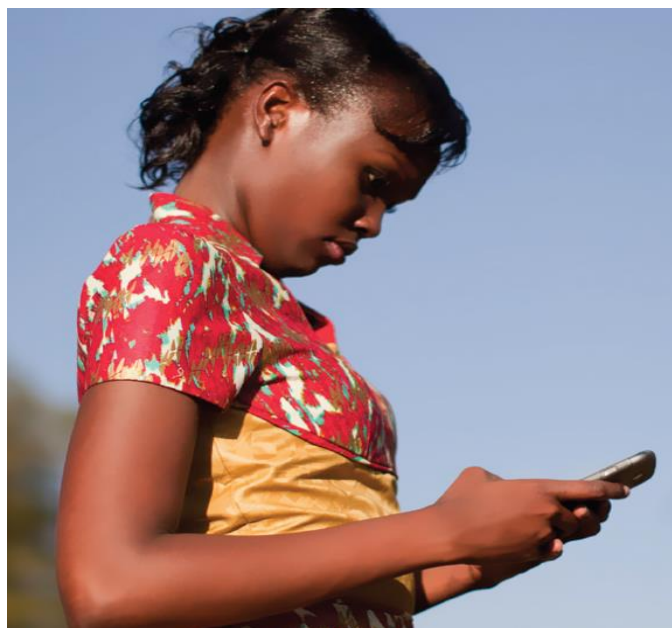


UNLOCKING THE POTENTIAL OF INFORMATION COMMUNICATIONS TECHNOLOGY TO IMPROVE WATER AND SANITATION SERVICES

KENYA CASE STUDY



By

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PREFACE

This report has been prepared for the Water and Sanitation Program (WSP) Study on “Unlocking the Potential of ICT Services in the Water and Sanitation Sector”. The study builds on and complements the World Bank’s Africa Regional Strategy (2011) and the World Bank Group’s Information and Communication Technology (ICT) strategy (2012). It further complements the E-Transform Africa series, a collaboration between the African Development Bank, the World Bank and the African Union, which captures the existing use of ICT in six sectors (agriculture, climate change, education, health, financial services, government) and two cross-cutting themes (regional trade and integration, ICT competitiveness).

WSP has spearheaded the use of ICT in many countries in particular with its contribution in financing the use of the mWater pilot platform in countries such as Senegal, Mali, Niger and Benin, Akvo Flow and Fulcrum in Liberia and Sierra Leone and Maji Voice in Kenya. As many sector stakeholders are interested to learn from these pilot interventions, it is necessary to improve the documentation on these experiences and propose practical modalities for scale-up.

There is also a very strong drive around the use of ICT in the WASH sector and a growing interest among external partners. As such, there is a need to develop clearer partnership platforms with both short- (i.e. project specific) and medium-term objectives, to understand the potential information that can be generated through ICT, increase accessibility to and use of that information, and ensure that ICT generated information is implemented more sustainably in support of WASH objectives.

The study was carried out by the Water and Sanitation Program (WSP) of the World Bank to fill a gap in understanding how the potential of ICT can improve water and sanitation services globally with a particular emphasis in Africa. It covers a global desk review and case studies in 7 African countries (Kenya, Uganda, Tanzania, Senegal, Benin, Niger and Liberia), complemented by cases from other regions (Latin America, North America, South Asia and East Asia) and analyses strengths and weaknesses of existing ICT tools. It also provides evidence on how ICT can be used to leapfrog the water and sanitation sector towards more sustainable service delivery.

As such, this study sought to not only document experiences of ICT use in the WASH sector but also analyze them within a framework of enabling factors and barriers in terms of Vision, Process, Customer/User, Service Delivery, Human Capacity, Governance and Finance.

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ACRONYMS

CAK	Communications Authority of Kenya
ICT	Information And Communication Technology
KNBS	Kenya National Bureau Of Statistics
KPI	Key Performance Indicators
MIS	management information systems
NCWSC	Nairobi City Water And Sewerage Corporations
SMS	Short Message Service
WASREB	Water Services Regulatory Board
WASPA	Water Service Providers Association
WARIS	Water Regulation Information System
WSP- World Bank	World Bank's Water And Sanitation Program
WRMIS	Water Resources Management Information System
WSTF	Water Services Trust Fund
WSB	Water Service Boards
WSP	Water Service Provider

1. INTRODUCTION

ICT in the Kenyan water sector is at the forefront of supporting improved performance and efficiency in service delivery. All the key sector players, including the regulator and service providers currently have ICT applications in use, with many still evolving. At the national level, ICT use is facilitating data collection and analysis using simple/user friendly applications such as WARIS, a web-based tool for performance assessment of water service providers and MAJIDATA, a database on urban poor water and sanitation service delivery. In the urban sub-sector, applications are being used to support most operation and business processes, including billing.

All stakeholder consultations with regulators, development partners and civil society highlighted that Kenya has sufficient human capacity to drive ICT processes and that the private sector is a key partner in sustaining the use of ICT given their edge in infrastructure and technical capacity, underscoring the need for partnerships to leverage the different capabilities and sector needs.

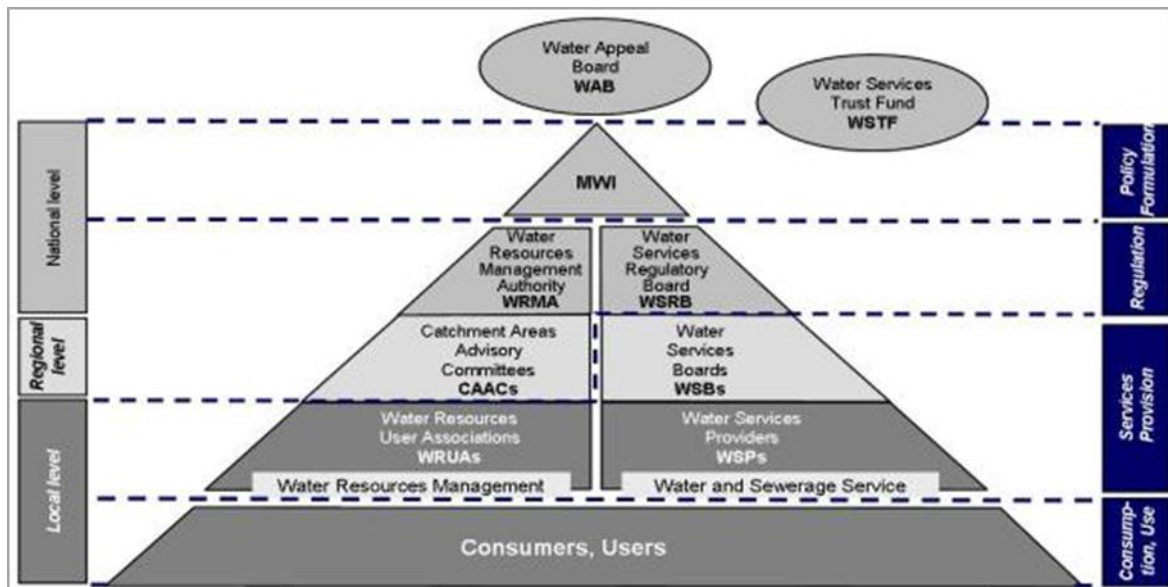
This report presents findings of a field study in Kenya that took place in October 2014. The first section offers a landscape analysis of Kenya, looking at the regulatory and operating environment of the water and ICT sector and then a more detailed look at six ICT applications currently in use by the key water sector institutions visited during the consultations. The second section then looks specifically at the case of MajiData. The case study report has been prepared based on consultations with key water sector stakeholders in Kenya, along with literature on ICT for development and the sampled applications. The stakeholders that were consulted during the preparation of this report are presented in Annex A.

