control the procurement of contractors and engineering firms were commissioned to build wastewater treatment plants. But once construction was completed no further

resources were allocated to ensure that these new or upgraded wastewater treatment works were operated and maintained properly.

Financial aspects

- Government failed to couple investments in infrastructure with matching investment in technical capacity for operation and maintenance of the sanitation infrastructure to ensure sustainable sanitation service delivery.
- All the municipalities reviewed as part of the study were struggling with huge debts because of non-payment for municipal services by businesses, government institutions and households. Payment of municipal service charges by these consumer groups could improve the long-term financial viability of municipalities.

Social aspects

- The current interpretation of the concept of human rights has led to the perception that human rights meant that basic water supply and sanitation should be free. The national government needed to clearly define its boundaries of responsibility. Similar criteria for qualifying for the RDP housing subsidy should be applied to the bucket replacement programme to reduce the financial burden for government.
- The BEP consultants and contractors did not always have the necessary social focus, and they did not consider H&HE and user education as components of sanitation infrastructure projects.

CONCLUSIONS

The following key conclusions are based on the findings of the study:

What worked?

- The bucket eradication programme was characterized by good project management, effective coordination and cooperation of sector departments and it enjoyed buy-in from all the political levels and the three spheres of government.
- The deployed engineers played a significant role in helping municipalities without technical capacity to eradicate the majority of pre-1994 buckets by July 2009.
- The beneficiary households were satisfied with the waterborne sanitation facilities, they believed that their health had improved and their human dignity was restored because they were no longer subjected to the dehumanizing buckets.

What did not work?

- The BEP case study municipalities failed to comply with most of the sanitation policy principles.
- The supply driven approach adopted in the implementation of the BEP failed to plan for sustainable sanitation service delivery because it focused on toilet construction. This led to poor performance of wastewater treatment works which were assessed as

part of the study because no resources were allocated to the proper operation and maintenance of new or upgraded WWTWs.

- The BEP put limited emphasis on Hygiene awareness, community involvement and user education.

LESSONS LEARNED

Sanitation service delivery was a complex process that could not be reduced to a toilet
The BEP focused on toilet construction and neglected the sustainability aspects such as community involvement, affordability, hygiene education, user education and proper O&M of wastewater treatment works.

Failure to invest in water efficient sanitation technologies could put pressure on local water resources
The neglect of the integration of water conservation and water demand management measures into the BEP could put pressure on local water supply and increase the cost of providing water services to poor households who depended on subsidized water services.

Partnerships between local universities and municipalities can contribute solutions to sanitation challenges
The successful piloting of the Integrated Algal Pond System (IAPS) for treating municipal sewage by Rhodes University and Makana Municipality demonstrated the important role that could be played by partnerships between local universities and municipalities in finding solutions to local sanitation problems.

Municipalities were implementing stringent measures to improve revenue collection
Several municipalities reviewed as part of this study were implementing stringent measures to improve revenue and debt collection, such as deduction of municipal service charge arrears of municipal officials and councillors from their monthly salaries.

It is crucial for municipalities to take ownership of sanitation infrastructure projects
Municipalities must take leadership and ownership of their sanitation infrastructure projects instead of handing over control to the consulting engineers because they remain legally responsible for O&M and sustainable sanitation service delivery long after the engineers had finished construction of infrastructure and left.

Repair and replacement of malfunctioning components of the wastewater treatment works should not be subjected to rigid municipal procurement procedures
Municipal management must treat the requests for the repair or replacement of components of wastewater treatment plants as urgent and not subject them to the standard government procurement procedures because the delays could compromise the wastewater treatment processes and the quality of effluents discharged.

RECOMMENDATIONS

- Weak sanitation governance must be addressed and the water sector regulator must implement appropriate penalties and incentives to enforce compliance with effluent discharge standards.
- DWA as the water sector regulator should implement competency criteria for technical directors and plant operators in all municipalities. This could be modelled on the National Treasury competency criteria for finance staff in municipalities.
- Sanitation sector leadership and coordination must be improved.
- Resources should be allocated to reverse the identified problems which were threatening the sustainability of sanitation services.
- Engagement of the private sector to operate and maintain wastewater treatment works that posed a high environmental risk should be considered.
- Community involvement, H&HE and user education must be placed at the centre of sanitation service delivery to ensure community ownership.
- Stringent measures adopted by several reviewed municipalities to improve revenue and debt collection should be replicated in municipalities facing similar challenges.
- Low cost robust wastewater treatment technologies such as the Integrated Algal Pond System (IAPS) piloted by Makana Municipality and Rhodes University should be considered for scaling-up in rural municipalities with limited financial and technical capacity to operate conventional wastewater treatment works.
- Incentives must be provided to encourage municipalities to implement innovative sanitation technologies that are affordable and acceptable to the beneficiary communities.
- Flexible procurement procedures are required to accelerate the repair or replacement of crucial components of WWTWs to avoid compromising the wastewater treatment processes.

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- Makhetha Development Consultants
- National Sanitation Programme Unit
- Regional Sanitation Coordinators
- Researchers from Rhodes University EBRU
- Community representatives who participated in focus group discussion
- Local clinic nurses
- Contractor responsible for installing the Close Circuit wastewater treatment plant in Tokologo.

Surveyed municipalities in Free State and Northern Cape provinces

- Surveyed deployed engineers
- Officials of NSPU-NDHS
- National sanitation sector stakeholder workshop participants

NB. The details of the participants are provided in the Appendix to the main report.

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LIST OF ABBREVIATIONS

BEP	Bucket Eradication Programme
BOD	Biological Oxidation Demand
COGTA	Department of Cooperative Governance and Traditional Affairs
CSIR	Council for Scientific and Industrial Research
DBSA	Development Bank of South Africa
DM	District Municipality
DPLG	Department of Provincial and Local Government
DWA	Department of Water Affairs
DWAF	Department of Water Affairs & Forestry
EBRU	Environment Biotechnology Research Unit
EC	Eastern Cape
FS	Free State
GDS	Green Drop Score
H&HE	Health & Hygiene Education
IAPS	Integrated Algal Pond System
KPIs	Key Performance Indicators
LG	Local Government
LM	Local Municipality
NC	Northern Cape
NDHS	National Department of Human Settlements
NSP	National Sanitation Programme
NW	North West
O&M	Operation & Maintenance
PMU	Project Management Unit
RDP	Reconstruction and Development Programme
SALGA	South African Local Government Association
STATS-SA	Statistics South Africa
UDS	Urine Diversion Sanitation
VIP	Ventilated Improved Pit
WC/WDM	Water Conservation/Water Demand Management
WRC	Water Research Commission
WWTWs	Wastewater Treatment Works

1 INTRODUCTION

1.1 Background and context

The National Government took a decision to accelerate the eradication of the bucket sanitation system because this system was considered to be unhygienic and expensive to maintain. It also violated the human dignity for the users and those responsible for collection and disposal of the human waste from bucket toilets. Former President Mbeki in his state of the nation address of February 2006 set a target for the eradication of all pre-1994 buckets from the formal townships by December 2007.

In February 2005, the sanitation bucket backlog in formal townships was 252 254 buckets (DWAF, 2006). According to the close out verification report (DWA, 2009) of the bucket eradication programme (BEP), between February 2005 and December 2007, the national government allocated a total of R1.8 billion for the BEP and in July 2009, 244 258 buckets were replaced and a bucket backlog of 7996 was still outstanding.

Definition of the bucket sanitation system:

A bucket sanitation system is defined as a toilet with a bucket or other removable receptacle placed directly under the toilet seat for the purpose of collecting urine and faeces (DWAF, 2007).

The majority of municipalities used the conventional waterborne sanitation system to replace buckets in urban formal settlements. This presented a challenge for municipalities servicing areas without bulk sewers and adequate wastewater treatment capacity and in some cases the available water supply could not support the new waterborne sanitation systems.

1.2 Rationale for the study

This study was initiated to assess what worked and what did not work during the implementation of the BEP. It was considered important to assess the extent of compliance of the BEP with the sanitation policy principles of the 2001 White Paper on Basic Household Sanitation (DWAF, 2001) and to evaluate the impact of the BEP on the quality life for the beneficiary communities. There was also a need to document lessons learned from the accelerated bucket eradication programme so that these lessons could inform the planning of future sanitation upgrading programmes for households that were still using the bucket sanitation system.

1.3 Objectives

The study had the following objectives:

- To evaluate the integration of sanitation policy principles in the implementation of the bucket eradication programme.
- To assess the integration of water conservation and water demand management strategies in the implementation of waterborne sanitation systems and consideration of water availability, wastewater treatment plant capacity and compliance with groundwater protocol.

- To evaluate the planning for O&M of sanitation facilities within the context of free basic sanitation services, household affordability and environmental sustainability.
- To assess household perceptions of the impact of the bucket eradication programme on the improvement in the quality of their lives.
- To evaluate the level of technical advice provided to municipalities by consulting engineers to assist them to implement technically and financially sustainable sanitation systems.
- To document best practice and highlight problem areas.
- To make recommendations for scaling-up good practice and initiatives necessary to rectify the identified problem areas.

1.4 Scope and limitations of the study

The scope of the study included the evaluation of the BEP and the broader aspects sanitation service delivery in selected municipalities that had huge bucket backlogs in February 2005. The study focused on buckets which were eradicated between February 2005 and July 2009. The evaluation was based on 5 case study municipalities selected from four provinces (Free State, Eastern Cape, North West and Northern Cape) that had the bulk of sanitation buckets at the commencement of the accelerated phase of the BEP in February 2006. The study included an assessment of the role played by the deployed engineers in the implementation of the BEP and a review of financial performance of selected municipalities focusing on bad debt, water and sewerage debtors for 2008 to 2010 financial years.

One of the limitations of the study was that it was not possible to interview all the relevant municipal officials and councillors due to the difficulty in securing appointments with them. The change in municipal councillors due to the 2011 Local Government elections also affected the interviews of relevant councillors who participated in the implementation of the accelerated BEP.

1.5 Structure of the report

The report provides a summary of the findings, lessons learned from the implementation of the accelerated BEP and recommendations for improvement of sanitation service delivery.
The report is made up of the following chapters:
Chapter 1: The chapter provides background and context for the evaluation of the bucket eradication. It also provides the rationale, objectives, scope and limitations of the study.
Chapter 2: It presents the evaluation framework, describes the methods used to collect data. It also provides the criteria used to select case study municipalities and stakeholder engagement processes.
Chapter 3: It presents a desktop review of status quo and achievements of the bucket eradication programme
Chapter 4: The chapter presents findings from the evaluation of BEP implementation processes and outcomes of the BEP in five case study municipalities.

Chapter 5: This chapter presents key findings from the assessment of role played by the deployed engineers in the acceleration of the BEP and it also provides a review of the technical performance of the beneficiary municipalities.

Chapter 6: The chapter presents a review of the financial performance of selected municipalities over a period of three years after the majority of buckets were eradicated.

Chapter 7: The chapter presents the BEP perspectives of national sanitation sector stakeholders.

Chapter 8: It provides a critical analysis of the BEP through the sustainability lens to determine how the sustainability dimensions were taken into consideration during the implementation phase.

Chapter 9: The chapter presents conclusions of the study, lessons learned and recommendations for addressing the identified problems in the delivery of sustainable sanitation services.

2 METHODOLOGY

2.1 Evaluation framework

The evaluation of the bucket eradication programme focused on the analysis of aspects of the BEP that worked and identified what did not work. It made recommendations on how things could be done differently and also documented lessons learned from the BEP. These findings can be used to review sanitation policy, sanitation strategies and improvements in sanitation programme implementation.

Type evaluation

The evaluation was qualitative and it used a combination of process based evaluation and outcome-based evaluation, these processes are described below:

Process evaluation **–** focused on understanding the resources, activities and outputs. Project documents such BEP progress reports prepared by the Bucket Eradication Consortium and municipal documents such as Integrated Development Plans, Technical Reports, Annual Reports, Indigent Policies, 2011 Green Drop Report and other relevant documents were used as sources of information. Interviews with the relevant stakeholders and role players and on-site inspections were conducted.

Outcome-based evaluation – This type of evaluation focused on the assessment of compliance with sustainable sanitation policy principles and perceived benefits of the programme by beneficiary communities. Document review, interviews and focus group discussions with representatives of the beneficiary communities were used to assess outcomes of the BEP.

Research questions

The study was guided by the following research questions:

- Extent of compliance with the sanitation policy principles which are outlined below:
  - Integration of health and hygiene education into the bucket eradication programme;
  - Access to basic sanitation as a right;
  - Community participation – extent of involvement of beneficiary communities in decision-making processes, such as the selection of sanitation technology options;
  - Financial sustainability – Was affordability of operation & maintenance taken into consideration during the planning of the BEP?
  - Environmental integrity – What plans were in place to prevent pollution of water resources from effluents discharged from wastewater treatment works?
  - Water Conservation/Water Demand Management measures **–**To what extent did municipalities integrate Water Conservation/Water Demand Management measures during the replacement of the bucket sanitation system?
- How did the BEP contribute to local economic development, job creation and job security for labourers who used to empty the buckets?
- What was the role of the deployed engineers in the implementation of the bucket eradication programme in beneficiary municipalities?

- What was the effect of the BEP on the financial performance of selected municipalities?
- What were challenges and lessons learned from the implementation of the BEP?

2.2 Data collection methods

The study used primary and secondary data to evaluate the BEP.

The following data collection methods were used to improve the quality and reliability of the data:

- Interviews were used to get in-depth information and also to assess the perceptions of key informants (municipal officials, municipal councillors and deployed engineers);
- On-site inspection was used to evaluate the quality and operations of the sanitation infrastructure;
- Focus group discussions were used to assess the perceptions of the BEP by the beneficiary households;
- Document review was used to obtain comprehensive information;
- Survey questionnaires were used to assess the role played by deployed engineers. (Two different questionnaires were used, one for deployed engineers and another one for the beneficiary municipalities).

Data analysis and synthesis of the results

The data collected using the different research instruments was classified and analysed according to the parameters set for this study that were informed by the research questions discussed above.

2.3 Selection of BEP case study municipalities

The evaluation of the BEP was based on an in-depth analysis of 5 selected case study municipalities and the following criteria were used to select case studies:

Criteria for the selection of case study municipalities

- Provinces that had the highest number of qualifying buckets during the accelerated phase of the bucket eradication programme, starting from February 2006 – July 2009;
- Innovation – municipalities that used innovative approaches to eradicate the buckets, such as the use of close-circuit system to provide waterborne sanitation systems under conditions of scarce water resources;
- Municipalities with huge bucket sanitation backlogs;
- Municipalities replacing the bucket sanitation with waterborne under difficult socio-economic conditions such as negative economic growth and high unemployment levels,
- Municipalities with both economic and technical constraints (limited water availability and lack of funds to ensure financial sustainability of waterborne sanitation services).

A description of the 5 case study municipalities is presented in Table 1 below.

Table 1: Description of case study municipalities

Municipality	DM, Province	Population	No. of Households	Bucket backlog in 2006	Selection criteria	Defining characteristics
Mangaung	Motheo, FS	752 906	202762	16 370	Municipality with the highest no of buckets in FS	Mangaung was experiencing rapid urbanization; improvement in income of its population
Tokologo	Lejweleputswa, FS	21323	7477	1446	Innovation ─ Piloting close circuit wastewater treatment and recycling sanitation system	Poor municipality with a decreasing population, high dependency on grants
Sol Plaatje	Frances Baard ─ NC	243 018	52120	8221	Municipality replacing the buckets under difficult socio-economic conditions	Sol Plaatje was experiencing high unemployment (38.8%) and limited prospects for economic growth
City of Matlosana	Dr Kenneth Kaunda , NW	401 122	119274	14 400	Municipality with highest no. of buckets in the NW	High average income per household because of high employment in mining and supporting industries
Makana	Cacadu, EC	70 059	18864	2805 (1303 pre-1994)	Municipality with difficult socio-economic conditions	High unemployment rates (34.3%) and only 32.1% of the population is employed, 51% of HHs depend on government grants

2.4 Stakeholder engagement

The following groups were targeted for interviews:

- Regional sanitation coordinators in the 4 provinces participating in the study (FS, NW, NC, and EC provinces) – 3 regional sanitation coordinators assisted with the selection of case study municipalities;
- Municipal officials responsible for sanitation services:
  - A total of 19 municipal officials from the 5 case study municipalities were interviewed;
  - 22 municipal officials representing 22 surveyed municipalities in Free State and Northern Cape provinces were surveyed to assess the contribution of deployed engineers to the implementation of the BEP.
- Engineers deployed to support the municipalities – 11 deployed engineers were interviewed;
- Representatives of the Bucket Eradication Consortium;
- 2 Focus group discussions with community representatives were held for each of the five case study municipalities – A total of 88 community representatives participated in these focus group discussions;
- Key informants – 5 Councillors and 2 clinic nurses were interviewed for the BEP case studies.
- Two professional service providers (BIGEN Lead Consultant for Mangaung and TDBC Agency for Tokologo – contractor responsible for installing and O&M of the Close circuit wastewater treatment and recycling plant).