2. LANDSCAPE ANALYSIS

2.1 Regulatory and Operating Environment

The Ministry of Water and Irrigation has the overall mandate for policy formulation and oversight of water sector services in Kenya. The functions of the Ministry are separated between service delivery and water resources management, with decentralisation of the roles for regulation, asset management, and service provision to the different administrative levels as shown in figure 1 below. Regulation and asset management are the main responsibility of the central government with service provision decentralised to water service providers (WSPs) at the local/county level.

Figure 1: Ministry of Water and Irrigation (MWI) institutional arrangements



Source: Kenya annual water sector report 2012 – 2013

The above institutional structure is aligned to the 2000 Water Bill, however, as of 2014 there is a new draft bill being discussed in parliament. The new draft bill attempts to align the institutional roles with the provisions in the 2010 government of Kenya (GoK) constitution which, beyond acknowledging water as a basic human right, calls for further devolution of the service provision function to county governments. This bill is also anticipated to provide guidance on how to manage the transition process, cognisant of existing capacity of county governments and the change management process. Further, as part of this reform process, the number of ministries in Kenya has been reduced/amalgamated and the water sector is now under the Ministry of Environment, Water and Natural Resources. In addition, a multi-stakeholder transition authority has been set up and a Water Sector Transition Implementation plan developed to guide the process.

Discussions with WSP-World Bank however, indicated that there is a lot of uncertainty concerning the direction the devolution process will take as some of the provisions in the 2014 water bill are not similarly appreciated by all stakeholders. This is particularly true in regards to the separation/delineation of the current role of the Water Service Boards (WSBs) versus the counties, especially during the transition process. The means of addressing trans-boundary water resource management and water development issues for service areas that cover more than one county is another potential issue of contention.

According to the Water Services Regulatory Board (WASREB) impact report on water sector performance for the period 2013-2014, the reform of the water sector in Kenya has seen many improvements in water resources management and service delivery with the different players visibly taking on their assigned roles. This is evidenced by the achievements of the water resources management authority and the clear roles of WSBs and Water Service Providers (WSPs). However, the water sector is still faced with several challenges that limit this performance (MWI 2013). These include but are not limited to:

- Weak monitoring and evaluation of sector activities which is linked to limited accountability and information management systems. The water resources management information system (WRMIS) was identified as one key area that needed attention;
- Weak financial reporting;
- Unclear coordination between sector actors leading to less than desirable performance;
- High population growth that does not match the resource allocation and investment in water and sanitation infrastructure. This is reflected in the low coverage figures at 53.3% for water and 66.7% for sanitation compared against the universal coverage 2015 MDG target;
- High non-revenue water; and
- Poor utilisation of information management systems at WSB levels leading to inadequate planning for service provision based on unreliable data.

ICT has substantial potential to help address the above challenges and improve the efficiency and performance of the Kenyan water sector.

2.1.1 ICT Policy

Kenya has adopted ICT as a major thrust and building block to development, including it as one of the key pillars for development in Kenya's vision 2030, a strategic roadmap towards realization of social and economic development by the year 2030.

The ICT driven development process has been facilitated by the liberalization of the market and development of key infrastructure including the national optic fibre backbone infrastructure (NOFBI) and a Government Common Core Network (GCCN) intended to serve as a shared and secure interoperable Government-wide ICT architecture. With this infrastructure, over 95% of the country's population has access to mobile phones and as of June 2014, internet connectivity was estimated at 54.8 % (CAK, 2014). IDC 2014 estimates that there has been an increase of about 3 billion USD (about 3.2% of GDP) in government spending on ICT over the period 2006 to 2013. This provides a conducive environment for the introduction and scaling up of ICT in development processes.

The regulatory environment for ICT is rich with several guiding pieces of legislation including the Kenya Information and Communications (Amendment) Act, 2013 that replaced the information and Communications Act (KCA) of 1998; Science and Technology Act (Cap. 250) of 1977; and Kenya Broadcasting Corporation (KBC) Act of 1988, ICT ACT 2011, the national ICT policy 2006 and cyber security policy. The Kenya Information and Communications (Amendment) Act, 2013 allows for establishment of an autonomous regulatory body, the Communications Authority of Kenya (CAK) replacing the Communications Commission of Kenya (CCK). The national ICT policy 2006 provides guidance on use of ICT in development through defining measures to stimulate increased investment and use of ICTs in different sectors, provisions for human resource development and industry standards, promotion of different strategies including E-government and facilitating the development of sectoral IT policies and strategies.

2.1.2 ICT use in the WASH sector

ICT in the water sector in particular is at the forefront of supporting improved performance and efficiency in service delivery. All the key players including the regulator and service providers have

different ICT applications in use, with many still evolving. Generally ICT is used by stakeholders working at the national level and/or within the urban sub-sector. At the national level, ICT use is mainly to facilitate data collection and analysis using simple/ user friendly applications like WARIS, a web-based tool for performance assessment of water service providers and MAJIDATA, a database on urban poor water and sanitation service delivery. In the urban sub-sector, applications are used to support most of the operation and business processes, including billing.

While the water sector has many players making use of ICTs each system or application is independent and there is limited interoperability between them. This is noted in the case of MajiData and WARIS, where data from the former is manually extracted and imported into the latter. A similar situation is also noted with utilities, where each have different ICT applications in use for their work flow processes.

All stakeholder consultations with regulators, development partners and civil society highlighted that Kenya has sufficient human capacity to drive ICT processes and that the private sector is a key partner in sustaining the use of ICT given their edge in infrastructure and technical capacity, underscoring the need for partnerships to leverage the different capabilities and sector needs. Furthermore, it was noted that most ICT applications in use in the water sector receive the majority of their financing externally from development partners limiting sustainability especially in the absence of post-development support.

2.2 Selected ICT4WASH Applications in Kenya

The water sector in Kenya has moved towards more advanced ICT facilitated data collection and management due to technology advancement and reduced infrastructure costs. Several applications are now in use to aid performance measurement, and improve business/work process and governance through availability of reliable information. Below are six of the key applications discussed during stakeholder consultations in Kenya.

2.2.1 Maji Voice

a) Vision

Majivoice was developed with the aim of improving efficiency, responsiveness and governance of urban water service providers through provision of an efficient and transparent system to coordinate and resolve consumer complaints raised to Water Action Groups (WaGs). WaGs are part of the WASREB strategy (through its consumer and public affairs department) to strengthen consumer engagement/dialogue and thus provide targeted response based on clear understanding of needs.