- Workshop with officials of National Sanitation Programme Unit of the National Department of Human Settlements;
- National Sanitation Stakeholder workshop including representatives from National Department of Human Settlements, National Treasury, Presidency: Department of Performance, Monitoring &Evaluation, South African Local Government Association, City of Matlosana, CSIR, Bucket Eradication Consortium, Department of Water Affairs and Ministerial Sanitation Task Team.

3 REVIEW OF THE STATUS QUO AND ACHIEVEMENTS OF THE BEP

3.1 Implementation process for the BEP

The National Government adopted a "business unusual approach" to the acceleration of the bucket eradication programme and the following approaches were used:

3.1.1 Verification of the bucket sanitation backlog

The National Sanitation Programme (NSP) used a direct approach to collect information on the number of buckets that constituted the backlog of pre-1994 buckets in formal townships. At the onset of the BEP, the bucket sanitation backlog figures from the Water Service National Information System were used for planning. However, it became necessary to undertake a physical verification of the bucket sanitation backlog figures on the ground because the municipalities kept increasing the backlog figures and the corresponding budgets required to eradicate the buckets. The NSP conducted on-site verification of buckets in the different municipalities by physical counting all buckets. The process generated a backlog figure of 165 921 buckets in June 2006. This number included buckets in formal established areas; it excluded informal settlements because these settlements were not included in the Bucket Eradication Programme. The figures from the 2001 Census could not be used because they included all buckets in formal and informal settlements and did not distinguish between pre-1994 and post-1994 buckets.

3.1.2 Role of the Bucket Eradication Consortium

In April 2006, DWAF–NSP appointed the Bucket Eradication Consortium (BEC) to accelerate the eradication of the bucket sanitation system. The BEC appointed 21 engineers to provide technical support to the municipalities without technical capacity. The role of the deployed engineers was to provide project management support for the implementation of the entire sanitation project cycle. At the time of the appointment of BEC, the backlog figure given to the consortium by DWAF was 231 000 household buckets. These DWAF figures were based on a survey of all Water Services Authorities which was conducted in November 2005.

Provision of technical support to the WSAs

The BEC supported WSAs in the following ways:

- Supporting WSAs with the MIG registration of projects;
- Assess the capacity of WSAs to prepare business plans and provided help where there was no capacity to undertake this task;
- Monitoring of projects in liaison with the WSAs;
- Held regular meetings with Regional DWA officials and followed up on any queries and responded to calls for assistance in cases where WSAs were not cooperating with DWA.

The majority of engineers and technicians were deployed to municipalities in Free State, Northern Cape and Eastern Cape Provinces. The project manager of the BEC was responsible

for preparing and submitting monthly progress reports to DWAF–NSP to keep NSP informed of progress in the bucket eradication programme.

3.2 Overview of the bucket eradication programme per province

The overview focused on the five provinces that had the bulk of buckets at the onset of the accelerated bucket eradication programme.

The following Table 2 shows progress achieved by the BEP from February 2005 to July 2009 (DWA, 2009).

Table 2: Number of buckets eradicated from Feb 2005 to July 2009 per province

Province	Bucket backlog Feb 2005	Bucket backlog July 2009	#Buckets replaced July 2009	% of buckets eradicated
Free State	127 658	7179	120 479	94.4%
Eastern Cape	48 417	190	48 227	99.6%
North West	35 189	0	35 189	100%
Northern Cape	16 691	627	16 064	96.2%
Mpumalanga	15 172	0	15 172	100%
Gauteng	5 169	0	5 169	100%
Western Cape	3 128	0	3 128	100%
KwaZulu-Natal	750	0	750	100%
Limpopo	80	0	80	100%
Total	**252 254**	**7996**	**244 258**	**96.8%**

3.2.1 North West Province

In June 2006, the North West (NW) Province had a bucket sanitation backlog of 25 124 and to eradicate this backlog, the provincial government prioritised bucket eradication in 5 local municipalities. The Development Bank of Southern Africa provided a loan of R100 million to the Provincial Department of Local Government and Housing; this amount was used to co-fund the eradication of buckets. By March 2007, a total of 12 100 buckets were eradicated. DBSA deployed a senior engineer to oversee and monitor progress in the bucket replacement programme in this province. Upgrading of the bulk water supply pipeline was undertaken in Maquassi Hills Local Municipality to support the bucket eradication project. The Provincial Department of Local Government and Housing had intensive engagements with national and provincial stakeholders to identify innovative solutions for addressing funding shortfalls in the eradication of buckets in order to achieve the December 2007 target.

The NW Province faced the following challenges in its efforts to accelerate the bucket eradication:

Capacity and human resources – Skills shortage at the municipal level negatively affected project planning, project execution and delivery.

Limited funding allocation to sanitation – Bucket eradication and upgrade of the water supply infrastructure to support the new waterborne sanitation infrastructure were constrained by inadequate budgets. This problem was addressed by securing a loan from the DBSA.

3.2.2 Eastern Cape Province

The bucket verification exercise which was conducted by the Provincial Department of Housing, Local Government and Traditional Affairs and DWAF in July 2006 confirmed that the pre-1994 bucket sanitation backlog in formal settlements was 37 192 buckets and by March 2007 this backlog was reduced to 9019 units. The Eastern Cape government used the following approach in accelerating the eradication of the bucket sanitation system:

Hands-on-support

Extensive hands-on-support was provided by different institutions to ensure that Eastern Cape Province met the bucket eradication target set by the national government. The following resources were deployed to provide hands-on support:

- DBSA-Siyenza Manje provided engineers, provincial MIG support staff, municipal Project Management Unit (PMU) support staff, District Cluster facilitators and junior technicians.
- The Bucket Eradication Consortium contracted seven engineers to provide technical hands-on support to municipalities in this province.
- Former Department of Provincial and Local Government (COGTA) provided additional technical support.

Management structure for BEP in EC province

The EC provincial government set up the following structures for coordinating the implementation of the BEP:

- The Eastern Cape Premier's Co-ordinating Forum in collaboration with former DWAF (DWA), this forum ensured optimal utilization of the resources of the BEP and better coordination of all the sector activities that impacted on the BEP.
- The Regional Director established an intervention task team which was responsible for ensuring co-ordinated support to municipalities. This task team had high level representation (Chief Directorate / Deputy Director General) from all the relevant sector departments.
- The Mayor/Municipal WSA managers' forum was established at a local government level and this forum met every fortnight to report on progress in the implementation of the BEP at a local level. It reported progress to the EC Premier's coordinating forum. This forum also helped to streamline the hands-on-support and contributed to improved coordination role of Department of Housing, Local Government &Traditional Affairs (DHLGTA) through ensuring that the hands-on-support was deployed to municipalities with the greatest need.

A Provincial Communication Strategy was developed for dissemination of information on the BEP to all stakeholders; this strategy played an important role in ensuring that achievements

and best practice were communicated to all sanitation sector stakeholders in the EC province. The DHLGTA facilitated collaboration with EC-DWA Regional Sanitation and other sector partners and it helped to keep all stakeholders focused on the goal of achieving the national target of eradicating all qualifying buckets by December 2007.

Challenges

The following challenges posed a threat to the achievement of the target of eradicating all buckets by December 2007 in this province:

- Environmental sensitive sites delayed the implementation of the bucket replacement projects in these sites.
- Hard rocky sites caused delays in project implementation because of the increased costs of removing the rocks.
- Termination of contracts due to poor performance by contractors; this problem was addressed by sub-contracting competent contractors to avoid the delays associated with the procurement of new contracts.
- Rejection of VIP toilets by communities and demand of full waterborne sanitation system in areas without adequate water supply infrastructure and wastewater treatment capacity.

3.2.3 Free State Province

The Free State Province had the highest bucket sanitation backlog at the onset of the accelerated BEP in 2006. To assist the municipalities to increase the rate of bucket eradication, the Free State Provincial Department of Local Government and Housing in partnership with DWA (former DWAF) and Treasury conducted one-on-one sessions with municipalities to assess their readiness to meet the delivery targets. The findings from this process showed that out of a total of 19 Local municipalities (LMs) participating in the BEP, 13 LMs did not have any major challenges that could affect their ability to meet the December 2007 target. The remaining 6 municipalities faced significant challenges; this group included Mangaung, Masilonyana, Matjhabeng, Ngwathe, Mantsopa and Setsoto municipalities.

The Free State Province faced the following challenges related to the BEP:

- Community demand for waterborne sanitation systems while municipalities lacked adequate budgets to build the required infrastructure within the time frame of the accelerated BEP;
- No differentiation of bucket backlog according the definition of BEP of pre- and post-1994 buckets;
- Slow procurement processes in municipalities;
- Poor performance by some contractors and consultants.

In response to these challenges, the Free State – DWA Regional Office developed a framework for the acceleration of the bucket eradication programme in Free State and the Bucket Eradication Consortium allocated more technical resources to support the struggling municipalities.

3.2.4 Mpumalanga Province

Mpumalanga Province had a bucket backlog of 15 172 in February 2005 and 11737 of these buckets were eradicated by March 2006 and the remaining 3435 buckets were eradicated by September 2006. The accelerated bucket eradication programme was driven by the Premier's office and a fund for the Premier's Bucket Eradication Programme was established for the eradication of all buckets from formal townships. On 29th September 2006 the Premier of Mpumalanga hosted a function to celebrate the completion of the bucket eradication programme in Mpumalanga Province ahead of the national target of December 2007 set by the President of South Africa.

The Mpumalanga DWA-Regional Office co-operated with the Department of Local Government and Housing in supporting the affected municipalities to accelerate the eradication of the bucket toilets. The beneficiary communities were engaged through the Ward structures and municipal technical sections.

3.2.5 Northern Cape Province

In February 2005, the bucket backlog for Northern Cape was estimated at 16 691 buckets and this backlog was reduced to 8470 buckets by April 2006. The challenges faced by this province with regards to achieving the goal of eradication of all buckets by December 2007 included poor contractor performance, long procurement processes, rejection of dry sanitation technologies by beneficiary communities and rocky conditions which increased the cost of excavation to lay sewer networks. In addition to these challenges, most projects required development of bulk water supply and wastewater treatment works. The Bucket Eradication Consortium assisted the municipalities with project planning, prioritisation and project implementation.

3.2.6 Other provinces

The following provinces were not the focus of the accelerated bucket eradication programme because they eradicated all the buckets prior to the commencement of the accelerated bucket eradication phase in June 2006:

Limpopo

Limpopo province eradicated its bucket backlog of 80 by March 2006; therefore, there were no reports on the bucket eradication programme for this province.

KwaZulu-Natal (KZN)

KZN had a bucket backlog of 750 in February 2005 and all these were eradicated before March 2006.

Gauteng

Merafong LM was the only municipality in Gauteng province which had buckets that qualified for inclusion in the accelerated BEP. It had three bucket eradication projects and two were completed in 2006/2007 financial year and the third project had completed water

and sewer reticulation infrastructure and 563 toilets were 'complete' but not yet operational because the pump station capacity was being upgraded to meet the increased demand.

Western Cape Province
The Western Cape Province had a small bucket backlog of 1323 in April 2007 and its active projects were in the following four municipalities: George, Knysna, Theewaterskloof and Kannaland.

3.3 State of the bucket replacement projects at the close of the accelerated BP

The DWA project close-out report (DWA, 2009) based the assessment on the following criteria:

Completed projects – All buckets were replaced with new operational sanitation infrastructure.

Completed projects with significant problems – These projects were "complete" because they had gone through the entire project cycle but were not fully operational. The problems ranged from poor workmanship, lack of proper operation and maintenance of the pump stations and lack of user education.

Incomplete projects – Basic elements of the project were still missing such as connections to bulk sewers, inadequate bulk water supply for flushing toilets, lack of adequate funding, etc.

Table 3 provides a summary of the status of the bucket replacement projects at the close of the BEP in July 2009:

Table 3: Status of the bucket replacement projects in July 2009

Province	Number of beneficiary HHs	Completed projects	Completed with major problems	Incomplete projects	Total # of projects
Free State	85 951	69	31	35	135
E Cape	29 927	22	15	3	40
N West	15 656	2	10	1	13
N Cape	7322	12	6	2	20
Gauteng	1 125	2	1	0	3
W Cape	960	1	3	0	4
Total	**144 376**	**108**	**66**	**41**	**215**

3.3.2 State of bucket eradication projects at the end of the project term

According to the DWA Close-out verification report (DWA, 2009) at the end of July 2009 when the programme came to an end, the bucket backlog was reduced from 252 254 to 7996, and the majority of the remaining buckets were in the Free State Province. This number included completed projects with major problems. In addition to completed projects there were 41 incomplete projects and 85% of these were in the Free State.
A brief description of the incomplete projects is provided below:

Free State
The majority of the incomplete projects were in three municipalities, namely, Setsoto, Mohokare and Matjhabeng. Incomplete or incorrectly built sewer networks and connections in Matjhabeng caused backflow of sewage or overflow of manholes, while in Mohokare sewage was flowing into the streets due to incomplete pump stations and sewer networks and there was inadequate water for the waterborne sanitation systems. To address the problem of lack of water for waterborne sanitation systems, a decision was taken to implement a close circuit wastewater system sanitation which treats and re-used wastewater for flushing the toilets.

Eastern Cape
Nxuba Local Municipality replaced buckets for all households in New Lingelethu in Bedford/Adelaide but not all of them were functional because of lack of connections to bulk sewer networks. The required wastewater treatment works and water reticulation systems were not yet available, while the available wastewater treatment plant had already exceeded its design capacity. This led to the flow of sewage into the Nyara River below Bedford. It was anticipated that the outstanding infrastructure would be completed by June 2010.

Chris Hani Municipality replaced 200 buckets in Tarkastad but these toilets were not being used because of problems with the operation and maintenance of the pump station serving this community. The beneficiary households were still using buckets.

Northern Cape
None of the 627 toilets constructed in Douglas, Siyancuma Municipality were connected to the reticulation system because the previous contractor failed to complete the project. It was anticipated only 355 toilets out of 627 toilets would be functional by March 2010. The municipality had applied to MIG for additional funds to complete the project.

3.4 Monitoring and Evaluation of the bucket eradication programme
A DWA report (DWA, 2010) on the technical evaluation of the bucket sanitation programme highlighted the following programme challenges:

Shortage of technical skills at the municipal level – Most municipalities lacked technical skills and municipal officials responsible for operation of sanitation systems were not actively involved in the implementation of BEP, consequently, their 'ownership' of the new infrastructure was limited. Some municipalities were provided with full waterborne sanitation systems for the first time without providing them with funds to employ technical officials with the necessary expertise to operate and maintain sewerage systems and wastewater treatment works.

User education – Users were not made aware of operation and maintenance requirements of their toilets and some were using newspaper for anal cleansing, this led to frequent blockages. In some cases households used the toilet for disposing solid waste.

Sanitation technology choice – Municipalities provided waterborne sanitation systems in areas lacking sufficient water supply and adequate wastewater treatment capacity because of pressure from beneficiary communities who rejected dry sanitation technologies.

Planning – Municipalities were usually not involved in the planning of the bucket replacement projects, consequently, factors such as technical capacity and affordability were not taken into consideration.

Standards and specifications – There were reports of contractors who used poor quality materials in their attempt to reduce unit costs, for example, light duty doors and frames were used for the toilet superstructure and poor quality cisterns were wasting water due to the failure of the valves. The use of low quality materials had a negative impact on sustainability of the sanitation systems.

Operation and maintenance of the sanitation systems – Municipalities allocated very low budgets to O&M and this was due to lack of technical capacity within municipalities. Households were expected to pay for all maintenance costs at the household levels; however, due to high levels of poverty, households could not afford to pay a plumber to fix the blocked toilets. The lack of proper O&M for the sewer network and wastewater treatment works led to the discharge of untreated sewage into the environment, this posed a public and environmental health risk for the affected communities and aquatic ecosystems.

3.5 Achievements of the bucket eradication programme

The following successes and weaknesses of the BEP are based on the review of the status quo of BEP:

Successes

- As a result of strong political will and government commitment, 244 258 buckets (96.8%) were eradicated from formal townships between February 2005 and July 2009.
- There was effective national coordination and cooperation of sector departments, the Department of Water Affairs (former DWAF), DCOGTA (former DPLG) and National Treasury cooperated in resolving funding bottlenecks and contributed to the acceleration of the bucket eradication programme. Similar coordination structures were established at the provincial government levels in the affected provinces and these were led from the Premier's office.
- Flexible procurement processes were adopted by national government through the appointment of the Bucket Eradication Consortium which was contracted by DWA and its role was to assist municipalities to prepare technical reports. Municipal Councils held '*ad hoc*' meetings to expedite the approval of contracts for bucket eradication projects.
- There was sector-wide communication of the BEP and buy-in by all stakeholders at all levels such as the Presidency, Cabinet, Portfolio Committee, National and Provincial Sector departments, Premiers and mayors and other stakeholders.

- Effective project management of the BEP by deployment of engineers helped municipalities without technical capacity to meet the target of eradication of the majority of pre-1994 buckets.

The main lesson learned from the implementation of the accelerated BEP was that government could work efficiently provided there was strong leadership at the highest level coupled with political will and government commitment in all spheres of government.

Weaknesses

- The BEP was political driven and this resulted in the following weaknesses:
- The BEP focused on toilet construction and limited attention was paid to the assessment of water availability, water supply and wastewater treatment capacity before decisions were taken to replace the buckets with waterborne sanitation systems.
- Community participation, Hygiene awareness and user education were generally neglected.
- No attention was paid to the availability of technical capacity to operate and maintain the new or upgraded wastewater treatment works.

4 EVALUATION OUTCOMES OF THE BEP IN CASE STUDY MUNICIPALITIES

4.1 Analysis of the BEP implementation process in case study municipalities

The analysis of the BEP implementation process in case study municipalities is based on the interviews with municipal officials and review of the relevant municipal reports.

4.1.1 Mangaung Municipality

Bucket sanitation backlog

In February 2006 Mangaung Municipality had a bucket backlog of 16 370 buckets, 680 of these buckets were pre-1994 and they were located in Mangaung Township. The rest of the buckets were post-1994 and Botshabelo had the largest post-1994 buckets estimated at 12 228 buckets in 2007.

Number of BEP projects

Mangaung implemented 17 BEP projects which were managed by 8 consulting engineering companies and a total of 8 contractors were appointed to implement the projects. BIGEN-AFRICA was the lead consultant for the BEP in Mangaung. The municipality took a decision to eradicate all buckets because the O&M costs for the 16 370 buckets was more than R18 million per annum at an average of R1125.31 per stand, on the other hand, the O&M of cost of waterborne sanitation system per stand was estimated at R475.05 per stand per year.

Budget spent on BEP

The total BEP project value was R236 million and the municipality was shocked to learn from the Department of Water Affairs &Forestry (DWAF) that the special bucket eradication fund was limited to pre-1994 buckets because the majority of buckets in this municipality were post-1994 and they did not qualify for the special bucket fund. Funding sources for the BEP included MIG which provided R91.8 million and the municipality was forced to transfer R144.2 million from its own funds to support the eradication of all buckets from the formal settlements. This was achieved by delaying other infrastructure projects. The unit cost of providing waterborne sanitation infrastructure per stand was estimated at R21 000.00. Unlike the normal property development process where the municipality was only required to provide bulk sewer networks and WWTWs, the BEP required the municipality to cover the cost of the toilet superstructure and plumbing system inside the stand, the municipality estimated this cost at R7000 per stand. This put a heavy financial burden on the municipality.

Sanitation coverage by the bucket eradication programme

Mangaung Municipality eradicated the following categories of buckets:

All the 680 pre-1994 buckets were eradicated from Meriteng and JB Mafora Wards in Mangaung Township in 2008. In addition to the pre-1994 buckets, the municipality eradicated 2763 post-1994 buckets from the same township. Another 7305 post-1994 buckets were eradicated from Botshabelo. Therefore, the municipality eradicated a total 10 748 buckets during the accelerated BEP phase. The municipality has set a target for the eradication of the remaining buckets by 2014.

Job creation
The BEP created 1581 jobs for local people and the monetary value of these jobs was estimated at R9.6 million. The municipality created opportunities for emerging contractors who were mentored by BIGEN-AFRICA.

4.1.2 Tokologo Municipality

Bucket sanitation backlog
In October 2006 the bucket sanitation backlog for Tokologo Municipality was estimated at 1446 pre-1994 buckets.

Piloting of the close circuit wastewater recycling sanitation system
Tokologo Municipality took a decision to replace the buckets in Seretse Township with Ventilated Improved Pit (VIP) toilets. In August 2007 the contractor started building the VIP toilets, but after the excavation and lining of 270 pits, the community of Seretse rejected the VIP toilets and the project was suspended while the municipality was looking for alternative sanitation technology options. After consultation with the community, the municipality decided to pilot the closed circuit wastewater treatment and recycling sanitation system. The pilot WWTW was completed in early 2010 and it had been in operation for less than a year when the evaluation of the BEP was conducted.

The close circuit wastewater recycling sanitation system was implemented as a pilot project supported by a partnership between Department of Water Affairs, Department of Cooperative Governance and Traditional Affairs and Tokologo Local Municipality. TDBC Agents were appointed to implement the close circuit wastewater treatment and recycling plant. The plant has a design capacity for 3000 households but the current project aimed to connect 1000 households and the spare capacity would be used to connect future housing development in this township. Concerns raised on the pilot of this technology included the potential public health hazards if the re-cycled wastewater failed to meet the public health and environmental quality standards.

Budget spent on the BEP
The original budget allocated to this pilot closed circuit wastewater recycling sanitation system was R21 million, R5 million was allocated to the construction of the pilot plant and R16 million allocated to the construction of the sewer networks and household connections.
R21 million was made up of R19 million from the MIG and R2 million from the Provincial Infrastructure Grant (PIG). The VIP toilets which were damaged by the community during the community protest led to a budget shortfall. A further R5 million was allocated to the pilot project from the Provincial Infrastructure Grant. The total budget spent from 2007 to 2010 on the pilot closed circuit wastewater recycling sanitation system and connection of 500 households was R26 million. The municipality could not connect the remaining 500 households from Seretse Township because it exhausted its budget.

BEP coverage

The municipality connected 500 households to the close circuit wastewater treatment and recycling sanitation system and the remaining 500 households were still using buckets in 2010 because of lack of funds to connect these households to the pilot plant. The municipality had appointed consultants to prepare a breakdown of the budget required to connect the remaining 500 toilets so that the municipal could identify other sources of funds, the target for connecting all 1000 households to the pilot plant was the end of 2010.

4.1.3 Sol Plaatje Municipality

Bucket sanitation backlog

At the beginning of the accelerated bucket eradication programme in February 2006, the bucket backlog for Sol Plaatje was 2157 buckets and all the pre-1994 buckets were in Galashewe Township, Kimberley.

Expenditure and funding sources for the BEP

The bucket replacement projects were funded by MIG. In 2005/2006 the municipality spent R1 718 000 on the bucket eradication, an amount of R3 438 000 was spent to eradicate 447 buckets in 2006/2007 and in 2007/2008 an amount of R9 million was allocated for the eradication of the remaining buckets. The three wastewater treatment works in Sol Plaatje had already exceeded their design capacity. From 2008 to 2012 Sol Plaatje Municipality has focused on the upgrading and refurbishment of the three WWTWs. It was estimated that the total costs of upgrading Homevale WWTWs would be R140 million. From 2008-2010 an amount of R37 589 671 from MIG and R2 million of internal funds was spent on the upgrade of Homevale WWTWs.

An amount of R14 685 000 from MIG was budgeted for upgrade of Ritchie WWTWs in 2011/2012 financial year. In 2010/11 financial year, De Beers contributed R1.4 million towards phase one refurbishment of the Beaconsfield WWTWs and phase two which was funded by MIG at a cost of R12 133 625 was expected to be completed in April 2012.

BEP coverage

Sol Plaatje LM replaced all the 2157 buckets with waterborne sanitation system; these were located in Dunstan, Soul City, Tambo Square and Zone 6 in Galashewe and surrounding townships. The municipality replaced 860 post-1994 buckets with UDS toilets but the beneficiary households were dissatisfied with this level of service, they were demanding waterborne sanitation systems. Low flush on-site sanitation system was provided to 2000 households in informal settlements, but these households were dissatisfied with this sanitation technology.

The municipality was faced with a challenge of lack of adequate funds for the eradication of all the post-1994 buckets in formal settlements in Ritchie where 400 households were affected and informal settlements in Kimberley where about 2000 households were using buckets. The municipality had approached Frances Baard District Municipality to request additional funds for eradicating the bucket sanitation backlog in informal settlements, but the

DM could not help because it only had funds for supporting O&M of Urine Diversion Sanitation toilets. Sol Plaatje has adopted a policy of providing full waterborne sanitation system to formal urban settlements and communal portable toilets or buckets which are shared by several households in urban informal settlements.

4.1.4 City of Matlosana

Bucket sanitation backlog

In June 2006, the City of Matlosana had a bucket sanitation backlog of 14 400, this municipality did not differentiate between pre-1994 and post-1994 buckets. These buckets were in Kanana Township in Orkney, Khumo Township in Stilfontein, Alabama and Jouberton townships in Klerksdorp and Tigane Township in Hartbeesfontein.

Budget spent on BEP infrastructure

The City of Matlosana spent an amount of R68.3 million on the eradication of the bucket toilets and related infrastructure.

Funds spent on the eradication of buckets in the different townships are shown in Table 4 below:

Table 4: BEP infrastructure expenditure spent on different townships

Township	**Amount spent**
Kananga and its extensions	R20.3 million
Khumo and its extensions	R11.4 million
Alabama, Joubert and extensions	R30.3 million
Tigane township and extensions	R1.0 million
Total	**R63.0 million**

Investment in wastewater treatment plants

To meet the increasing demand for wastewater treatment capacity from the settlements that were benefiting from the BEP, Matlosana invested in the expansion and upgrading of sewerage networks and wastewater treatment plants. The upgrading of Orkney WWTWs had cost an estimated amount of R33.0 million in 2009/2010 financial year and the completion of the upgrade was estimated to cost an additional R7.0 million. The upgrades include the following: extension of sewer pipelines; increasing capacity of treatment plant units, relining of outfall sewers; replacement of sewer pumps and replacement of outfall sewers. The upgrade of Stilfontein WWTWs cost an estimated R9.0 million; these upgrades include the replacement of sewage pipelines and extension of sewer networks. The upgrade of the Klerksdorp WWTP cost approximately R8.0 million and the upgrades include extension of sewer networks, upgrading of pump stations, upgrading inlet works, replacement of pumps and screens as well as replacement of aerator gearboxes. Hartbeesfontein WWTP was upgraded at an estimated cost of R3.0 million and most of the funds have been spent on upgrading the sewer networks. By 2010, the municipality had spent about R63 million in the upgrading of the wastewater treatment capacity to handle the BEP connections.

Sources of funding
The sources of funding for the BEP included the following:
MIG was the source of funding for the BEP and former Klerksdorp Municipality had the largest number of buckets in North West in 2005 and between 2006 and 2008, a total of R90.4 million was spent on reducing the bucket backlog of 14 400 households.

Division of Revenue Act – Matlosana received additional funds through Division of Revenue Act (DoRA) in 2008/09 financial year and combined with MIG, total budget spent on BEP was R122.8 million and the average unit cost per bucket eradicated was estimated R7224.00 per stand.

BEP coverage
Matlosana took a policy decision to provide all formal urban stands with the waterborne sanitation system. A total of 12 436 households were provided with waterborne sanitation services under the BEP by 2008 financial year and an estimated 74 600 people benefited. In Khumo Township, the households had two waterborne sanitation toilets per stand, one toilet was part of the RDP house and the outside bucket toilet was replaced as part of the BEP. At the end of the accelerated BEP phase in July 2009, the City of Matlosana still had a bucket backlog of 2545 households; these buckets were due to be eradicated in 2009/2010 financial year. However, due to the on-going mushrooming of new informal settlements, it was difficult for the municipality to completely eradicate all buckets.

Job creation and local economic development
The City of Matlosana created 997 jobs during the implementation of the BEP. The municipality also appointed 26 emerging contractors during the implementation of the BEP. It removed barriers to their entry into the construction industry by reducing surety required for constructing 50 toilets, retention fees were reduced for this group and they were paid every two weeks to help them with cash flow management. The municipal officials mentored and coached the emerging contractors. All the emerging contractors who successfully completed their 50 toilets were allocated additional units based on their performance.

4.1.5 Makana Municipality

Bucket sanitation backlog
Makana LM had a backlog of 1303 pre-1994 and 1502 post-1994 sanitation buckets in formal townships.

Expenditure and funding sources for BEP
Makana used different sources of funding to eradicate the bucket sanitation system, namely, R13.4 million from the BEP fund (DWA), R7.3 million from MIG and R20 million from Cacadu District Municipality. The total budget spent on the eradication of 2500 buckets was R40.7 million. The unit cost of replacing the bucket with waterborne sanitation system was R16 120.00 per stand.

To meet the anticipated increase in demand for wastewater treatment capacity, Makana upgraded Mayfield WWTP at a cost of R11 million between March 2006 – August 2008 and Belmont Valley WWTP was upgraded at a cost of R4.6 million from March 2007 – October 2007. The total budget spent on upgrading wastewater treatment capacity was R15.6 million.

BEP coverage

The BEP benefited 2500 households in Makana by 2011, but this municipality had not yet achieved 100% bucket eradication, there were about 305 households in both formal and informal settlements that were still using buckets. At the end of May 2011, a bucket backlog of 102 was left in KwaNdancama and Eluxolweni formal townships. The municipality has allocated a budget of R2.6 million for the eradication of these buckets in 2011/12. The communities that benefited from the BEP included Tantyi, Newtons, Xolani and Makana Skop, Extension 2, 3 and 7, KwaNdancama and Eluxolweni townships.

4.2 Extent of compliance of the BEP with the sanitation policy principles

Five case study municipalities were evaluated to assess the extent to which they complied with sanitation policy principles of the White Paper on Basic Household Sanitation (DWAF, 2001) during the implementation of the bucket eradication programme. The findings are presented below:

Integration of Hygiene awareness and user education

Although 2 out of 5 case study municipalities reported that hygiene awareness and user education were part and parcel of the implementation of bucket eradication programme, but all the community representatives who participated in the focus group discussions did not recall participating in any Hygiene awareness workshops. The municipal officials reported that MIG funds for the bucket eradication programme did not include any budget for Health & Hygiene and user education. Only one municipality reported using different source of funding for Hygiene awareness workshops. The City of Matlosana was the only municipality that engaged community development workers to conduct user education for beneficiaries of the bucket eradication programme. It was worth noting that community representatives who participated in focus group discussions in Matlosana did not report any problems with frequent blockages of toilets which were a common problem for the three case study municipalities that did not provide any user education.

Access to basic sanitation as a right

Sections 24(a) and 27(1b) of the 1996 Constitution of South Africa implicitly refer to access to basic water and sanitation as a human right. The Water Services Act No.108 of 1997, Section 3(1) states that "*Everyone has a right of access to basic water supply and basic sanitation*" (DWAF, 1997). All five case study municipalities indicated that they had pro-poor policies in place for providing basic sanitation services to indigent households that met the qualification criteria for the indigent status. The majority of the BEP beneficiaries in all case study municipalities were not paying for sanitation services because they were considered indigent. None of the five municipalities made any special provision for the sanitation needs of the physically disabled people and other vulnerable groups. Households

were provided with a one-size-fits-all toilet which did not cater for the special needs of the physically disabled people.

Community participation

Four case study municipalities did not involve the beneficiary communities in the selection of sanitation technology options and implementation of the BEP. Mangaung municipality was the only one that involved the beneficiary households in the selection of waterborne sanitation system and these households were satisfied with their waterborne sanitation system.

Tokologo municipality implemented VIP toilets without involving the beneficiary community and these toilets were rejected and vandalised by the community. This experience taught the municipality a costly lesson on the importance of community participation in the selection of sanitation technology. The municipality conducted several workshops to engage the community of Seretse Township in the decision-making process before piloting the closed circuit wastewater treatment and recycling sanitation system. The beneficiary community supported the choice of this technology because they were aware of all the technical constraints associated with the implementation of conventional waterborne sanitation system in this township due to water scarcity in this area.

The community representatives who participated in focus group discussions in Sol Plaatje municipality indicated that they were dissatisfied with the location of their toilets next to the kitchen and dining-room. They believed that this could have been avoided if they were consulted and their preferences taken into consideration before the construction of toilets.

The lack of engagement of beneficiary communities in 4 out of 5 case study municipalities resulted in the lack of ownership of toilets by households who believed that the municipality should be responsible for repairing leaking toilets and broken doors at no cost to them.

Although all the focus groups were happy with their waterborne sanitation facilities, they indicated that they would have liked to be consulted and be involved in the implementation of the bucket replacement projects.

Financial sustainability

Affordability of operation and maintenance of the waterborne sanitation system by beneficiary households was not taken into consideration during the selection of waterborne sanitation system in all five case study municipalities. A political decision was taken to replace buckets with the waterborne sanitation system. All municipalities assessed were faced with a problem of poor payment for municipal services.

The replacement of the buckets with waterborne sanitation system in Mangaung municipality resulted in a huge saving in O&M costs because the O&M cost of the buckets was more than twice that of the waterborne sanitation system per stand. None of the beneficiaries of the BEP were paying for sanitation service in this municipality, but the Councillor indicated that the municipality was planning to start billing households for sanitation services.