The idea was conceptualised in 2010-11 and developed further during the 2012 water hackathon in Kenya. WASREB was one of the institutions that presented a problem – the need for a feedback mechanism for handling consumer complaints – to be solved by this hackathon. A Prototype was developed from the Hackathon results and site studies undertaken in select WSPs (Eldoret and Mombasa) to further refine the prototype. Targeting of test sites was based on purposive sampling considering representation from each WSB and areas with existing WaGs.

b) Process

Majivoice is a mobile to web system based on open-source software that serves as a platform for consumers to log their complaints to the WSP. Complaint logging is done via registered short code service (USSD), structured Short Message Service (SMS), or on the web using a computer or internet enabled phone. Complaints can still be received by phone calls and later manually logged into the Majivoice system by the WSP. The SMS cost is borne by consumers who are motivated by the opportunity to obtain fast response to complaints. After a complaint has been worked on, an 'end of

a workflow process' is completed by a senior manager at NCWSC and a feedback sms sent to the customer to indicate action taken.

Specifications for and development of Majivoice were based on results of site surveys in eight regions identified for the pilot. Following the initial systems development stage, Majivoice was rolled out to two utilities: Nairobi city water and sewerage corporation (NCWSC) and Nakuru water. Application development is still a work in progress with external capacity building support involving basic maintenance still being provided to NCWSC by a consultant.

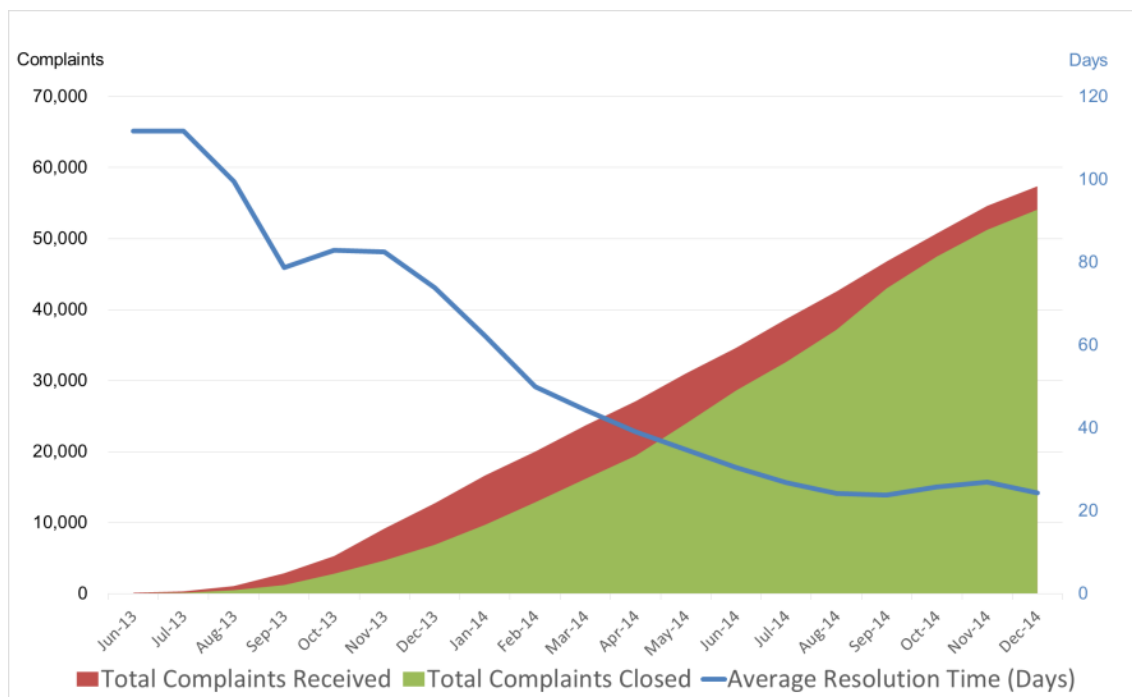
NCWSC Field teams have a mobile version that shows tasks and reports (assessment forms) on action undertaken. Quality assurance is provided through a time stamped ticketing system and WASREB has a dash board that can be used for monitoring purposes. Through this, comparison with historical data can also be done in case of need for triangulation to ensure accuracy of data provided.

c) Users

Majivoice has been a useful tool for decision making and several benefits have been realised through its use including, improved work flow processes, improved response time to customer complaints and thus improved customer confidence in the utility. The tool has also contributed to a clear understanding of the business operating environment informing utilities and WASREB where the main focus of interventions should be; for example NCWSC realised that the main challenge for the corporation was in billing, leading to the development of a new meter reading system.

WASREB is developing an indicator on customer service and this will further facilitate defining impacts of MajiVoice on utility performance. Some regulators, such as those in Zambia, have expressed interest in adopting a similar tool to Majivoice.

Figure 2: Decreased resolution time and number of complaints processed through Majivoice



d) Uptake and Lessons Learnt

Majivoice's implementation and success has been driven by the fact that it responded to an immediate and already recognised need; utility performance and thus customers satisfaction was low and this motivated customers to buy into the process faster.

Majivoice retains existing customer management processes where possible and is considered as a valuable addition to work flow processes, including planning, technical support and customer feedback. The fact that it was perceived by NCWSC staff as an improvement to existing systems further contributed to the successful application of Majivoice.

The potential of Majivoice to improve all aspects of service delivery is yet to be maximised. The information obtained through Majivoice can potentially be used by different stakeholders outside of the utility, for example by CSOs/DPs in order to advocate for increased financing to the sector and to engage policy makers on the development of conducive policies on subsidies or ICT security.

Stakeholder involvement during the development process is a key driver to the success of any ICT application. End-users are particularly important as they will influence the sustainability of the initiative. The experience of involving customers in the development and training phases is reported to have facilitated acceptance of Majivoice by target communities including bearing the cost of use.

Internet connection and cost of use also affected uptake of the tool. The limited internet connectivity in areas where smaller WSPs operated delayed deployment of Majivoice. In some cases, based on KEWASNET member experience, it was reported that some communities – in trying to avoid user costs – do not use the application directly but report complaints to WAGs who then send the SMS to the utility.

2.2.2 WARIS

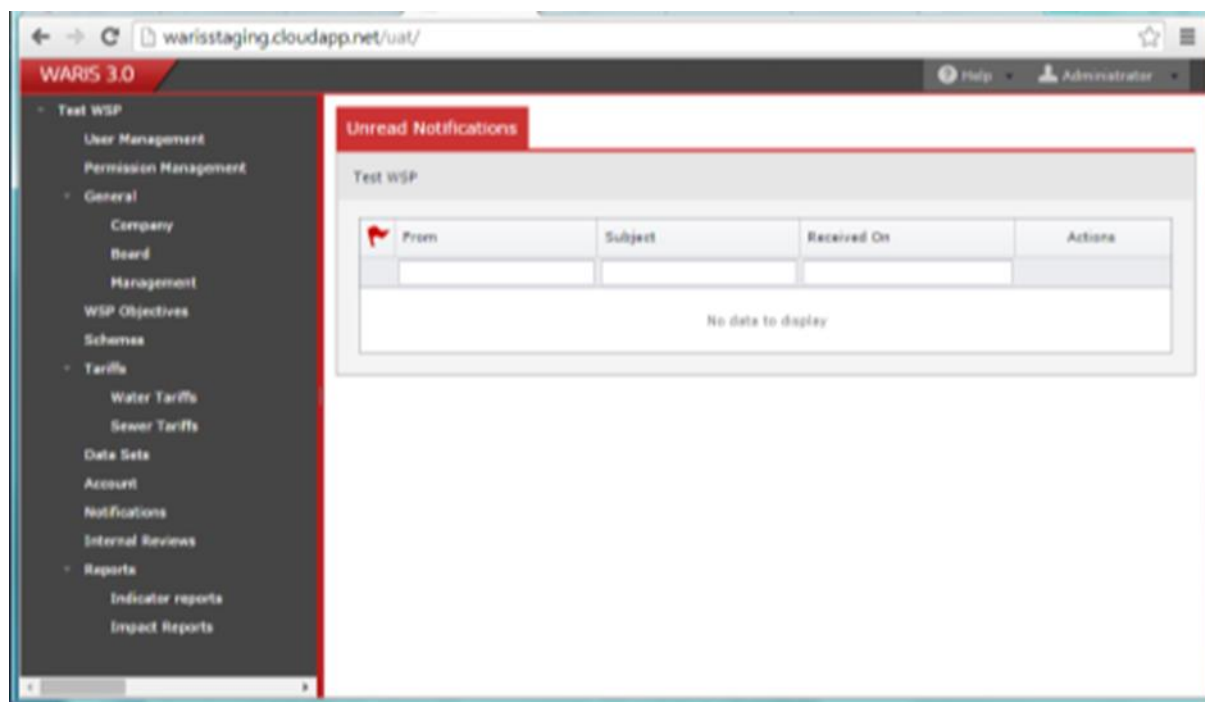
a) Vision

WARIS (Water Regulation Information System) was developed out of the need for a user friendly and reliable monitoring and reporting system to facilitate WASREB's mandate of monitoring WSPs. The tool was developed based on existing national performance monitoring indicators. The development was outsourced to private consultants and was financed with support from GIZ.

WARIS is a web-based database with performance indicators reported on by WSBs and is used for preparing the annual WASREB impact report. The application has been in use since WASREB inception and has evolved over time, based on results of user experiences. WSBs are provided with a template by email and CDs distributed to WSPs through WSBs and capacity building/ training undertaken at the beginning of each reporting cycle. Annual refresher events also serve as a feedback session on operation and assessment of WARIS. System upgrades are then undertaken, for example to add new modules such as one on informal settlements.

WARIS version 2.0 started as a stand-alone system, which has now been upgraded to WARIS version 3.0. The upgrade was in response to technology evolution, enhanced capacity within WASREB in the use and management of ICT applications, as well as in response to the need for a more efficient and user friendly system. WARIS 3.0 is based on a central database and has both an online/web-based version and an offline option for WSPs with limited internet connectivity. It also has an inbuilt validation system for QA e.g. out of range values. Figure 2 below provides a screen shot of the WARIS 3.0 dashboard/ user interface.

Figure 3: WARIS user interface



b) Process

WARIS has evolved over time, with changes made to the structure and content to respond to feedback and user requirements. Experience of users in WASREB revealed the need for systems to be dynamic and to respond to changing needs, address gaps in the initial development process and thus remain relevant and user friendly. For example updates such as adding modules were initially difficult because WARIS 2.0 is a standalone system and the system structure was rigid requiring deleting the database and reinstalling for any update to be made.

The WASREB strategy of involving different user departments, including IT and M&E, yielded positive results in the pace of ICT uptake, the development team of any new ICT application/tool should be multi-skilled to ensure all organisation needs are catered for.

Some of the key challenges of WARIS 2.0 were incompatibility with existing infrastructure of the WSPs in particular operating systems, malware and system errors for dealing with localised systems. Development of the upgrade to WARIS 3.0 was much simpler given the high user interface during the deployment phase of WARIS 2.0 and the advantage of utilising the existing platform; Staff within WASREB were already conversant with the system and were able to identify improvement measures.

Data and thus MIS are decision support tools; the quality of data has a direct correlation with any decision made. In recognition of this fact, WASREB is developing an indicator for data accreditation to ensure reliability and confidence in data, given the often conflicting statistics provided by different sector stakeholders.

The availability of quality and timely information is seen to have some influence on the level of financing that the sector receives from both the government and development partners. The integration of ICT tools in service delivery, especially in data management, has enabled WASREB to identify areas that need to be prioritised.

2.2.3 Jisomee Mita

a) Vision

The Jisomee Mita initiative was part of the World Bank's Water and Sanitation Program (WSP- World Bank) supported "Maji *Mashinani*" program under the Athi Water Services Board – the regulator of NCWSC - to improve service delivery to the urban poor. The "Maji *Mashinani*" initiative was first piloted in Kayole SOWETO, an informal settlement in Nairobi's Eastlands area, as an expansion of the water supply network and to promote improved water supply access through a micro financing model - using social connections financed through low cost loans to residents. A 2010 socio-economic study by the World Bank showed a high willingness to pay for water in Kayole, which has a population of approximately 90,000. However, the cost of a new connection at KSH 8215 was close to 70% of the average monthly household income. The loan was to facilitate residents' ability to afford this connection cost upfront. Financing was done in partnership with K-Rep Bank, however, NCWSC still had the challenge of collecting revenue from the consumers. Revenue collection in the area was very low, if done at all, because the security of NCSWC meter reading and billing field staff could not be guaranteed. Informal water service providers initially resisted NCWSC intervention because of potential loss of revenue and the reining in on illegal connections. Jisomee Mita was thus adopted as a solution to address the issues of non-payment of bills and insecurity of meter readers, as well as in recognition of the low and often unpredictable incomes of the urban poor.

Informal settlement residents live in a 'kadogo' (small scale and hand to mouth) economy. The success of Jisomee can be attributed the fact that bills are more manageable given flexible payment where one can pay for as low as weekly consumption.

b) Process

Jisomee Mita is a web-based ICT platform that enables water consumers to use a mobile phone to query and receive current water bills at a frequency of their convenience by sending their meter reading to NCWSC and receiving instant feedback. A customer takes the meter readings as trained, sends the reading by phone using SMS to NCWSC, NCWSC then calculates the water consumed and sends a response SMS indicating consumption and the amount to be paid. At the end of each month, NCWSC reconciles each customer's bill and sends the outstanding amount plus a component on the amortized loan amount for the social connection. To date it is reported that over 80% of the customers have fully paid up their loans. Through this service, customers are also able to send queries concerning inconsistencies in bills. Payments are made through the mobile payment platform using safaricom's MPESA.

The user requirements and system design was done by NCWSC and development of the application by the local private sector. The original prototype developed is still being used with enhancements made based on lessons from the pilot. NCWSC intends to scale up the intervention to other locations using a participatory approach and it is anticipated that a new version will be developed. Benefits of the Jisomee Mita initiative in improving service delivery and utility performance have been acknowledged, however the scaling up process is largely driven by the pace of roll out of the "Maji *Mashinani*" program. This is attributable to the high financing resource requirements for infrastructure development since the water supply network to most of the informal settlements is informal in nature or non-existent.

c) Uptake and Lessons Learnt

The success of any application is dependent on its response to user needs and requirements. Jisomee Mita is said to have been adopted at a very high pace because it facilitated satisfying a critical need for potable water by informal settlements that are often not prioritized by utilities. In addition, it responds to the income patterns of this segment by providing flexible and affordable payment options.