In Tokologo municipality, the households that were connected to the closed circuit wastewater treatment and recycling sanitation system were not paying for the service because this was still a pilot project. However, the municipality was planning to install meters in future so that households could pay based on the volume of grey water used to flush their toilets.

Sol Plaatje municipality had a high dependency on equitable share because more than 40% of its households were indigent and it was providing free O&M service for fixing the blocked drains inside the plots in black and coloured townships. The Ward Councillor interviewed for the study expressed concern about the long-term financial sustainability of O&M for sanitation services for poor communities.

The City of Matlosana implemented several successful initiatives to improve the debt collection rates, these contributed to the increase in the rate of payment of municipal services by its consumers. The beneficiaries of BEP that were not registered as indigents were paying for sanitation services in the two townships assessed as part of this study.

Due to high levels of poverty in Makana municipality, all BEP beneficiary households were not paying for sanitation services because they were considered to be indigent. The high dependency on equitable share grant was a source of great concern for Makana municipality because it could threaten the long term financial sustainability of sanitation services if the national government was unable to sustain the increase in the equitable share allocation.

The municipalities with low revenue base such as Sol Plaatje, Makana, Tokologo were concerned about the increasing number of indigent households and their high dependency on equitable share.

Environmental sustainability

South Africa is a water scarce country; therefore the protection of the health of aquatic ecosystems is one of the pillars of the National Water Act (DWA, 1998). Municipalities have a legal obligation to prevent pollution of water resources. The study found that only Mangaung and Sol Plaatje municipalities had dedicated budgets and teams that were responsible for monitoring sewers to detect blockages and leakages.

Mangaung Municipality had maintenance teams and a system for logging sewerage blockages and the information was passed on to the refurbishment teams to conduct investigation and to resolve the cause of the blockages. This municipality also allocated a dedicated budget for refurbishment contracts. However, the inspection of the bulk sewer infrastructure by the researcher showed that the some bulk sewer pipes installed under the BEP were left exposed and some of these pipes were leaking.

The neglect of user education by 4 out 5 case study municipalities was responsible for the high incidence of toilet blockages caused by the use of inappropriate anal cleansing materials and disposal of foreign materials such as condoms. This led to sewage overflow from

manholes thus posing an environmental hazard. This could have been avoided if user education on proper operation and maintenance was provided during the implementation of the BEP.

Mangaung Municipality was the only case study municipality that conducted a thorough review of its water supply and wastewater treatment capacity before taking a decision to replace the buckets with the waterborne sanitation system.

A review of the performance of Mangaung municipality in the 2011 Green Drop assessment programme revealed that although Mangaung Municipality had taken measures to protect the environment from pollution, its average 2011 Green Drop Score (GDS) was 38% and all its eight wastewater treatment plants scored poorly in wastewater quality compliance. This was a major concern for the DWA regulator because this municipality had technically competent personnel (DWA, 2011).

In Tokologo Municipality the users of the closed circuit wastewater treatment and recycling sanitation system experienced regular blockages of the drains and this caused overflow of sewage from manholes thus leading to the pollution of the local environment. There was also a pollution threat from the failure of valves that control the flow of treated grey water from the storage tank to the connected households. Due to the lack of technical capacity within Tokologo municipality, an external contractor was appointed by the municipality to operate and maintain the pilot plant for a period of two years.

A review of performance of Tokologo Municipality in 2011 Green Drop Report showed that this municipality received an average municipal GDS of 0%, all its 3 plants had deteriorated to the maximum risk profile and the final effluents were 100% non-compliant thus posing a huge pollution threat to the limited local water resources (DWA, 2011).

Sol Plaatje Municipality had put measures in place to protect the environment from malfunctioning sanitation systems; it had dedicated O&M teams for the different suburbs and townships to ensure that blockages of the drains and sewers were addressed before they could create environmental problems. The municipality was experiencing a problem of cable theft from one of its wastewater treatment works (WWTWs) and this had a negative impact on the efficiency of the wastewater treatment process, if the problem was not addressed, it could create an environmental hazard.

A review of the performance of Sol Plaatje in the 2011 Green Drop Report showed that this municipality received an average GDS score of 76% in 2011 Green Drop assessment, but two out of three of its WWTWs received very poor scores for wastewater quality compliance. All its three plants had already exceeded the wastewater treatment capacity, thus posing a pollution threat to the local water resources that were receiving the non-compliant effluents (DWA, 2011). The municipality was in the process of upgrading its wastewater treatment works to meet the increasing demand.

An on-site inspection of the wastewater treatment works of the City of Matlosana found that Klerksdorp and Hartbeesfontein WWTWs were discharging non-compliant effluents into local rivers. This was causing the deterioration of water quality downstream of these plants. The high biological oxygen demand (BOD) wastewater from the abattoir was presenting the municipality with a huge challenge in proper operations of its Klerksdorp wastewater treatment plant. This wastewater became septic in the inlet screens due to blockages caused by the clots from abattoir wastewater. This had a negative impact on the wastewater quality compliance of this plant.

The municipality was faced with the following problems with regards to proper operation and maintenance of the Hartbeesfontein wastewater treatment works:

- The uncontrolled release of wastewater from the chicken processing factory affected the proper operation of the Hartbeesfontein WWTWs because of the high BOD wastewater that flows to the plant, daily.
- Chicken feathers cause blockages in the system and compromised the effectiveness of the treatment process and compliance of the treated effluent quality.
- Fat deposits increased the concentration of suspended solids especially in winter; this had a negative impact on the proper operation of the plant and the quality of the treated effluent discharged.

Poor sludge disposal practice was identified in Klerksdorp WWTP and this could pose a risk to the environmental integrity. The plant operators reported a problem of slow response by the management to the request for the replacement of crucial components of the wastewater treatment plants. The delayed response from the municipal management compromised the efficiency of wastewater treatment processes and had a negative impact on streams that were receiving non-compliant effluents from the WWTWs of this municipality.

Matlosana received an average municipal GDS of 51.7% in 2011 Green Drop report and two out of four of its plants scored less than 50% for wastewater quality compliance, these plants were considered to be in high risk space because of the threat they posed to the local water resources (DWA, 2011). The problems areas identified during the physical inspection of the plant by the researcher concurred with the findings of the 2011 Green Drop report on Klerksdorp WWTP such as the poor score in wastewater quality compliance due to difficulties in treating the high BOD wastewater from the abattoir, lack of proper disposal of dried sludge which was stored in the plant. According to the 2011 Green Drop report, the flow meters had not been operational for two years; this had a negative impact on proper operations of the Klerksdorp WWTWs.

The study identified the lack of enforcement of municipal by-laws was as a major problem. The following figures (1-5) highlight the problems in Klerksdorp WWTWs and impacts of the chicken factory in Hartbeesfontein WWTWs

Figure 1: Wastewater with blood flowing into the screens in Klerksdorp WWTWs

Figure 2: Bloody wastewater turning septic in one of the inlet screens due to blockage caused by "thick" clots of blood in the wastewater

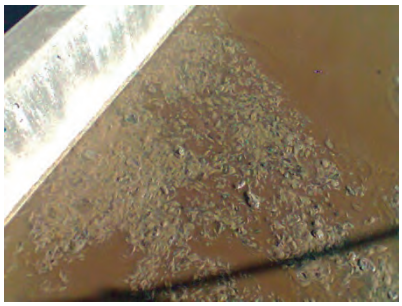

Figure 3: Feathers collected in one of the corners of the activated sludge reactors in Hartbeesfontein

Figure 4: Secondary clarifier

Figure 5: Fat, blood and feathers collected in one of the corners of chlorine contact tank

Makana municipality had not taken any special measures to ensure environmental sustainability. The municipality received an average GDS of 49% in 2011 and all its three plants scored very poorly in wastewater quality compliance and the non-compliant effluents were posing a huge pollution risk to the receiving waters (DWA, 2011). However, Makana Municipality was taking steps to build the technical capacity needed to improve operation and maintenance of its wastewater treatment plants by supporting the training of the plant operators through a partnership with DBSA-Siyenza Manje programme.

Integration of Water Conservation/Water Demand Management principles

Four municipalities did not take any water conservation and water demand management measures into consideration during the implementation of BEP. Mangaung municipality was the only municipality that installed 6 litre cisterns in household toilets to reduce water consumption. This municipality was also participating in the National WC/WDM programme and it was supporting a water leak detection and repair project to help households to reduce water consumption.

4.3 Use of innovative approaches by case study municipalities

The study identified the following innovative approaches that were used by three case study municipalities to improve sanitation service delivery:

Mangaung Municipality organized tours of local school children to the bucket eradication project sites to create awareness of careers in the sanitation field. Its aim was to attract more young people to careers in the sanitation sector. The municipality also targeted the youth with the health and safety awareness campaign, this contributed to the reduction in the incidence of accidents during the BEP construction phase.

Tokologo Municipality piloted the closed circuit wastewater treatment and recycling sanitation system in response to the community demand for the waterborne sanitation system under conditions of severe water scarcity. This technology is an adaptation of the Rapid Reactor Activated Sludge System which was originally developed for treatment of wastewater for re-use in the irrigation of lawns. The following Figures 6 and 7 show the components of the close circuit wastewater treatment and recycling plant:

Figure 6: Tokologo – Close circuit wastewater treatment tank divide into three compartments of equal volume

Figure 7: Storage tank with treated wastewater for distribution to the connected houses

Makana Municipality in partnership with Rhodes University – EBRU successfully demonstrated the application of Integrated Algal Pond System (IAPS) in the treatment of municipal sewage. The effluent produced from this technology meets the national effluent discharge quality standards (Wells, 2005). This robust and low-cost wastewater treatment technology could offer small rural municipalities with limited technical skills an appropriate high level of sanitation service that produces effluents of acceptable quality and generates algal biomass which could be used for crop production. It could also reduce the financial burden of providing waterborne sanitation services to communities that could not afford to pay for sewerage services due to poverty. The technology could create employment in poor municipalities and also contribute to the prevention of pollution of water resources. Makana was still looking for sources of funding to scale-up the IAPS for treating its municipal sewage. The IAPS pilot plant is shown in Figure 8 below:

Figure 8: Makana IAPS – Pilot plant in Belmont Valley wastewater treatment works

4.4 Perceptions of the BEP by beneficiary households

The following issues were highlighted by the focus group discussions with representatives of beneficiary households and interviews of Ward Councillors in the five case study municipalities.

Impact of the BEP on the quality of life for the beneficiary communities

The majority of the participants in focus group discussions in all five case study municipalities were satisfied with their new waterborne sanitation facilities which were safe, convenient and hygienic. Households were no longer subjected to the awful smells which used to pollute the air on days when the buckets were placed on the streets for collection. They believed that their quality of life had improved and their human dignity was restored. Community members who were forced to defecate in bushes because they could not stand the filthy and smelly bucket toilets were now using the new toilets. Even their young children were able to use the flush toilets without fear, mothers used to worry that their young children would fall into the bucket toilets.

However, one focus group of community representatives in Mangaung were dissatisfied with the poor quality of materials used to build their toilets, they reported that toilet seats were already falling apart. Tokologo community representatives were happy to have flush toilets but the closed circuit wastewater treatment and recycling sanitation system did not meet their expectations in terms of reliability. Households from Sol Plaatje municipality who were provided with Urine Diversion Sanitation system were dissatisfied with this sanitation technology options because they perceived it to be inferior. Other problems experienced by some communities were delays in municipal response to blocked drains. They expressed concerns about the use of inappropriate anal cleansing materials which caused frequent blockages of toilets because poor households could not afford to buy toilet papers.

Improvement in health

All focus group participants believed that the replacement of the buckets with waterborne sanitation system contributed to a reduction in the incidence of diarrhoea in children. The local clinic sister interviewed as part of this study confirmed that there was a reduction in the incidence of diarrhoea in children in the BEP beneficiary communities in Sol Plaatje municipality. The focus groups also reported an improvement in the general health of their communities, they attributed the improvement to the elimination of flies that used to breed in uncollected buckets and spread sanitation-related diseases to the community.

The focus group participants from Makana and Tokologo municipalities were concerned about the slow progress in the eradication of the remaining buckets because these buckets were posing a health threat to their communities. This showed that communities were aware of the relationship between poor sanitation and the spread of sanitation-related diseases in their communities.

The focus group participants from the City of Matlosana and Makana municipalities where user education was provided to the beneficiary households did not report any problem of blocked toilets in their communities.

The focus group participants from Mangaung, Tokologo and Sol Plaatje municipalities believed that the lack of user education was responsible for the high incidence of blockages in their toilets because users were not aware of the importance of using toilet paper in the proper operation of their waterborne sanitation facilities.

The community leaders were concerned about the potential negative impact of the lack of H&HE and user education on the long-term sustainability of the sanitation systems. They believed that this problem could have been avoided if users were aware of the negative impact of using inappropriate anal cleansing materials and disposal of foreign objects on the proper functioning of the waterborne sanitation systems.

The focus group participants from Tokologo believed that there was no improvement in health of the children under five years old and the rest of the community because only 50% of the households were provided with waterborne sanitation facilities while 500 households were still using buckets. The local clinic nurse that was interviewed also expressed the same sentiment as the focus groups. This demonstrated the importance of allocating adequate budgets for achieving 100% sanitation coverage for the entire community in order to achieve maximum health benefits.

The focus group participants from Mangaung reported that members of the community had realized that the disposal of condoms into the toilets and use of newspapers were causing regular blockages of their waterborne sanitation system. They started a campaign to make households aware of the negative impacts of foreign materials such as condoms, sanitary towels, rags, newspapers, etc. on proper operation and maintenance of the waterborne sanitation system. This campaign was led by a husband and wife team without any payment from the municipality. This showed that there was room for municipal/community partnership in the promotion of proper O&M of sanitation facilities at the local level.

Lack of community involvement

Although all the focus groups from the case study municipalities were happy with their waterborne sanitation toilets, they indicated that they would have liked to be consulted and be involved in the implementation of the bucket replacement projects. Only Mangaung involved the beneficiary households in the selection of waterborne sanitation technology. The lack of engagement of beneficiary communities in case study municipalities resulted in the lack of ownership of toilets by some households who believed that the municipality should be responsible for repairing leaking toilets and broken doors at no cost to them.

4.5 Challenges and lessons learned from the BEP case study municipalities

4.5.1 Challenges

The following challenges were identified by municipal officials from the five case study municipalities:

Securing adequate funds for the bucket eradication programme – The national bucket eradication fund was limited to pre-1994 buckets in formal townships, therefore, municipalities with limited revenue struggled to eradicate all post-1994 buckets.

Affordability of waterborne sanitation services for the poor – The smaller and poor municipalities were concerned about financial sustainability of waterborne sanitation services because the majority of the BEP beneficiaries were indigent and even those households who could afford to pay were not paying for sanitation services.

Use of inappropriate anal cleansing materials by poor households – Three case study municipalities were faced with a problem of regular blockages of drains because poor households could not afford toilet paper and they were also disposing foreign materials into the toilets. This increased O&M costs sanitation in these municipalities.

Lack of funds to upgrade and build new wastewater treatment works – Some municipalities with limited funds were struggling to secure funds for upgrading or building new WWTWs to accommodate the additional connections. This affected the quality of the wastewater discharged from these overloaded WWTWs.

Critical shortage of technical skills – Most case study municipalities did not have adequate technical skills for operation and maintenance of wastewater treatment plants.

4.5.2 Lessons learned

The following lessons are based on the outcomes of the BEP evaluation in case study municipalities:

- The problem of poor quality of the building materials and bad workmanship highlighted the importance of appointing technically competent people to conduct quality assurance for the sanitation infrastructure.
- The neglect of user education was costly because it increased the O&M costs for the municipalities and households due to frequent blockages of the drains and sewers.
- Neglecting community involvement in the selection of sanitation system could be costly, for example, the rejection and vandalization of VIP toilets in Tokologo.
- The close circuit waste water treatment and recycling sanitation system had a potential to provide households with a higher level of services if it was operated and maintained properly.
- The successful piloting of the Integrated Algal Pond System (IAPS) for the municipal sewage treatment by Rhodes University and Makana municipality demonstrated the

important role that could be played by partnerships between universities and municipalities in finding solutions to sanitation problems.

- Municipalities could take initiatives to solve the skills problem without waiting for the national government; for example, Makana was taking steps to reverse the problem of shortage of technical skills in partnership with DBSA-Siyenza Manje programme which was training plant operators.

5 ASSESSMENT OF THE ROLE OF DEPLOYED ENGINEERS IN THE IMPLEMENTATION OF THE BEP

The National Sanitation Programme deployed 21 engineers to provide technical hands-on support to municipalities without technical capacity. This was necessary to ensure that the target of eradicating all pre-1994 sanitation buckets from formal townships was achieved by all municipalities. Survey questionnaires were used to assess the role played by the deployed engineers and their contribution to the BEP as perceived by the municipalities that hosted the engineers. The following aspects of the role of deployment engineers in the eradication of buckets from municipalities were highlighted:

5.1 Contribution of the deployed engineers

The deployed engineers performed their functions as outlined in the National Bucket Eradication Programme Strategy (DWA, 2006) and helped the majority of municipalities to eradicate the pre-1994 buckets from formal townships.

Project management

The following are examples of contributions made by the deployed engineers that were identified by the engineers and verified by the surveyed municipalities:

- Setting up of the Project Management Unit (PMU) and compiling project management systems and policies to assist with the proper functioning of the PMU;
- Building of the capacity of municipal officials to run meetings and record minutes properly;
- Developed financial control systems for the municipalities;
- Ensured that the Safety and Health issues were addressed in BEP projects;
- Served as service providers, consultants and contractors for the municipalities with limited or no technical skills;
- Ensured that the bucket eradication projects were implemented according to the programme specifications;
- Contributed to the improvement of registrations, implementation and the expenditure of project budgets;
- Contributed to the municipal strategic meetings in municipalities with limited management capacity;
- Assisted municipal managers to understand the project life cycle and reporting methods in a few municipalities with limited management capacity.

Influence of deployed engineers in the choice of sanitation technology options

The survey assessed the level of influence exercised by deployed engineers on the beneficiary municipalities with regards to the selection of the sanitation technology options, planning for O&M costs, affordability, use of water efficient sanitation technologies, assessment of capacity of the water supply system and wastewater treatment works to support new connections. The study found that the deployed engineers played a limited role in influencing the choice of sanitation technology options because a political decision was already taken to

replace the buckets with the waterborne sanitation system. A few exceptions were Tokologo, Nketoana and Nama Khoi municipalities which used alternative sanitation technologies to replace the buckets (Close circuit wastewater treatment and recycling sanitation system or Urine Diversion Sanitation (UDS) system). The municipalities who were concerned about sustainability of waterborne sanitation system could not replace the buckets with dry sanitation technologies because the beneficiary communities demanded a higher level of sanitation service and refused to accept dry sanitation technologies. The deployed engineers helped Matjhabeng and Mohokare municipalities to rehabilitate and upgrade their existing dysfunctional wastewater treatment works.

Transfer of skills to municipal officials

Plant operators from six municipalities in Free State province were trained by engineers on how to troubleshoot wastewater treatment plant problems. The engineers also coached and mentored junior technical staff on technical aspects of wastewater treatment processes. The engineer who was deployed to Letsemeng Municipality trained the technical officials on the requirements of the Green Drop certification.

Positive impacts of deployed engineers on beneficiary municipalities

The following positive impacts of deployed engineers were identified by municipal officials:

- Deployed engineers helped municipalities to save money because their professional fees were paid by the National Sanitation Programme.
- They assisted the local builders to improve their skills and motivated them to start their own construction businesses.
- A few deployed engineers continued to support the municipalities beyond the completion of the accelerated BEP phase.
- Working with the deployed engineers helped to improve the skills of municipal officials in the implementation of capital projects.

5.2 Review of the technical performance of surveyed municipalities

The review of technical performance was conducted to determine whether the deployed engineers had any positive effect on the 2011 Green Drop Scores of the beneficiary municipalities. The following findings are based on the comparison of the survey responses of the deployed engineers and municipal officials with the 2011 Green Drop scores of the surveyed municipalities:

- The majority of the surveyed municipalities from Free State and Northern Cape provinces performed poorly in the 2011 Green Drop assessment programme despite the technical support provided by deployed engineers. The average Green Drop Scores (GDS) for FS and NC provinces were 32% and 23%, respectively. These scores placed the two provinces in the bottom three worst performing provinces in the 2011 Green Drop Assessment Report (DWA, 2011).
- There were a few improvements in the 2011 GDS technical performance for a few surveyed municipalities that could be attributed to the interventions of the deployed engineers, for example:

- Mohokare Municipality was the only surveyed Free State municipality that received a Green Drop Score of more than 50% (58.6%) and two of its plants achieved 100% score for wastewater quality compliance (DWA, 2011). The municipal official's response to the survey confirmed that the deployed engineer assisted this municipality to assess its wastewater treatment capacity and helped it to upgrade two of its plants. The regulator commended the municipality for its efforts in improving O&M of its wastewater treatment plants.
- Letsemeng Municipality improved wastewater quality compliance for its two wastewater treatment plants (62%) and the regulator was impressed with the positive trends shown by this municipality in the 2011 Green Drop assessment. The improvement could be attributed to the deployed engineer who trained the technical staff on requirements of Blue and Green Drop certification.

The following surveyed municipalities performed poorly despite the hands-on technical support of deployed engineers:

- Nala Municipality performed poorly in the 2011 GDS and this was attributed to the lack of competent technical staff in the 2011 Green Drop Report (DWA, 2011). The survey response of the engineer deployed to this municipality was that no transfer of technical skills could be done because there was not technical qualified official who could be trained to operate and maintain the wastewater treatment works in this municipality.
- A few surveyed municipalities had already failed to operate and maintain new wastewater treatment plants constructed to support the BEP, for example, Ngwathe municipality had a new wastewater treatment plant which was commissioned in 2009 which received a GDS of 0% for wastewater quality compliance.

The general impression from the review of the technical performance of the surveyed municipalities was that more support was required from the National Government to ensure that the huge investment made in improving the wastewater treatment infrastructure in municipalities is matched with the allocation of adequate resources to operate and maintain them properly and protect aquatic ecosystems. The support should be coupled with an accelerated programme of skills development for plant operators. If these measures are not implemented, the under-resourced municipalities without technical skills will continue to degrade our scarce water resources and pose a threat to public health, environmental integrity and economic development of South Africa.

5.3 Challenges faced by deployed engineers

The deployed engineers faced the following challenges during their deployment to municipalities:

- Difficulty in accessing information from the municipalities which was needed to fulfil their contractual obligations.

- Initially they experienced a lack of acceptance by the municipal officials and resistance to taking their advice on projects.
- Political interference in the implementation of the BEP;
- Verbal appointment of contractors by municipalities without pre-defining scope of work and this created a problem of poor accountability.
- No agreed schedule of rates between the municipalities and contractors, thus resulting in disputes.
- Appointed contractors under-estimated the budgets required to undertake the projects, once they discovered that the projects were no longer economically viable, they abandoned the projects.
- Inadequate capacity to undertake quality control of projects at the municipality level thus resulting in contractors being paid for shoddy work.
- Shortage of skilled personnel in the municipalities.
- Some service providers were not professionally competent to tackle the challenges associated with the implementation of the BEP implementation.
- Municipalities had difficulty in working with consultants who were appointed by National DWA because these consultants were outside the municipality's chain of command and control.

5.4 Lessons learned from the technical hands-on support of the BEP

The following lessons were highlighted by deployed engineers and beneficiary municipalities:

Perspectives of deployed engineers

- The costs of implementing the bucket eradication programme could have been reduced significantly if proper planning was undertaken before commencement of the construction of sanitation infrastructure.
- The BEP placed enormous pressure on wastewater treatment plants which did not have spare capacity for new connections and the bucket eradication fund should have taken this into consideration.
- Poor management of consultants and lack of terms of reference for monitoring their performance made it difficult to make them accountable.
- Established companies could have been jointly appointed with emerging contractors to facilitate capacity building and mentoring.
- An enabling political environment was crucial to the success of the BEP.
- The extent of technical skills shortage and lack of capacity in municipalities was huge.

Perspectives of the beneficiary municipalities

- Procedures and processes to be followed must be understood by all decision-makers before making final decisions on infrastructure to be implemented, for example, a feasibility study should be done to understand an overall project framework.
- It was important for municipalities to take ownership of their projects instead of handing over control to the consulting engineers.

- Importance of clarification of roles and responsibilities for proper operation and maintenance of sanitation facilities between end-users and the municipality. This should take place before the construction of the sanitation infrastructure.

5.5 Recommendations

The surveyed deployed engineers and beneficiary municipalities made the following recommendations for improving sanitation upgrade programmes:

- Selection of sanitation technologies should be based on local conditions because a one-size fits all approach does not work.
- Proper O&M plans and manuals must be in place before the construction of the new sanitation infrastructure commences.
- Competent management and technical personnel are critical for the proper operation and maintenance of sewerage networks and wastewater treatment plants.
- National government should continue to deploy engineers to support the struggling municipalities to ensure that the new wastewater treatment works continue to be operated and maintained properly.
- The bucket sanitation system should never be used again as a sanitation option because of public health risk and environmental hazards.

6 REVIEW OF THE FINANCIAL PERFORMANCE OF SELECTED MUNICIPALITIES

The aim of the review was to assess the financial performance of the seven municipalities over a period of three consecutive years following the eradication of the majority of buckets. The review of financial performance was based on the analysis of IDPs, Annual Reports and Annual financial statements of the four surveyed municipalities from Free State province and three case study municipalities. Only municipalities that had a complete set of annual reports and annual financial statements for 2008, 2009 &2010 were selected for review.

6.1 Financial performance of the selected municipalities

Matjhabeng Municipality

Between 2001 and 2007, Matjhabeng experienced a 40% reduction in households with no income and the income trends showed that residents were moving from low income to middle and high income groups. Despite the positive income trends, the municipality was faced with a problem of poor revenue collection which strained its cash flow position. To address this problem, the municipality reviewed and implemented credit control and debt collection policies. Figure 9 below shows an increase in revenue and expenditure over the three years and in 2010 there was a reduction in bad debts, water and sanitation debtors. This could indicate that the credit control and debt policies implemented by the municipality were working.

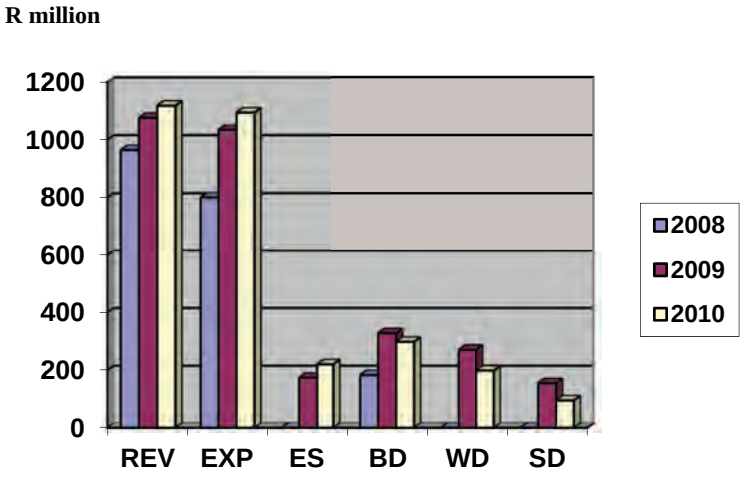

Figure 9: Matjhabeng Revenue /Expenditure patterns (Abbreviations: REV = revenue, EXP = expenditure, ES = equitable share, BD = bad debts, WD = water debtors, SD = sanitation debtors)

Mohokare Municipality

Mohokare municipality has a high level of poverty with 64% of its residents earning insufficient income to sustain themselves. Consequently, the municipality relies heavily on grants and subsidies to fund its operating expenses. The subsidies and grants accounted for 45.6% of the total annual revenue in 2009/2010. The revenue collection rate was very poor,

for example, in 2008/2009 the collection rate for municipal service charges was 27.3% and in 2009/2010 this was further reduced to 25.1%. The low rate of revenue collection was due to the poor implementation of credit control and debt collection policies. To address this problem, the municipality was planning to appoint competent staff in its credit control division. It was implementing regular audits of the indigent register and it was also planning to write-off debts for registered indigent households. Other measures for improving revenue collection included review of billing systems to ensure accurate billing information and the municipality had plans to put measures in place to reduce wastage of water by indigent consumers. The following Figure 10 below shows a huge increase in revenue in 2010 while expenditure was lower. On the negative side, the bad debts showed an upward trend over the three year period reviewed. No data was available on water and sanitation debtors.

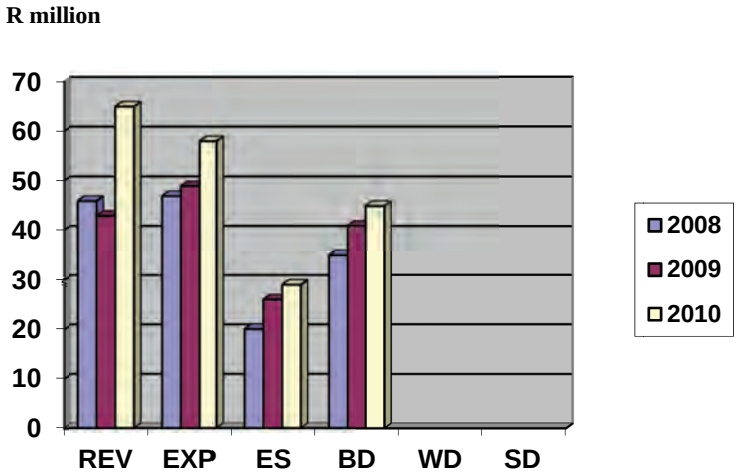

Figure 10: Mohokare Revenue/Expenditure patterns (data on water and sanitation debtors was not available)

Kopanong municipality

The majority of the population of Kopanong Municipality is extremely poor with 80.63% of households earning a monthly income of less than R1500. The municipality has a high dependency on grants and subsidies. It was also faced with a challenge of poor debt payment by government departments and business, in 2010 these two sectors accounted for 42% of bad debts. Initiatives implemented by the municipality to improve debt collection included an annual review of the debt management policy, update of consumer/debtors' databases and implementing of an on-line billing system which was linked to individual municipal town offices. Fig 11 below shows a significant increase in expenditure in 2010, a huge increase in bad debts, slight reduction in water debtors and an increase in sanitation debtors during the same year.

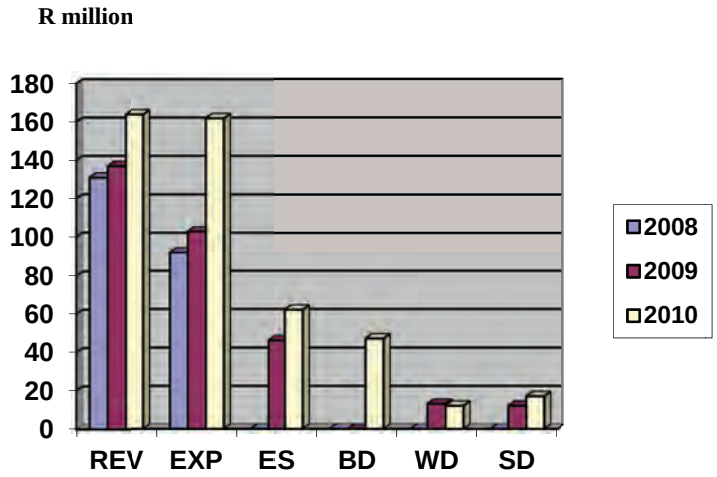

Figure 11: Kopanong Revenue/Expenditure patterns

Setsoto Municipality

Setsoto Municipality was experiencing high unemployment rate and high levels of household debt for service charges. To improve revenue and debt collection, the municipality was conducting consumer awareness campaigns on the importance of paying for municipal services. It was also deducting service charge arrears from monthly salaries of municipal officials and councillors who had service charge debt. Figure 12 below shows a downward trend in the revenue while expenditure increased over the three year period. There was an increase in bad debts and water debtors over the reviewed three years. The sanitation debtors showed a downward trend, this decrease could be attributed to the 100% sanitation subsidy for indigent households

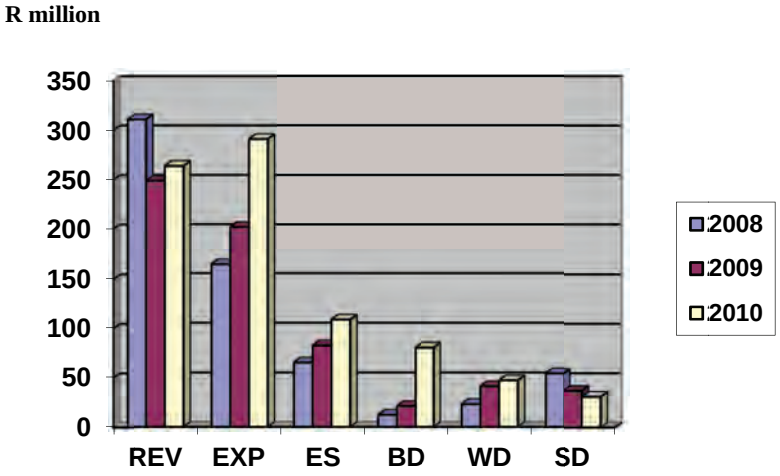

Figure 12: Setsoto Revenue/expenditure patterns

Sol Plaatje Municipality

Sol Plaatje Municipality has high unemployment rate and 27 181 households out of a total of 52 120 households were registered as indigents in 2010. The municipality achieved more than 80% revenue collection rate in 2009/2010 financial year. To improve its financial viability, the municipality was implementing several measures such as:

- Implementing cost saving measures and reducing operating costs;
- Improving billing and revenue collection rates for the billed amount;
- Ensuring correct bills and delivery of municipal accounts on time;
- Prioritising customer service in order to encourage customers to pay for municipal services.