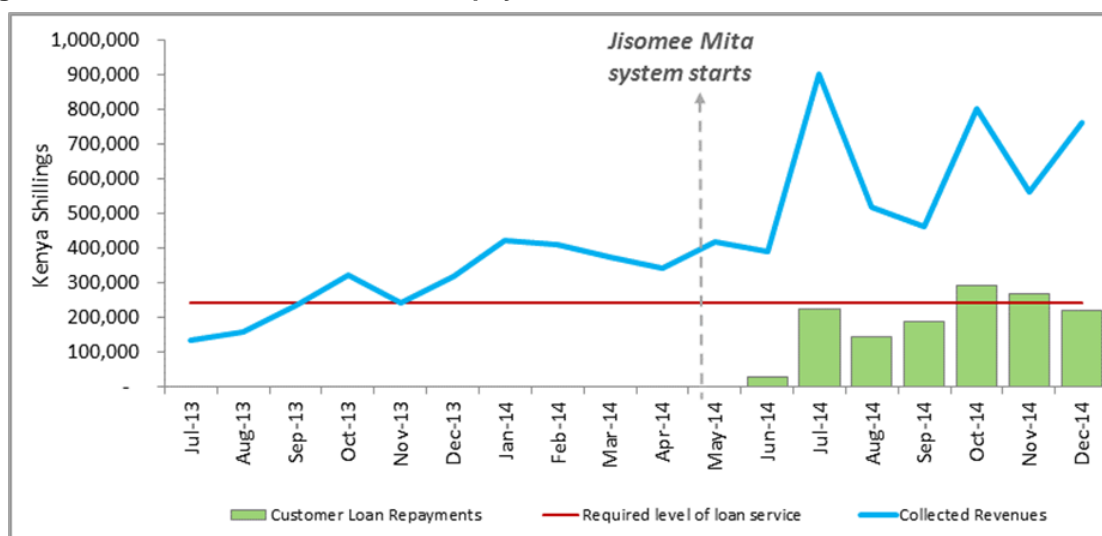
The uptake of Jisomee Mita by NCWSC has been facilitated by the fact that it addresses key challenges for the utility around revenue collection in informal settlements, areas often viewed as commercially unviable and high risk. Availability of management buy in is also a key driver for introduction and adoption of ICT as part of an organization’s work flow processes. Management and staff of NCWSC were actively engaged in the development and deployment of Jisomee Mita, which facilitated faster acceptability. User buy in was supported by the low consumer confidence levels in the quality of traditional billing mechanisms attributed to inconsistent/unreliable meter readings. However NCWSC did need to offer additional incentives to consumers, such as writing off arrears, to encourage buy in.

The main NCWSC customer management system (CMS) is not dynamic (easily modified), making it vendor dependent. This limits modifications that can be done by NCWSC as all changes have to be done by the developer. For example, all source codes (software programs) are written in Spanish and NCWSC staff are not in a position to alter them. In addition, costs for modifications are high – it was reported that an initial quote of USD 60,000 was received for system integration so NCSWSC has to run parallel systems, CMS and Jisomee. Since the Jisomee application is essentially at the development stage with the first pilot barely six months old, further development work and integration are envisaged.

The Jisomee platform does not run on a database and with the growing volumes of data, its performance will be compromised. NCWSC is therefore planning to upgrade to a more advanced database like ORACLE or MySQL; this will be part of the scheduled migration to new infrastructure.

Payments made by Jisomee customers through the bank are not reflected in the Jisomee system as the banking interface is only linked to CMS. NCWSC’s operational costs are currently high because of subsidizing the costs of the SMS and tariffs for MPESA payment in addition to having to pay the service provider managing the MPESA gateway. However, this is justified by the increased monthly collections that reached an average of around 600,000 KES between May 2014 and December 2014 and a reduction in bill generation costs since deployment of Jisomee. The graph below shows the revenue collected by NCWSC as well as loan repayments by customers before and after the launch of Jisomee Mita.

Figure 4: Collected revenue and loan repayment before and after Jisomee Mita



Kayole Project Financial Performance *1 USD = 90 KES

2.2.4 Mobile field assistant

NCWSC also uses a Mobile meter reader, the “mobile field assistant” to perform meter reading functions. This initiative was benchmarked from the Johannesburg Water Utility and its customization to the Nairobi context was done in-house and funded by the utility. The mobile field assistant uses smart phones to collect information on geo-references, meter readings and location of households. It supports extended work process functions, for example an automatic routing system is incorporated as part of the software and meter readers are presented with a route plan. There is also a dedicated access point network provided by the service provider (safaricom) that ensures security of data.

There was initial resistance to the new system and as part of the change management process a one month training for all staff and the board of directors was organized to explain the capabilities of the system.

NCWSC currently estimates the operating costs for this system at about USD 82,000 (7m KSH), despite this seemingly high cost, several benefits and opportunities have been realized as detailed below.

- i. The costs of meter reading have significantly reduced. There is an estimated 88% reduction in lifecycle cost for basic infrastructure (android mobile phone vs previously used data loggers).
- ii. NCWSC has seen a reduction in non-revenue water (NRW) from 40 to 38.5%.
- iii. Improved governance has been achieved through availability of reliable data, reduced customer complaints and knowledge of actual customer base.
- iv. Utilities in other African countries have expressed interest in the mobile meter reader and NCWSC is considering the potential of a commercial venture. Whereby the proprietorship rights would be maintained by NCWSC as means of sustainability and resource mobilization to reduce the need for external subsidies and/ or financing.
- v. Charging the phones is a challenge as most phone batteries last about 4 hours. Providing phone power banks has been considered as an immediate solution but there is no reliable supplier of these power banks. Some companies within the private sector have expressed interest in supporting the application. For example, LG in providing phones, IBM and Samsung in providing a storage solution for managing big data. The latter are considering undertaking research to develop a sustainable data management solution for large data sets and applications suitable for low income settlements. NCWSC is exploring the option of engaging LG to provide customized phones with extended battery life.

2.2.5 Mmaji

Mmaji is a mobile phone based application that provides information to customers in informal settlements on availability and price of water in order to support informed decisions on which public water point to purchase from. It works in a similar methodology to the stock market. Information from water points is collected at frequent intervals during the day and collated to provide up to date data to consumers.

Consumers have several payment options involving direct cash and IT solutions. A recent innovation is the use of public transport travel cards that are loaded with credit and allow for access to public water supply and ablution points at discounted prices.

2.2.6 WASPA MIS Tools

Water service providers association (WASPA) operates an internal performance review mechanism for member WSPs that collects data on 54 key performance indicators (KPIs). Some of this

information is manually collected and maintained in a database based on simple excel based spreadsheets.

Information is used for tracking progress against KPI to design improvement strategies, identify advocacy themes for WASPA and priority intervention areas. Some of these KPIs are the same as those collected by WASREB, however, there is no comparison or correlation done with WASREB data. The key challenge is that WASPA data is more up to date whereas that by WASREB refers to the previous fiscal year.

WASPA has a simplified excel based MIS tool for monthly data collection that is used for data triangulation to ensure quality and consistency in data reported. WASPA tries to ensure that similar data sets are reported by WSPs to both WSBs and WASPA albeit the process being limited to participating WASPA members.