Figure 13 below shows that a huge increase in revenue for 2010, this could be attributed to the measures implemented by the municipality to increase revenue, bad debts and water debtors were on an upward trend over the review period. The downward trend in sanitation debtors could be attributed to the 100% sanitation subsidy for indigent households.

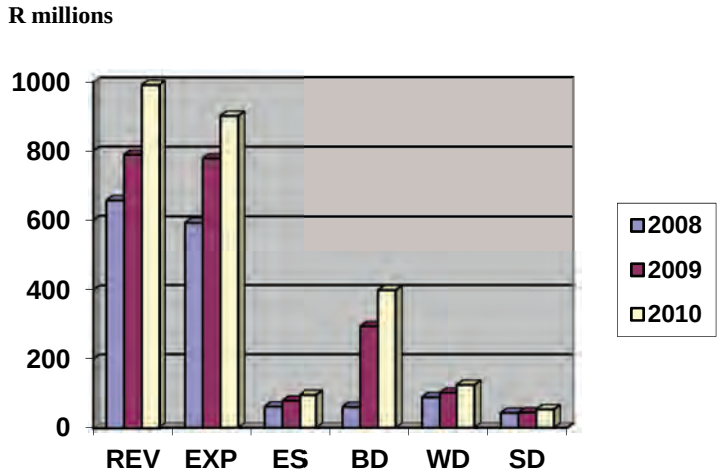

Figure 13: Sol Plaatje Municipality Revenue/expenditure patterns

Mangaung Municipality

Mangaung Municipality was faced with a problem of the increasing debtor's book due to the inability of households to pay for municipal services. This led to a decline in the levels of revenue collection for rates and service charges. To improve its financial situation, the municipality was focussing on improving revenue collection and attracting new investments into the city of Bloemfontein. It was using public awareness campaigns to register indigent households and to identify households that could afford to pay for municipal services. These campaigns were contributing to an increase in revenue collection. The municipality has implemented fiscal discipline and sound financial management systems. It was also improving financial accountability in order to achieve a clean audit. The following measures were implemented to increase the rate of revenue collection:

- Provision of free basic water and sanitation services to all households was discontinued in January 2010 and only registered indigent households were receiving free basic services.
- Establishment of dedicated business units to manage different categories of debtors, namely, business, government and residential customers. This was expected to improve revenue collection because of the availability of dedicated staff and other resources. Each business unit has staff responsible for disconnections to ensure that

consumers who fail to pay their municipal accounts on time were disconnected immediately.

- Businesses that failed to pay rates and service charges on time were not allowed to make repayment arrangements but were disconnected with immediate effect.

Figure 14 below shows an increase in revenue over three years reviewed, a slight increase in expenditure and a significant reduction in bad debts for 2010, but the water and sanitation debtors (WSD) showed an upward trend over the three years reviewed.

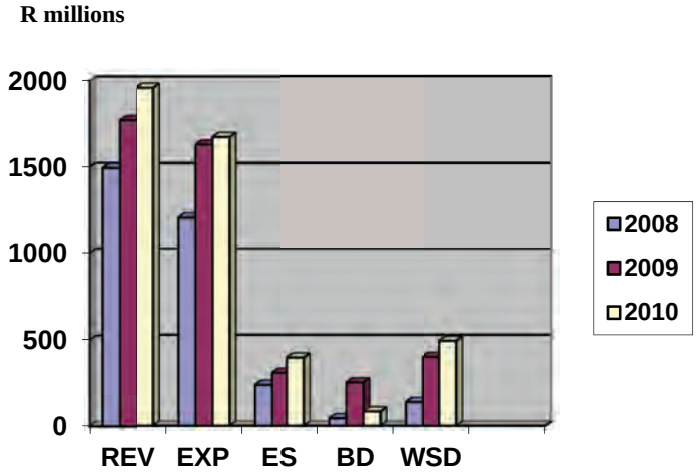

Figure 14: Mangaung Revenue/Expenditure patterns

City of Matlosana

The economy of City of Matlosana was negatively affected by the closure of some mines in Orkney and Hartbeesfontein during 2009/2010 financial year. The retrenchment of workers contributed to an increase in the number of indigent households from 37 113 households in 2007/08 to 39 389 in 2009/10. The City of Matlosana experienced lower payment levels for rates and services charges during 2009/2010. Out of total of 123 595 accounts issued in 2009/2010, only 49 872 were paid and this was equivalent to 40% payment rate. This contributed to the huge deficit shown in Figure 15 below. Since 2008, the municipality has engaged a service provider to improve debt collection for accounts that were more than 90 days overdue and this initiative helped the municipality to increase its revenue collection rate to 85%. Operation 'Patela' launched by the municipality in 2010/2011 also contributed to further improvements in the levels of payment for rates and service charges. The municipality was implementing a range of revenue collection strategies to increase levels of payment for rates and services. It was also moving towards setting water tariffs that were fully cost reflective, this was in line with the National Treasury requirement for municipality to ensure that water tariff structure reflected the full cost of service provision by 2014. Figure 15 below shows a huge increase in expenditure for 2010, increase in bad debts while water debtors and sanitation debtors showed limited change in 2010 financial years.

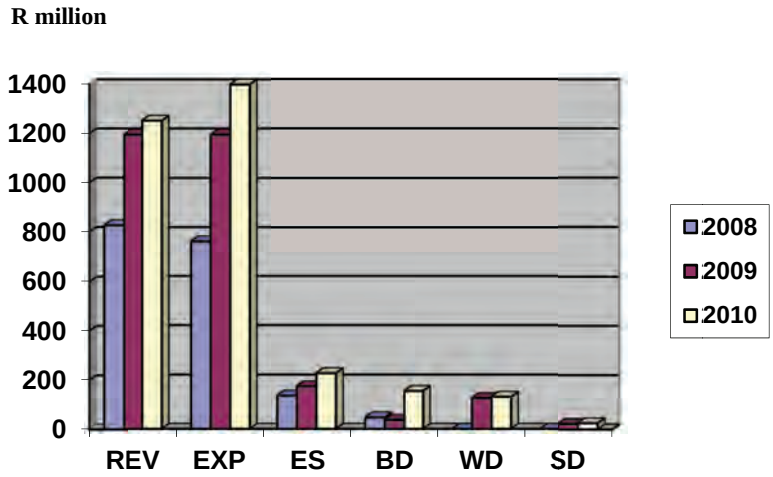

Figure 15: City of Matlosana Revenue/Expenditure patterns

6.2 Key issues emerging from the review

The following key issues emerge from the review of financial performance of the seven selected municipalities:

- Most municipalities were struggling to improve revenue and debt collection, but all the reviewed municipalities were taking steps to improve revenue and debt collection.
- The municipalities that serve poor populations had an increasing dependency on equitable share because their consumers were too poor to pay for municipal services.
- Municipalities implemented stringent debt collection measures, for example, Setsoto Municipality was deducting municipal service charge arrears from monthly salaries of municipal officials and councillors. These measures should be supported and be implemented by other municipalities facing the similar challenges.
- There was a general decline in the expenditure on repairs and maintenance in municipalities facing huge increase in bad debts. This required attention in order to ensure that municipal infrastructure continued to deliver reliable municipal services.
- Government departments and businesses were also responsible for huge service charge debts in the selected municipalities. The national government could play a role in forcing government departments to pay for municipal services on time so that they could help to improve revenue collection in the municipalities.

7 PERSPECTIVES OF THE NATIONAL SANITATION SECTOR STAKEHOLDERS

National workshops were used to solicit views of national sanitation sector stakeholders on the successes and weaknesses of the bucket eradication programme and recommendations to addressing problem areas. (Refer to the appendix for details of the stakeholders that participated in the national workshops). The perspectives of the national sanitation stakeholders on the BEP are provided below:

7.1 Political aspects

- The Bucket Eradication Programme (BEP) was driven from the Presidency, it was a Schedule 7 project with minimum influence from municipalities, and therefore, municipalities could not be held liable for the weaknesses in the BEP. Municipalities were under pressure to meet the delivery targets for the BEP by December 2007.
- The context under which the BEP was implemented was characterized by the following features:
  - Due to the pressure to meet the political driven targets, strategic sanitation planning at the local level was generally neglected;
  - Feasibility studies were not prioritized, for example, the assessment of water availability, institutional capacity and wastewater treatment capacity required to handle additional waterborne sanitation connections was not done;
  - The BEP programme did not make provision for budgets for addressing soft issues such as mobilization of beneficiary communities, H&HE and user education. These processes required a lot time, therefore did not fit within an accelerated delivery mode of the BEP.
- The municipal technical directors were forced to succumb to political pressure to replace bucket sanitation with waterborne sanitation systems under difficult technical, environmental and socio-economic constraints.
- The key performance indicator for the BEP was the number of buckets replaced, there was no focus on quality of toilets constructed, sustainability issues such as water availability, capacity of wastewater treatment works, affordability and technical capacity to operate and maintain sewerage networks and wastewater water treatment plants were not included in the key performance indicators (KPIs).
- The political targets and supply driven approach to the implementation of the BEP overlooked the definition of sanitation as a service that goes beyond the provision of a toilet.

7.2 Institutional aspects

- Despite the government's huge investments in the eradication of bucket sanitation because this technology was considered to be unhygienic and a violation of human dignity, the municipalities were continuing to perpetuate the use of buckets in urban informal settlements without basic sanitation facilities.
- The research finding which confirmed that the BEP did not comply with most sanitation policy principles raised an issue of effectiveness of national and provincial

oversight roles. It was unclear which government department had overall responsibility for regulating compliance of sanitation programmes with sanitation policy principles. The transfer of sanitation responsibility from the Department of Water Affairs (DWA) to National Department of Human Settlements (NDHS) has created confusion on responsibility for sanitation regulation, there is an urgent need to clarify roles and responsibility for regulation of sanitation services delivery.

- The municipal capacity constraint which was being blamed for all the sanitation service delivery problems identified by the evaluation of the BEP should be addressed as a matter of urgency. There was a belief that the technical skills existed in many instances, but they were not being utilised effectively.
- It was noted that National Treasury had competency criteria for finance staff in municipalities. The municipalities were required to submit regular reports on how they were meeting these competency criteria. This model could be extended to basic municipal services such as water provision, sanitation service delivery and refuse removal. DWA already had a self-assessment system in place based on 16 business attributes that were considered necessary for the provision of good sanitation services; this could be extended and developed into competency criteria.
- The momentum that was created during the accelerated phase of the BEP had been lost and the cooperation amongst all sanitation sector stakeholders at all levels of government was non-existent.
- The current perception was that bucket toilets would always exist. There was a perception amongst many communities that the only way to eradicate buckets was to build houses, which came with water and sanitation services. The buckets were 'mobile' in that they were moved to wherever they were needed. Until the housing backlog was addressed, buckets would stay. A means of eradicating the buckets needed to be identified other than merely stating that the NDHS would address the matter when houses were built. The problem existed in informal areas, and sanitation for these settlements would not be prioritised without ring fenced funds.
- During the implementation of the BEP, the government appointed private companies to control the procurement of contractors and engineering companies were commissioned to build wastewater treatment plants. But once construction was complete no further resources were allocated to ensure that these WWTWs were operated and maintained properly. The model of using the private sector to operate and maintain government infrastructure could be adapted for the municipal sector where there was no technical capacity for proper O&M of WWTWs. Examples of Koeberg power station and Gautrain network where private companies and foreign engineers were contracted to provide technical services were cited as models that could be adopted for the O&M of local government infrastructure.

7.3 Financial aspects

- The budget originally allocated for the bucket eradication programme did not take into consideration the need to upgrade, refurbish or build new wastewater treatment works to increase wastewater treatment capacity in order to accommodate the new connections to the sewerage networks.

- Most of the huge debts owed to municipalities were due to non-payment for municipal services by businesses, government institutions and middle-class households. If these groups were to start paying for services, municipalities could have more revenue to subsidize the poor.
- There was concern that most of the beneficiaries of the BEP in the 5 case study municipalities were not paying for sanitation services. In most of these municipalities the BEP beneficiaries were not billed for sanitation services, therefore, even those who could pay were unable to do so. This placed a heavy financial burden on municipalities especially those that have a low revenue base.

7.4 Technical aspects

- It was pointed out that currently engineers were not subjected to ethics committees. Some engineers built plants, received their payments, and they did not return to rectify any faults. However, engineers did have their own ethical code, and could be sued for bad workmanship. Currently the WRC was attempting to put a formal proposal to the Engineering Council stipulating that engineers be made responsible and accountable for the quality of their work.
- Engineers tended to interpret the national sanitation policies as standards. The policy recommendations stated that a minimum sanitation requirement was a VIP toilet, but it did not state that poor people should automatically get VIP toilets. The World Health Organisation did not state that poor people should get VIPs; it stated that VIPs were a minimum requirement for an adequate sanitation facility. The sanitation options are numerous.
- There could be several professionals at a national level who determined that installations complied with Construction Specifications Institute (CSI) building codes, but this thwarted innovation, and led to solutions that were not necessarily the most appropriate ones for the local context.
- It was noted that since the National Department of Human Settlements (NDHS) took over the responsibility for sanitation service delivery, the sanitation backlog had not received any further attention, it was doubtful if the target of eliminating 100% of the sanitation backlog including buckets by 2014 would be achieved.
- There was concern that since sanitation infrastructure responsibility was transferred to the NDHS, houses were being built with waterborne sanitation systems without water resource assessment being considered. Municipalities were not sure how to adapt their systems to the change because in terms of the Water Services Act of 1997, they were still submitting their Water Services Development Plans to DWA. This conflict in roles between DWA and NDHS needed resolution so that municipalities would know how to handle the sanitation service component.
- The neglect of water conservation and water demand management measures by the majority of BEP case study municipalities was a concern for the national sanitation sector stakeholders. It was suggested that municipalities could be given incentives to reduce water losses to acceptable levels by delaying investment in new water supply infrastructure until they had reduced unaccounted for water losses.

- Poor enforcement of compliance with national codes – The WRC funded research on RDP housing projects found that only 10% of the projects complied with water planning codes. In rural water supply projects, tens of millions of rands had been spent on engineering, but cheap taps had been installed that failed within a month after completion. It would have been more economical to install more expensive taps that could last for ten years and provide the beneficiary communities with a reliable water supply.
- Incentives were need to encourage municipalities to implement alternate sanitation technologies that were low cost and robust but still meet the hygiene requirements and are acceptable to the beneficiary communities.

7.5 Social aspects

- There was a general appreciation of the importance of meaningful community involvement in the planning and selection of sanitation technology options so that beneficiary communities could become active participants in their development instead of the current situation where they were passive beneficiaries. This would promote community ownership of sanitation facilities and contribute to sustainable sanitation services.
- The current interpretation of the concept of human rights led to the perception that human rights meant that everything should be free. The national government should clearly define its boundaries of responsibility. There were criteria for qualifying for free housing. Where a house was provided by government, it had to have a bathroom and toilet. Should the state's responsibility be limited to the provision of bulk sanitation infrastructure or to manage every aspect of sanitation in every house? An example of Springbok in Northern Cape Province was cited where the municipality built houses with connections to main water supply system and sanitation sewers. The households who did not qualify for RDP subsidy were expected to pay if they wanted a house connection to the main water supply system and sewerage pipes.
- A concern was expressed on the lack of provision of sanitation facilities for meeting the needs of physically disabled people during the implementing BEP in all case study municipalities and other sanitation infrastructure delivery programmes. It was argued that 100% bucket backlog eradication could not be claimed because it overlooked six percent of the population which was physically disabled. In addition to the physically disabled people, there were the frail people, elderly and other vulnerable groups with special sanitation requirements who did not benefit from a one-size-fits-all sanitation facility. Unless the physically disabled people and other vulnerable groups were considered, then a claim of 100% success was meaningless.
- According to the National Sanitation Programme Unit, the neglect of Hygiene awareness and user education by case study municipalities during the implementation of the bucket eradication programme was not due to the lack of budgets for these components because the BEP budget made provision for R300 per household to cover H&HE. It could be concluded that the lack of effective monitoring and evaluation could be blamed for the failure of municipalities to include H&HE and user education during implementation of the BEP.

- Generally, the BEP consultants and contractors did not have the necessary social focus, and they did not always consider the hygiene awareness and user education as components of sanitation infrastructure projects.
- Although the NSP unit had produced several hygiene education and awareness brochures, guidelines and supporting documents and conducted dissemination workshops across the country, these initiatives did not reach the beneficiaries at the local level. There was a need to support the promotion of hygiene awareness and user education at the lowest level and it was also important to create awareness amongst all spheres of government that H&HE was not a once-off event but it was an on-going component of sanitation service delivery which was necessary to achieve sustainable behavioural change.
- Beneficiary households must be made aware of the availability of budgets for Hygiene and user education during the community mobilization phase so that they could demand these services from their municipalities. This would also help to increase accountability of contractors and municipalities to the beneficiary households.
- The following examples of good practice with regards to H&HE and user education were cited by the workshop participants from the Eastern Cape Province:
  - Implementation of rural VIP sanitation projects in the villages of the Eastern Cape was preceded by the provision of H&HE and end-user education. This was being done in partnership with the National Sanitation Programme Unit which monitored the implementation of H&HE and funded the training of field workers who were responsible for H&HE and user education. This approach had already resulted in more sustainable sanitation outcome.
  - It was pointed out that a number of municipalities in the EC province were already training members of the community as village health workers, who were then employed by the municipality to conduct on-going H&HE in the villages.
- Community involvement and Hygiene education must be the cornerstone of sanitation improvement programmes in order to ensure sustainable sanitation services for the poor communities. The government should review the supply driven approach to sanitation infrastructure which characterized the BEP because it failed to empower beneficiary communities to become active participants in their development. It perpetuated community dependency on government and made beneficiaries to expect that the municipality had an obligation to repair the broken toilets at no cost to them.
- Importance of community involvement was highlighted by research conducted by the WRC on rural sanitation projects implemented during the first ten years of the rural sanitation programme. In this programme sanitation projects were participatory and depended on contributions from the community in the form of 'sweat equity' or input of some kind. Household toilets were implemented quickly and successfully when there was community contribution and households took ownership of their toilets. The next ten years had been characterized by 100% subsidy for toilet construction and external project management for sanitation projects. Consultants and engineers would enter communities, erect toilets and leave, providing limited H&HE or follow up, if

any. The current period was one in which the mistakes resulting from the supply-driven approach were being rectified.

8 LOOKING AT THE BEP THROUGH THE SUSTAINABILITY LENS

8.1 Understanding the meaning of sustainable sanitation services

8.1.1 Multi-dimensions of sustainable sanitation services

According to WaterAid (2010) sustainability refers to sanitation services and good hygiene practices that continue to work and deliver benefits over time. It is about lasting benefits achieved through sustained sanitation services and good hygiene practices.

Sustainable sanitation services have the following five dimensions:

- *Social sustainability:* Sanitation services must be acceptable to the end-users; therefore a full engagement of beneficiaries in the selection of the sanitation technology option is mandatory to ensure that users take ownership of the sanitation facilities provided. The community consultation provides the municipality with an opportunity to assess willingness to pay for improved services and to negotiate roles and responsibilities for O&M of sanitation facilities during the planning phase.
- *Institutional sustainability:* The selection of the sanitation technology and service levels must be based on availability of technical and management capacity at the municipal level. Ability to collect revenue needed to fund service delivery must also be assessed upfront.
- *Technical sustainability:* The choice of the sanitation technology must be based on a thorough assessment of the local technical constraints such as potential groundwater pollution where on-site sanitation technologies are considered and where waterborne sewerage systems are considered, the wastewater treatment capacity and availability of water and capacity of the water supply infrastructure. Plans for disposal of sludge from the wastewater treatment plants and O&M plans must be in place before commencement of the construction phase. Access to scientific laboratories for testing the quality of effluents must be established to ensure that they comply with the national effluent quality discharge standards.
- *Financial sustainability:* Sanitation services must be affordable to the municipality and beneficiary households. Where certain categories of households require sanitation subsidy, it must be established how much subsidy can be sustainably provided before decisions are taken to select sanitation technologies and service levels. The funding sources for O&M and rehabilitation, upgrade and construction of new bulk infrastructure must be taken into consideration.
- *Environmental sustainability:* Sanitation services should not have negative impacts on the environment such as pollution of water sources from disposal of untreated human excreta and poorly treated effluents. Municipalities have a legal responsibility to protect public health and aquatic ecosystem.

8.1.2 A framework for strategic planning of urban sanitation

The multi-dimensional facets of sanitation services require a strategic planning approach to address the complex challenges of urban sanitation services for the poor. Parkinson and Saywell (2011) highlighted the following key factors for successful strategic planning for sustainable sanitation services:

- Spatial and temporal dimensions affecting the demand for sanitation services in different parts of the city must be considered.
- Effective participation of stakeholders in order to secure their buy-in for the implementation of sanitation improvement programme.
- Transparent relationship between institutions and clarification of roles and responsibilities for the different stakeholders and role-players.
- Capacity must be built to prepare and implement strategic plans at the municipal level.

8.2 Assessment of BEP performance against the multi-dimensions of sustainable sanitation services

8.2.1 Social sustainability

The findings from the evaluation of the BEP in five case study municipalities from four provinces showed that there was limited or no engagement of beneficiary households in the planning and selection of sanitation technology options. Focus group discussions with representatives of the selected communities indicated that they would have liked to be consulted and involved in the implementation of the BEP. There was no clarification of roles and responsibilities for O&M of the sanitation facilities between the municipality and beneficiary households. The lack of end-user education resulted in regular blockages of toilets because of use of inappropriate anal cleaning materials and disposal of foreign materials.

In all five case study municipalities, the implementation of the BEP failed to make provision for sanitation facilities that met the special needs of physical disabled people and other vulnerable people. Households were provided with one-size-fit-all toilets and these toilets were not accessible to physically disabled people and other mobility impaired groups
Sanitation services delivery was about people; therefore, community involvement should be the cornerstone of sustainable sanitation services delivery because it leads to community ownership of the improved sanitation facilities. Therefore, the neglect of community engagement perpetuated community dependency on government and undermined community empowerment.

A report by COGTA (2009) indicated that the lack of genuine community engagement was responsible for the failure of local democracy and lack of accountability of the Local Government to the communities that they serve. According to this COGTA report the increase in service delivery protests could be attributed to the lack of effective community engagement by the local government.

8.2.2 Institutional sustainability

The National Government recognized that some municipalities lacked the technical capacity necessary to meet the target of eradicating all pre-1994 buckets from formal townships by December 2007. To address this gap, engineers were deployed to these municipalities to

support the implementation of the accelerated bucket eradication phase. However, the BEP decision-makers did not take any long-term measures to build the management and technical capacity in municipalities so that the new and/or upgraded sanitation infrastructure could be managed or operated properly. The large investments that were made in new wastewater treatment works to treat the wastewater from the additional connections to the sewerage networks were under threat because of failure to invest in management and technical capacity necessary to ensure proper O&M of the sewerage networks and wastewater treatment plants.

The accelerated BEP phase was successful in fostering effective coordination at all levels of government and it had systems in place to keep all the stakeholders and role-players informed of the progress in the eradication of pre-1994 buckets from formal townships. Municipalities were provided with all the resources they needed to achieve the delivery targets. Unfortunately at the end of this accelerated phase of BEP, the municipalities were left to deal with the challenges of eradicating the post-1994 buckets in formal townships without any dedicated funding. The technical capacity that was deployed to assist the municipalities to meet the deadline of December 2007 was withdrawn at the end of the accelerated BEP phase. There were no plans to support the municipalities without technical skills to operate and maintain the new sewerage networks and wastewater treatment plants. This has resulted in dysfunctional wastewater treatment works that were discharging non-compliant effluents into local resources.

The National Bucket Sanitation Eradication Strategy of DWAF (2006) identified insufficient municipal capacity as a risk to sustainability, for example, the additional sanitation infrastructure required sufficient financial resources and qualified technical staff that would be able to operate and maintain the new wastewater treatment works and prevent pollution of local water resources from poorly treated effluent discharges. The strategy urged the decision-makers to consider the risks to sustainability during the planning phase. The problem of on-going lack of technical skills identified by the study indicated that municipalities did not implement any measures to mitigate against the sustainability risks identified in the National Bucket Eradication strategy (DWAF, 2006).

Poor enforcement municipal by-laws was identified as a problem in one of the case study municipalities, this led to the disposal of high BOD wastewater from abattoirs and chicken industry without pre-treatment. This compromised the wastewater treatment processes and led to the discharge of non-compliant effluents.

The BEP performed poorly on this sustainability indicator because it did not make any provision for technical capacity needed for proper O&M of the new sanitation infrastructure after the completion of accelerated BEP phase.

The shortage of skills has been blamed for the failure of municipalities to deliver sustainable sanitation services. A report on the status of sanitation services in South Africa (DWA, Presidency, NDHS, 2012) identified the lack of technical capacity, high staff turn-over,

ineffective support programmes to municipalities and inadequate financial and management capacity as contributing factors to slow poor progress in the provision of sanitation services.

8.2.3 Technical sustainability

The majority of municipalities succumbed to political pressure and implemented waterborne sanitation systems although they were aware of technical constraints such as lack of water and limited wastewater treatment capacity. The politicians who made the decisions on the selection of the waterborne sanitation system focused on the replacement of the bucket with a waterborne sanitation toilet. They failed to appreciate that a toilet was not synonymous with a sanitation service, it was only one of the components of an adequate sanitation service, and other components of a sanitation service were hygiene awareness, user education, wastewater treatment capacity and O&M. The consequences of these omissions were high incidence of toilet blockages due to the use of inappropriate anal cleansing materials and disposal of foreign objects into the toilets, dysfunctional wastewater treatment works due to inadequate treatment capacity to handle additional connections.

Although South Africa is a water scarce country, the National Bucket Eradication Strategy (DWAF, 2006) was silent on the integration of water conservation and water demand management measures during the replacement of buckets with the waterborne sanitation system. Consequently, the majority of case study municipalities did not take WC/WDM measures into consideration when buckets were replaced with waterborne sanitation systems.

The majority of the municipalities that were surveyed for the study performed poorly in the 2011 Green Drop Assessment programme and in most cases the effluents discharged by their wastewater treatment plants failed to comply with wastewater discharge quality standards, the DWA regulator attributed this failure to plants that had already exceeded the design capacity.

It was worth noting that the National Bucket Sanitation Eradication Strategy (DWAF, 2006) emphasized the importance of considering water resource constraints when municipalities were selecting waterborne sanitation system for replacing the buckets. The strategy indicated that preliminary calculations had shown that the waterborne sanitation services were not feasible in some parts of the country. The issue of failing to upgrade or build new wastewater treatment plants to meet the demands of the additional connections was highlighted by DWAF as a risk to sustainability because discharge of non-compliant effluents would pose a hazard to public health and environmental integrity. However, these cautionary messages from DWA seemed to have fallen on deaf ears because most surveyed Free State and Northern Cape municipalities performed poorly in the 2011 Green Drop assessment programme and the poor performance was attributed to wastewater treatment plants that had exceeded their design capacity (DWA, 2011).

The failure of municipalities to comply with national effluent discharge standards could be attributed to poor performance and monitoring and lack of sanctioning for non-compliance. A report on the status of sanitation services in South Africa (DWA, Presidency & NDHS, 2012) concluded that roles and responsibilities for sanitation regulation, monitoring & evaluation

activities required clarification. This report also concluded that there was a need to improve performance monitoring through a well-coordinated M&E framework.

8.2.4 Financial sustainability

Affordability of the waterborne sanitation services for the municipality and beneficiary households was generally not taken into consideration when the decision to replace buckets with waterborne sanitation was taken. Municipalities with low revenue base and high numbers of poor unemployed people were struggling to generate enough revenue to provide sanitation services to their customers. In some municipalities more than 40% households were indigent; these municipalities were concerned about their high dependency on equitable share grant. They had no plans for dealing with the increasing number of indigent households except to rely on annual increases in equitable share allocation.

Mjoli et al., (2009) found that poor municipalities were unable to use cross-subsidies to provide free basic sanitation services to the poor because increasing sanitation tariffs for the small population of wealthy households and businesses would make their municipalities unattractive to these groups that contributed to the municipal economy.

A review of the financial performance of selected municipalities during three years that coincided with the eradication of the majority of buckets found that in addition to the challenge of collecting municipal charges from households, these municipalities were owed millions of Rands by government institutions and businesses. In some cases, even the municipal councillors and municipal officials were in arrears with their municipal service charges. This showed that the lack of appreciation of the importance of paying municipal service charges was endemic in the South Africa. Turning this situation around would depend on political will and government commitment at the highest level.

8.2.5 Environmental sustainability

One of the goals of investing in sanitation improvement programmes is to protect the aquatic environment from pollution by untreated human waste. The technical evaluation of BEP in case study municipalities found that there were environmental risks associated with the sanitation services, for example, in some cases the regular blockage of household toilets led to the overflow of sewage from manholes. In Tokologo, the manhole covers were stolen by collectors of scrap metals. Sol Plaatje also experienced problems with cable theft from the wastewater treatment works and this affected the proper functioning of the WWTWs. The poor enforcement of municipal by-laws in the City of Matlosana resulted in the discharge of wastewater with blood, fat and feathers from abattoirs and chicken industry without pre-treatment (Klerksdorp and Hartbeeesfontein WWTWs). This had negative impacts on the quality of effluent discharged from these plants which did not comply with national effluent discharge standards and polluted receiving streams.

All the five case study municipalities achieved average or low Green Drop Scores in the 2011 Green Drop assessment programme except Sol Plaatje Municipality which received an average municipal score of 76% but some of its plants scored poorly for wastewater quality

compliance. The majority of the 22 surveyed municipalities in Free State and Northern Cape provinces performed poorly in the 2011 Green Drop report because they were discharging non-compliant effluent discharge due to dysfunctional wastewater treatment works. Ngwathe Municipality which had a new wastewater treatment plant built under the BEP which was commissioned in 2009 scored 0% for wastewater quality compliance in the 2011 Green Drop assessment programme. The underlying causes of the poor performance were lack of technical skills and poor O&M. All these non-compliant effluents were polluting our rivers (DWA, 2011).

The following Table 3 shows the average municipal 2011 Green Drop scores (GDS) of case study and surveyed municipalities:

Table 4: 2011 Green Drop Scores of case study and surveyed municipalities

Name of LM	Average GDS (number of WWTWs)	Effluent quality – GDS range for the WWTWs
Dihlabeng FS	32% (3)	0%
Letsemeng FS	30.4% (5)	5-62%
Kopanong FS	1.2% (7)	0%
Mantsopa FS	20.4% (5)	0%
Masilonyana	0%	0%
Matjhabeng FS	14.2% (9)	0-18%
Mohokare FS	58.6% (3)	48-100%
Nala FS	20.4% (2)	0-5%
Naledi FS	5.4% (3)	0%
Ngwathe FS	44.9% (5)	0-80%
Nketoana FS	23.1% (4)	0%
Phumelela FS	5.0% (3)	0%
Setsoto FS	23.4% (4)	0-3%
Nama Khoi NC	37.2% (8)	0-48%
Kamiesberg NC	5.4% (2)	0%
Karoo Hoogland NC	11.9% (3)	0%
Khai- Ma NC	14.2% (1)	0%
Khara Hais NC	35.8% (2)	5-40%
*Mangaung FS	38% (8)	31-72%
*Tokologo FS	0%	0%
*City of Matlosana NW	51.7% (4)	15-83%
*Makana EC	49% (3)	0-20%
*Sol Plaatje NC	76% (3)	0-60%

*Case study municipalities (number in brackets = number of wastewater treatment works assessed)

NB. Tokologo and Masilonyana municipalities did not provide the assessment panel with a portfolio of evidence; therefore, they were automatically scored 0% for the 2011 Green Drop Report.

8.2.6 Key sustainability issues of the BEP

Viewing of the BEP through the sustainability lens showed that the BEP performed poorly in all sustainability indicators. This was expected from the implementation approach of the BEP which was top-down, target driven, supply-led and fully subsidized by national government.

This finding was not unique to the BEP, but the accelerated nature of the BEP accentuated all the sustainability challenges of supply-driven infrastructure programmes.
The unintended consequence of this approach was that it promoted a culture of dependency amongst beneficiary communities; they expected government to do everything for them including maintaining their household toilets. When the government failed to deliver on its political promises, communities go out, protest and vandalize municipal infrastructure to demonstrate their anger. In terms Section 152(b) of the Constitution of South Africa (1996) municipalities have an obligation to ensure that communities are provided with services in a sustainable manner.

A World Bank report (2011) identified the poor participation of citizens in service delivery and lack of accountability of government to the people they serve in all spheres as a problem for South Africa. This report pointed out that the focus of government supply driven delivery approach was on inputs and outputs and no attention was paid to the outcomes. Government would only achieve successful service outcomes if it worked with citizens to design, implement and evaluate services with each party holding each other accountable. Improvement in services did not require more investment in service delivery, but it required the creation of incentives for all stakeholders to work together in achieving better service outcomes.