3. CASE STUDY: MAJIDATA

3.1 Description of the MajiData System

3.1.1 Vision

MajiData was intended to provide planning data for improved governance and finance allocation in the urban sub-sector. This is in addition to establishing a harmonized criteria for defining water and sanitation coverage given the differing performance measurement criteria and perceptions among water sector stakeholders. Previously, pro-poor statistics were based on estimates and data collected mainly by civil society organizations, some of which had no clear basis. This made assessment towards realization of MDG 7 targets difficult and often resulted in high investment costs and skewed resource allocation.

MajiData is essentially an online database for socio-economic data on the urban poor and is limited to unserved urban settlements in Kenya. These settlements are defined by the WSTF on the basis of population density and do not necessarily coincide with the boundaries of delineated water service areas. Data was obtained for several indicators, including population, household size, water access by source of supply and service level, use of household water treatment, payment for water, size and number of dwellings in a particular town, sanitation access, and statistics on flood prone areas.

The MajiData dashboard as shown in figures 4 to 6 can be manipulated to provide user defined information, for example by administrative category from national to town level, key indicator, or particular slum.

“Previously, Kibera was described as the largest slum in Africa with a population of 1 million. Through MajiData, the actual population was determined to be about 300,000 in actual fact dispelling previous assertions” Han Seur, GIZ

Figure 5: MajiData dashboard 1

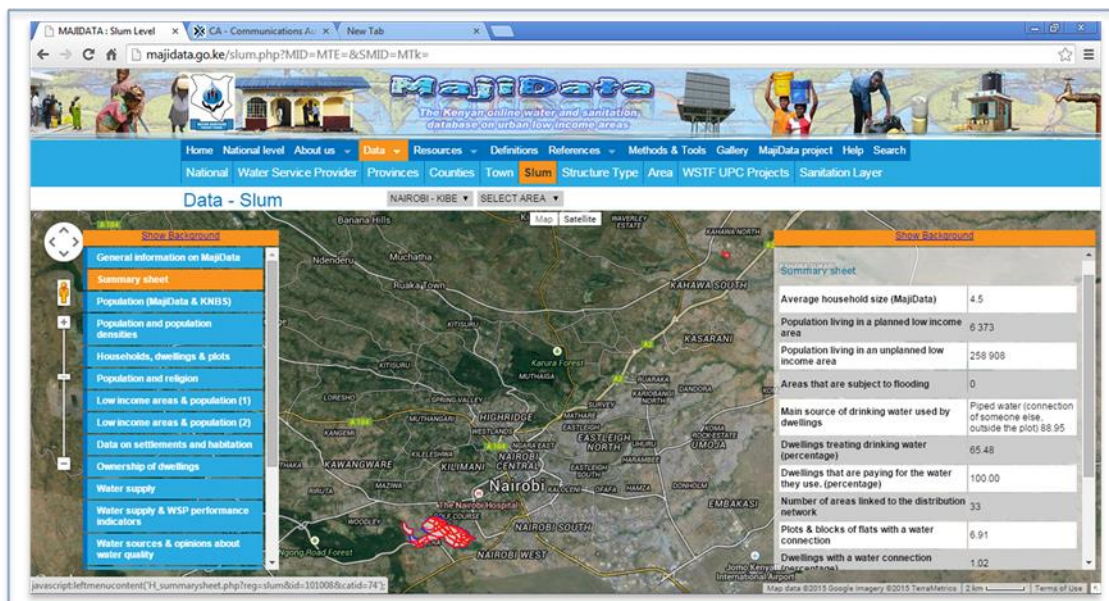


Figure 6: MajiData dashboard 2

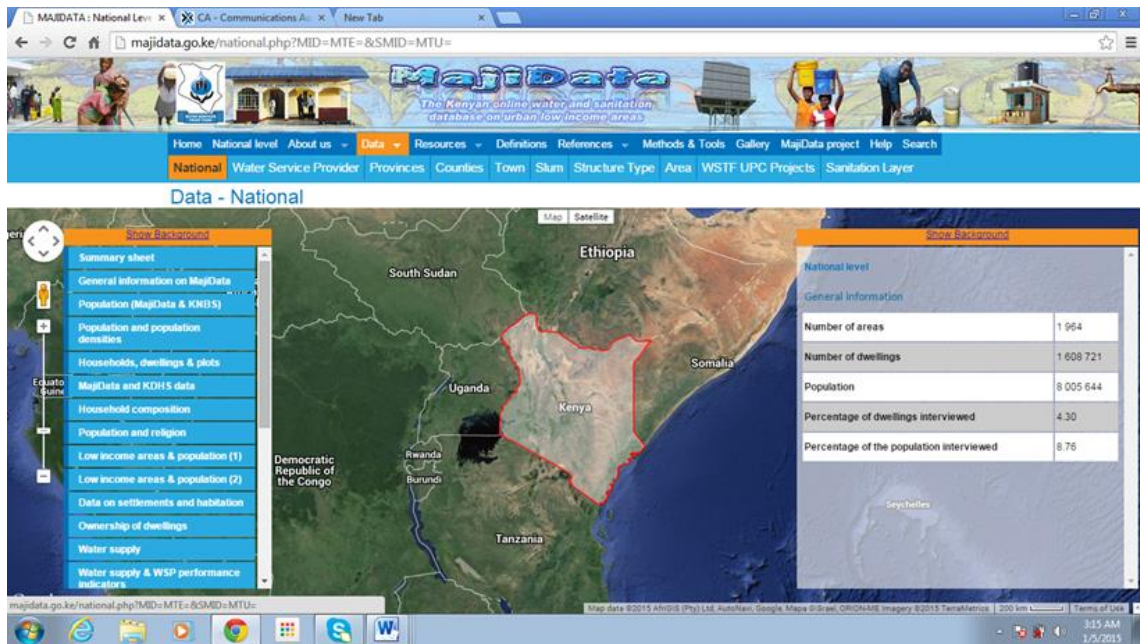
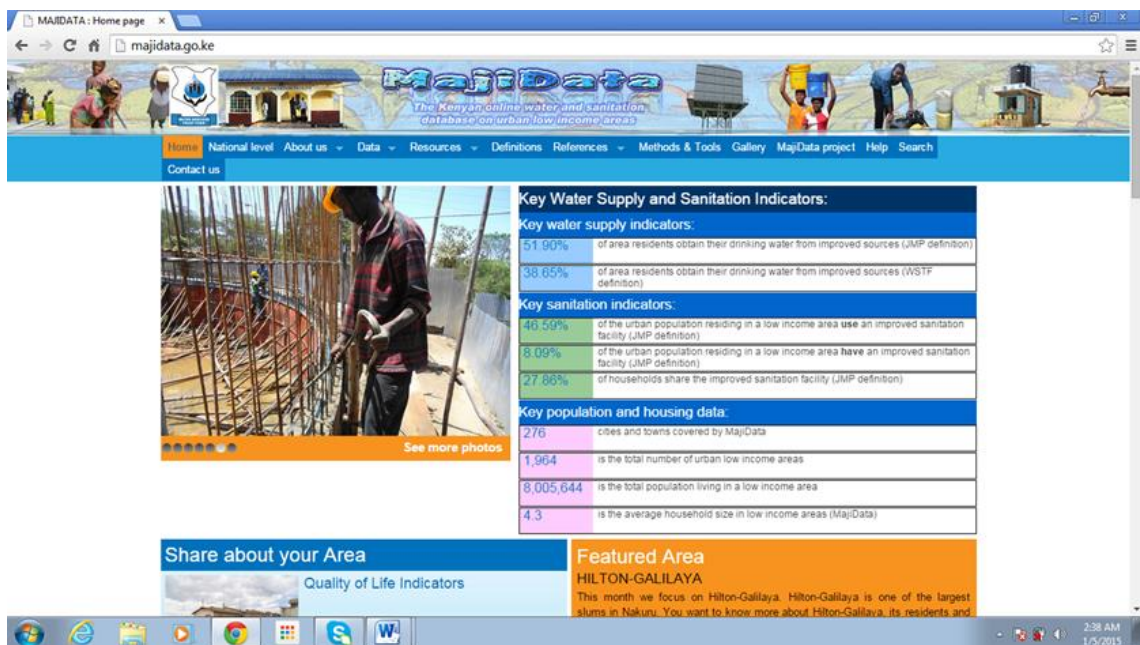


Figure 7: MajiData dashboard 3



3.1.2 Process

a) Background

MajiData was conceptualized in 2008 by GIZ (as a result of a personal initiative of the GIZ program manager) in response to the need for reliable pro-poor planning data that was identified and prioritized as a key undertaking during the 2007 water sector review performance. The undertaking committed to establishing a baseline on available unplanned urban settings as well as coverage statistics therein. However, no financing was allocated by GoK to support the process, so GIZ offered technical and financial resources as part of its support to the Kenya water sector reform process aimed at improving governance in the water sector. GIZ also provided leverage, having been involved with similar work in Zambia.

This role was delegated to the WSTF due to its existing capacity and its mandate of supporting the MoWI in providing water supply and sanitation services to rural and underserved urban communities. MajiData should have been hosted by WASREB as industry regulator, but in 2008 it had a lean institutional structure with limited capacity to handle MajiData process requirements. WSTF works mainly with WSPs and was motivated by the need to improve value for money in its investments given the huge financing gap and often exaggerated and unreliable data provided by WSPs in proposals.

The development process was outsourced to the private sector by GIZ and the same consultant who developed the Zambia system (Aquatis) was engaged.

Following concept development, WSTF agreed upon the structure of the user interface and key indicators using a participatory approach involving key stakeholders including the Kenya national bureau of statistics (KNBS). A multi stakeholder consultation was held to synchronize sector requirements, with KNBS playing a key role in data validation.

b) Methodology/development process

Development of the data collection protocol was facilitated by a team from Zambia that had implemented a similar tool (in Zambia). Data collection tools were developed in partnership with local authorities, MoWI, KNBS, WSPs and WSBs based on initial tools developed by WSTF. Database development was done in-house by outsourced project staff (consultants).

A project data collection team trained in partnership with local authorities and residents collected data using dwelling interviews and FGDs. Data collection started in 2009 and concluded in 2011, with the process taking a long time as a result of limited human and financial resources. Initial project financing from GIZ was obtained in 2009 and targeted the Lake Victoria south region; scaling up to other areas was demand driven based on sector stakeholder needs for development and availability of funds.

The main objective was to provide a baseline on pro-poor water and sanitation, following stakeholder consultations, however, during development, the scope was expanded to include other parameters important for pro-poor urban service delivery like information on housing.

Due to fund limitations, the initial concept involved developing a pro-poor database that would be stored on DVD. This was later changed with the coming on board of Google and IBM which were interested in providing solutions for improving analysis of large data volumes and ICT supported customer feedback mechanisms. Google's core competence was in web-based systems and came in to support the development of an interface to facilitate the transition from external hardware storage to a web-based system. The design process was done by Kenyans with Google providing technical and financial support.

Data incompatibility was a challenge during the data entry process requiring rigorous cleaning up, triangulation and in some cases repeat data collection. Furthermore data collected in the northern Kenya region with high levels of insecurity at the time is not considered reliable.

c) Scalability

Current data on the MajiData platform is dated, with no upgrade since 2011 because of funding limitations and the project-based nature of the initiative. A major update of MajiData is however planned with support from the German Government. It is anticipated that the process will actively involve and include tools that will allow for direct linkage with WARIS. WSTF anticipates that the data collection process will be institutionalized and incorporated within the current performance measurement framework of WASREB since requirements are similar. However, this arrangement is currently at a conceptualization stage and an agreement is yet to be reached.

The scale-up plan includes an SMS based direct feedback system to the MajiData platform to incorporate a complaints system that will address community issues. One of the key objectives of MajiData that was not realised is developing a platform for consumer feedback. It is hoped that the SMS system will provide this information on consumers' concerns.

With support from the Gates foundation, the WSTF is now developing a tool to facilitate M&E and performance measurement for all projects financed through the fund. The tool is intended to adopt a results chain model with data collected annually on smart phones and linked with MajiData. This project is also developing an android based application to facilitate real time data storage and analysis. It is planned that the user interface will be accessed by all stakeholders including local community users. Previously used paper-based forms have been replaced with automation using android phones.

WSTF reported that most of data on the MajiData database is not used, with an estimate of about 2% of the data used frequently. This may be attributable to the fact that there is no backend connection for users outside WSTF and that parameters/indicators collected are not frequently used by sector stakeholders – for example the database collected extensive information on housing status. This limits the rate of scaling up use and further development as there is no motivation for resource contributions.

3.1.3 Customer/User

The concept that led to development of MajiData originally envisaged a national platform and/or database on urban poor service delivery indicators. During the development and deployment process managed by WSTF, MajiData primarily focused on WSTF needs albeit with indicators relevant for other sector stakeholders.

The database is managed centrally by WSTF and can be accessed through the MajiData website (MajiData.go.ke). Users have limited user rights and currently export data manually into their independent systems for analysis for different planning uses. WASREB for example uses it as baseline data on pro-poor service delivery while CSOs and WSPs use it to obtain information to provide basis for intervention and for resource mobilization.

Consultations indicated that MajiData is the only comprehensive database on urban poor service delivery in Kenya and thus has the potential to be a very useful tool to development partners in this arena. The incentive to use it cannot be overstated especially for a demographic segment where data is often overstated and/or estimated. Another incentive is the free use/ open data it provides making data availability affordable to development practitioners. Mr. Shivaji from KEWASNET noted that MajiData has been a very useful resource for KEWASNET members, providing baseline data and the basis for defining data collection requirements in urban poor settlements.

The MajiData interface only allows external users to view available data and no direct analysis can be made. Users therefore have to extract data from MajiData and perform additional analyses using other tools to suit their different needs. The available data is also dated since the database has not been updated since 2011 making it almost redundant for current initiatives as well as the objectives for which MajiData was developed.

The above limitations highlight the need to incorporate MajiData into WSP and WASREB plans for performance monitoring and accountability on service delivery to the urban poor. Consultations with WASREB indicated the intention to integrate MajiData into WARIS 3.0 and with provisions to annually update as part of WSP reporting. However, the WSTF is considering the option of co-hosting with WASREB as a transition arrangement.