A view of the BEP through the sustainability lens highlighted the following issues:

- Sustainability was not a key driver of the accelerated phase of the BEP, the focus was on the number of toilets constructed to replace the buckets, and limited attention was paid to the other components of a sustainable sanitation service such as hygiene awareness, community involvement and institutional capacity to deliver sanitation service. Inclusion of these elements that determine sustainability of sanitation services would have slowed down the pace of the implementation of the BEP.
- Affordability of waterborne sanitation services for the municipalities and beneficiary communities was not addressed because this would have shown that most municipalities would struggle to finance high levels of sanitation services.
- The accelerated BEP did not give municipalities enough time to undertake strategic sanitation planning before the implementation of waterborne sanitation systems, for example, the problem of wastewater treatment plants that have already exceeded the design capacity thus resulting in non-compliant effluent discharges into local rivers. If municipalities had started by doing proper feasibility studies, some of these problems could have been avoided but they would not have met the December 2007 deadline for the accelerated BEP.
- The BEP was driven by short term gains without looking at the long term implications of connecting more households to bulk sewerage infrastructure and wastewater treatment plants which were designed to serve a smaller population. It also did not make provision for building technical capacity in municipalities to manage the new and upgraded wastewater treatment works. The consequence of this short term planning was that some municipalities were provided with high tech wastewater

treatment plants without technical competent personnel capable to operate and maintain them properly.

- The large investments made in new bulk sewers and wastewater treatment plants were not coupled with investments in capacity for proper O&M of these facilities.
- Municipalities with limited financial management capacity were not provided with support to devise plans for ensuring that the new sanitation services were financially sustainable.
- The beneficiary communities were not engaged as key stakeholders during the planning and implementation of the BEP, thus denying them the opportunity to play a key role in improving their sanitation services and taking ownership of the development process. Community engagement was important to empower communities to be self-reliant and less dependent on external agents to improve their living conditions. Passive beneficiaries of sanitation facilities lacked power to make municipalities and service providers accountable to them and this took away the 'Batho Pele' principle from the delivery of sanitation services.
- The neglect of hygiene awareness and user education by the majority of case study municipalities missed the opportunity of influencing behavioural change which was important for ensuring that communities learned to appreciate and prioritize sanitation services as important elements for their dignity and health.
- There was no sanctioning for poor performance especially at the local government where the problems of service delivery manifested.
- Lack of communication channels for beneficiaries to lodge complaints on poor sanitation service delivery to the relevant government institutions.
- The approach of learning by doing which was adopted by the national government to basic sanitation delivery did not work. South Africa missed the opportunity of learning from the failures of countries such as India which took decades to learn that supply-driven sanitation infrastructure projects did not lead to sustainable sanitation service delivery (Mjoli, 2009).

8.2.7 Challenges to sustainable sanitation service delivery

The following challenges that must be addressed to achieve sustainable sanitation services for all:

Weak national and provincial regulation and oversight of compliance of sanitation services with sanitation policy principles

The problem of non-compliance with sanitation policy principles and other national norms and standards could be attributed to ineffective regulation and oversight of sanitation services at national and provincial government levels. Poor quality assurance for the sanitation facilities was due to the lack of monitoring and evaluation at municipality level.

Chronic shortage of management and technical skills at local government level

Most of the problems of poor sustainability of sanitation services including lack of proper O&M of wastewater treatment works were due to the lack of technically competent plant

operators and also municipal management who did not have a technical knowledge to appreciate the importance of rapid response to maintenance requests.

Poor integration of hygiene awareness and user education into sanitation service delivery
Lack of user education caused regular blockage of toilets due to the use of inappropriate anal cleansing materials and disposal of foreign objects into the toilets. This contributed to the increase in the cost of O&M for the municipalities in three case study municipalities.

Poor O&M of wastewater treatment works continue to pose a problem to local water resources
The poor performance of most Free State and N Cape wastewater treatment works in the 2011 Green Drop Assessment Programme was due to shortage of technical skills, plants that have exceeded design capacity and plants requiring upgrade or new plants required to treat the increased volumes of wastewater from the additional BEP connections. The poor quality effluents had negative impacts on the health of aquatic ecosystems and also contributed to eutrophication and algal blooms.

Lack of integration of water conservation and water demand management measures in the implementation of the BEP
The lack of integration of water conservation and water demand management measures into the BEP contributed to the increased costs of providing waterborne sanitation services to the beneficiaries of the bucket eradication programme who were not paying for the sewerage services because they were indigent. Municipalities could have reduced their costs if they had used water saving measures when providing the sanitation facilities for households.

Financial sustainability of sanitation services was under threat in most municipalities
The lack of consideration of affordability of waterborne sanitation system before selecting this technology to replace the bucket was putting a heavy financial burden on municipalities especially those that have a low revenue base and high numbers of indigent households such as Tokologo and Makana municipalities. Sol Plaatje municipality was also concerned that more than 40% of its households were indigent.

Promoting community ownership of sanitation facilities
The BEP was implemented as a top-down programme which was characterized by the supply-driven approach. It did not provide any room for community engagement because community mobilisation by its nature was time consuming. Therefore, it would have made it difficult to meet the December 2007 deadline. Some beneficiary households were not taking ownership of their sanitation toilets because they believed that the municipality was responsible for O&M of their toilets.

Increasing levels of poverty and high unemployment levels were having a negative impact on revenue collection by poor municipalities

The review of the financial performance of selected municipalities after the end of the accelerated BEP showed that all municipalities were struggling with poor payment for water and sewerage services.

Rejection of dry sanitation systems by beneficiary communities

The decision taken by politicians to replace buckets with the waterborne sanitation system put the municipalities in a difficult position where they were forced to ignore the technical constraints and succumbed to community demand for waterborne sanitation services. Even where municipalities implemented dry sanitation technologies, the beneficiary communities accepted the dry sanitation technology (UDS) as a short term measure while the municipalities were upgrading water supply in order to augment water supply for supporting waterborne sanitation services. The reality of the high costs of bringing water to the drier areas of Free State and Northern Cape provinces were not considered by the beneficiary communities.

9 CONCLUSIONS, LESSONS LEARNED AND RECOMMENDATIONS

9.1 Conclusions

The following key conclusions are based on the findings of the study:

What worked?

- The bucket eradication programme was characterized by good project management, effective coordination and cooperation of sector departments and it enjoyed buy-in from all the political levels and the three spheres of government.
- The deployed engineers played a significant role in helping municipalities without technical capacity to eradicate the majority of pre-1994 by July 2009.
- The beneficiary households were satisfied with the waterborne sanitation facilities, they believed that their health had improved and their human dignity was restored because they were no longer subjected to the dehumanizing buckets.

What did not work?

- The BEP failed to comply with most of the sanitation policy principles.
- The supply driven approach adopted in the implementation of the BEP failed to plan for sustainable sanitation service delivery because it focused on toilet construction. This led to poor performance of wastewater treatment works which were assessed as part of the study because no resources were allocated to the proper operation and maintenance of new or upgraded WWTWs.
- The BEP put limited emphasis on Hygiene awareness, community involvement and user education.

9.2 Lessons learned

Sanitation service delivery was a complex process that could not be reduced to a toilet

The BEP focused on toilet construction and neglected the sustainability aspects such as community involvement, affordability, hygiene education, user education and proper O&M of wastewater treatment works.

Failure to invest in water efficient sanitation technologies could put pressure on local water resources

The neglect of the integration of water conservation and water demand management measures into the BEP could put pressure on local water supply and increase the cost of providing water services to poor households who depended on subsidized water services.

Partnerships between local universities and municipalities can contribute solutions to sanitation challenges

The successful piloting of the Integrated Algal Pond System (IAPS) for treating municipal sewage by Rhodes University and Makana Municipality demonstrated the important role that could be played by partnerships between local universities and municipalities in finding solutions to local sanitation problems.

Municipalities were implementing stringent measures to improve revenue collection
Several municipalities reviewed as part of this study were implementing stringent measures to improve revenue and debt collection, such as deduction of municipal service charge arrears of municipal officials and councillors from their monthly salaries.

It is crucial for municipalities to take ownership of sanitation infrastructure projects
Municipalities must take leadership and ownership of their sanitation infrastructure projects instead of handing over control to the consulting engineers because they remain legally responsible for O&M and sustainable sanitation service delivery long after the engineers had finished construction of infrastructure and left.

Repair and replacement of malfunctioning components of the wastewater treatment works could not be subjected to rigid municipal procurement procedures
Municipal management must treat the requests for the repair or replacement of components of wastewater treatment plants as urgent and not subject them to the standard government procurement procedures because the delays could compromise the wastewater treatment processes and the quality of effluents discharged.

9.3 Recommendations

- Weak sanitation governance must be addressed and the water sector regulator must implement appropriate penalties and incentives to enforce compliance with effluent discharge standards.
- DWA as the water sector regulator should implement a competency criteria for technical directors and plant operators in all municipalities. This could be modelled on the National Treasury competency criteria for finance staff in municipalities.
- Sanitation sector leadership and coordination must be improved.
- Resources should be allocated to reverse the identified problems which were threatening the sustainability of sanitation services.
- Engagement of the private sector to operate and maintain wastewater treatment works that posed a high environmental risk should be considered.
- Community involvement, H&HE and user education must be placed at the centre of sanitation service delivery to ensure community ownership.
- Stringent measures adopted by several reviewed municipalities to improve revenue and debt collection should be replicated in municipalities facing similar challenges.
- Low cost robust wastewater treatment technologies such as the Integrated Algal Pond System piloted by Makana Municipality and Rhodes University should be considered for scaling-up in rural municipalities with limited financial and technical capacity to operate conventional wastewater treatment works.
- Incentives must be provided to encourage municipalities to implement innovative sanitation technologies that are affordable and acceptable to the beneficiary communities.

- Flexible procurement procedures are required to accelerate the repair or replacement of crucial components of WWTWs to avoid compromising the wastewater treatment processes.

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11 APPENDIX

11.1 Participants: BEP case study municipalities

National Sanitation Programme and Regional Sanitation Coordinators: The following officials helped with the selection of case study municipalities
Mr Cyprian Mazubane (NSPU – NDHS)
Mr Sibusiso Potwana (Free State)
Mr Gavin January (Northern Cape)
Ms Mangie Rakale (North West)

Mangaung Municipality
Mr Gerhard Fritz – Sanitation manager
Mr Sam Tsomela – General Manager Water and Sanitation, Mangaung
Mr Janu de Beer – BEP Lead Consultant , BIGEN-Africa
Mr Mondeni – Plant Manager, Botshabelo
Mr Itumeleng – Sanitation manager, Thaba Nchu
Mr China Olifant – Ward Councillor, Mangaung
Ms Kekeletso Modise, Leader of Focus Group 1 and community representatives
Ms Pulane Semoko, Leader of Focus Group 11 and community representatives

Tokologo Municipality
Mr Lakes Chakane – Technical manager
Mr Slyvester Matiwane – Assistant Technical Manager
Mr K L Mofokeng – TDBC Agency (Contractor responsible for installing the Close Circuit Wastewater treatment and recycling plant)
Community representatives
Mr Piet Modise and his group of men (focus group)
Ms Boitsholo Dammie and her group of women (focus Group)
Mr Boitumelo Seakge – Councillor and Chief Whip of Tokologo LM

Sol Plaatje Municipality
Mr David Leeuw – General Manager, Water and Sanitation
Mr Winston du Plessis – Acting sanitation manager
Mr Shayle – Gogga Plant Manager
Community representatives
Ms Mary Sebego, Ward Councillor and Local nurse
Mr David Mahleleng, Focus Group leader for Soul City and focus group participants
Ms Ursula Temm, Focus Group leader for Tambo Square and focus group participants

City of Matlosana
Mr Khotso Seleke – Technical Manager, Sewerage Section
Plant operators – Makhafula Kefiloe, Humphrey and Okkie
Community representatives
Local clinic nurse (name withheld)

Mirriam Kapeng (Leader of the focus group from Khumo Township)
Mampe Makalora (Leader of the focus group for Kanana Township)
Focus group participants from Kanana and Khumo Townships

Makana Municipality

Mr Dabula Njilo	Director –Technical & Infrastructure
Mr Gary Evaton	Superintendent WWTWs
Dr Josiah Nyagwachi	DBSA Civil Engineering Expert seconded to Makana
Ms Phakama Booi	PMU Manager
Ms Sisanda Ponoshe	Senior Civil Engineering Technician
Prof Keith Cowan	Director Institute of Environmental Biotechnology, Rhodes University
David Render	Principal Technical Officer, Rhodes Univ – EBRU

Community representatives

Ms Nontombi Qhudeni	Ward Committee member of KwaNdancama
Mr Sandile Nomsobo	Outgoing Councillor of Eluxolweni
Ms Ivy Mniki	Leader of the focus group from KwaNdancama
Ms Sinazo Gontsi	Leader of the focus group from Eluxolweni

Participants in Focus Groups from KwaNdancama and Eluxolweni Townships

11.2 Surveyed municipalities

Free State municipalities

Name	Official	Designation	Contact details	Questionnaire
Dihlabeng	Johan Botha	Foreman	0760908054	Yes
Kopanong	Katiso Sebusi	Dir Technical Services	0836348950	Yes
Letsemeng	Gideon Sekhobo	Acting Technical Manager	0794947375	Yes
Mantsopa	Tshepo Selepe	Manager PMU	0718581807	Yes
Masilonyana	BC Mokomela	Administrator (DBSA seconded)	BangephiM@dbsa.org	Yes
Matjhabeng	N Mabini	PMU Senior Administrator	0579164111	Yes
Mohokare	Mr Tsoamotse	Head of Infrastructure	0846668456	Yes
Nala	Lebohang Sedio	PMU Technician	0732623232	No
Naledi	Michael Poone	Municipal Engineer	michaelp@naledimun.co.za	Yes
Ngwathe	Henk Coetzer	Acting Dir Technical	henkcoetzer@lantic.net	Yes
Nketoana	N T Makhanya	Technical Officer	0842889426	Yes
Phumelela	Hope Mthembu	Technical Manager	0832894487	Yes
Setsoto	Thabo Mokhethoa	Manager Water & sewerage services	0828363196	Yes

Name	Official	Designation	Contact details	Questionnaire
Tokologo	Lakes Chakane	Technical Manager	0767569789	No
Tswelopele	PW DeBruin	PMU Manager	0825744941	Yes

Northern Cape Municipalities

Name	Municipal Official	Designation	Contact details	Questionnaire returned	Mode of interview
Nama Khoi	Christo Bonn	Technical Manager	0723160254	No	No interview was granted
Kamiesberg	Fedric Holks	Technical Head	0276528000	No	No interview was granted
Karoo Hoogland	Frani Lotter	Head of Infrastructure	0836551438	No	No interview was granted
Khai-Ma	Petrus J Baker	Acting Infrastructure Manager	0549330252	Yes	Unable to respond to questionnaire
Khara Hais	Johan Kok	Technical Manager	0846412375	No	No interview granted

11.3 Deployed engineers

Deployed Engineer	Affiliation	Contact details	Questionnaire returned	Mode of the survey	Hosting municipality
Palesa Moshanyana	DBSA	0768512428	Yes	Face-to-face	Kopanong, FS Mohokare, FS
Johannes Vos	No info	083 2877200	No	Not applicable	Letsemeng, FS
Vincent Mafike	DBSA	0826151623	Yes	Electronic	Masilonyana, FS Tokologo, FS
Albert Shoko & Nelson Mwanza	DBSA	0766547337 0741047997	Yes	Electronic	Matjhabeng, FS
Mandla Mkhathali	DBSA	0824586689	Yes	Face-to-face	Nala, FS Setsoto, FS Tswelopele, FS
Sibongile Hololoshe	DBSA	0788494806	Yes	Electronic	Naledi, FS
Brighton	DBSA	0824190491	Yes	Face-to-face	Ngwathe, FS
Chalmers Pagiwa	SMM	0828838260	Yes	Electronic	Nketoana, FS
Alois Chaminuka	SMM	0726118738	Yes	Electronic	Phumelela, FS
Andre Smith	BVI	0766592558	Yes	Electronic	Nama Khoi, NC
Marius Bitha	No info	mkb@mweb.co.za	No	Electronic	Khai-Ma, NC

11.4 Workshop participants

National Sanitation Stakeholder workshop participants

Name	Institution
Mr Khotso Seleke	City of Matlosana
Ms Louiza Duncker	CSIR
Ms Marina Milstein	NSPU – NDHS
Mr Hassen Mohamed	DPM&E, Presidency
Mr Mark Bannister	DWA
Ms Jackie Nel	DPM&E, Presidency
Mr N S Ntebe	EC – Dept of Human Settlements
Mr Brendan O'Connell	Makhetha Development Consultants
Dr Fazel Randera	MSTT
Mr Iqbal Mohamed Ali	National Treasury
Mr James Archer	National Treasury
Mr Xolani Sithole	National Treasury
Mr William Moraka	SALGA
Mr Jay Bhagwan	WRC
Ms Alison Sussex	Write Connection (Scribe)

National Sanitation Programme unit–NDHS: Workshop participants

The following NSPU – NDHS officials participated in a BEP stakeholder workshop convened by the project leader:

Cyprian Mazubane
Vuyo Mxhego
Norma Lerobane
Simon Malebane
Pekane Mashiane
Mandisa Mangqalaza
Marina Milstein
Mirriam Ngoatje