3.1.4 Human Capacity

Development of MajiData was originally outsourced to the private sector mainly due to limited skill in WSTF at the time and to build on similar work already done by the consultant. The WSTF currently has a well-resourced IT department with capable staff to handle the operational requirements of MajiData, in addition, the Kenya IT sector has sufficient skill in case of new staffing requirements for the upgrade. However, the question of future ownership of MajiData and the shape it will take still remains given the need for integration and synergy within the sector and recognition of the mandates of KNBS and WASREB in data provision and performance measurement respectively

3.1.5 Finance

MajiData was mainly financed by GIZ through WSTF, the original budget of 1.5 million Euros covered 2,000 areas as part of the initial baseline. Other stakeholders came on board during the scale up to other regions.

3.2 DATA ANALYSIS AND KEY FINDINGS

The table below assesses various aspects of the development, implementation and application of the MajiData tool. The ICT impact chain developed by Gigler (2011) is used to assess the social and human impact of the ICT intervention. This involves an assessment of the information and communication options that have been made available, and the ability of the communities to use these opportunities to improve the quality of their lives.

Table 1: Impact assessment of the MajiData tool using the Impact chain analysis (Gigler, 2011)

Condition	Dimension	Assessment
Information Needs (existing information ecologies)	Information needs	<p>Before MajiData, information on informal settlements/ urban poor was scarce and often unreliable. The application enabled availability of reliable planning data and provided the WSTF a basis for evaluation of funding proposals to ensure equity of access as well as better targeting of available and limited resources annually.</p> <p>Development partners, including civil society and other advocates for marginalized communities such as the urban poor require reliable data. MajiData provided this and currently, the KEWASNET CEO notes that its members like KWAHO have used information in their rights based advocacy.</p>
	Communication needs	
	Communication channels	
	Information gaps	
Access to ICTs (ICT Infrastructure)	Access to electricity	<p>MajiData is a web-based application that requires internet connection. GoK has invested heavily in ICT infrastructure and connectivity which facilitates its use. Statistics from KCC indicate an increase of over 18 million internet subscribers over the last 10 years, an indicator of the high potential of ICT use in Kenya and for MajiData. The application is currently used by WSPs, CSOs working in urban poor settlements, WSBs and WASREB. All these already use ICTs in their operations so can easily navigate and use the tool, which is simple and user friendly especially given that the current user rights outside WSTF are limited to viewing reports and data sets. However, with service provision devolved to counties, their capacity to use web based applications needs to be established.</p>
	Access to ICT infrastructure	
	Geographic location	
Basic Use of ICTs (Simple ICT use)	Literacy rates	<p>The original concept was to provide data on urban poor settlements and distribute on DVD to key stakeholders. With additional funding attracted as a result of the realized potential of having reliable data and utilization, MajiData capabilities were enhanced to make it web-based. The initial development phase was participatory with key sector</p>
	Level of education	
	Socio-cultural context	
	Basic ICT training Poverty rates	

Condition	Dimension	Assessment
	Connectivity costs	<p>players involved in defining indicators, which contributed to the early adoption because of the perceived relevance of the data to be provided.</p> <p>WASREB, the regulatory authority did not have a reliable source of data on the urban poor, which MajiData provided. This is used as baseline information as part of annual impact reporting, however, the data is dated since no updates have been made since 2011.</p> <p>The potential for MajiData was largely acknowledged by many of the stakeholders consulted yet continued meaningful use will require proper institutional arrangements and integration with existing ICT applications like WARIS and Majivoice using similar data. The institutional arrangements will require identification of the best placed stakeholder to host the application and provide financing for the required operational costs.</p> <p>The application provides reliable data on urban poor particularly on population and water and sanitation coverage, a first in KENYA. However, information is currently owned by WSTF and other institutions have limited user rights on the MajiData platform and view it as a WSTF initiative; This limits sustainability of use in an arena with (i) different existing applications that can be manipulated to suit individual needs and (ii) unclear financing mechanisms to keep the application running and data relevant.</p> <p>The financial and social sustainability of MajiData is still not clear. Firstly, the intervention is still at its pilot phase and no updates of data have been made since the final data collection exercise in 2011. Secondly the data collection was largely driven by availability of funding from the stakeholders who required the data, hence the lack of continuity after initial funding.</p>
Meaningful use of the ICT tool (Level of use of the tool)	ICT Capacity building	<p>MajiData provided a comprehensive database on urban poor statistics. Application development and deployment was done in a participatory manner and information collected was at the micro level. Key stakeholders especially in the water and housing sectors were thus able to define their requirements. This facilitated meaningful use of the data and confidence in the planning and resource allocation at the time.</p> <p>Current users, including WASREB, CSOs as represented by KEWASNET and WSPs, undertake analytical assessments as part of their performance reporting and advocacy</p>
	Local and relevant content	
	Technical local appropriation	
	Sustainability	

Condition	Dimension	Assessment
		<p>work. It can thus be asserted that users have sufficient capacity to utilize MajiData and have benefited from the statistics.</p> <p>MajiData user rights are limited, with only WSTF having full rights to directly manipulate data on the platform. However, the data is currently manually exported by the other users and used to support analytical and performance measurement functions beyond currently defined indicators in MajiData. This makes it cumbersome to use given the existence of different unlinked applications of the different users.</p> <p>The sector does not have an established coverage definition presenting disparities on urban poor indicators for the case of MajiData. The fact that sector players have to perform additional / extended analyses on MajiData may make it redundant if another viable option for obtaining urban poor statistics is found.</p> <p>MajiData initiative was project driven and depended on available resources. Since 2011 no update has been made to the data decrying its sustainability and continued relevance.</p>
<p>Enhanced Information Capability (multiplier effect)</p>	<p>ICT Capabilities</p>	<p>Currently there is no linkage or direct interoperability between applications in use and MajiData; all users outside WSTF have to extract data from the MajiData platform and perform any required analysis using other tools. This is time consuming and compromises ownership of information provided. Before MajiData, WSTF had a lean IT department but with the growth of the institution as enhanced in part by the use of ICT applications to support planning and other business processes, the department has since grown in size and technical capacity. MajiData development and deployment also involved capacity building. MajiData experience also helped highlight the need for reliable information- from the inconsistencies between existing data and that collected through the MajiData initiative; strengthening the M&E systems and thus the IT department.</p> <p>KEWASNET intends to build a knowledge management center and anticipates to use MajiData as one of its information bases.</p>
	<p>Information literacy</p>	
	<p>Communication Capabilities</p>	
	<p>Content Capabilities</p>	
	<p>Local technical & social appropriation</p>	

Condition	Dimension	Assessment
		WSTF funding is now better targeted and beneficiaries (WSPs) are able to attract funding even outside WSTF because of the increased confidence in data provided to justify their funding proposals. In addition, WSTF reported increased value for money and transparency of its finance allocations. From the latter, it can be implied that more people have been served as a result of improved knowledge of actual need.

3.3 Discussion

3.3.1 Trends in the WASH indicators captured by the ICT tool

Data collection was a one-time exercise due to budget limitations so no trends based solely on MajiData can be obtained. However, it provided extensive baseline information on water and sanitation statistics on the urban poor delineated across different administrative and water service provider service areas. This provided a good platform to prioritise resource allocation as well as identify areas that were being marginalised in addition to estimating the actual needs in these settlements.

3.3.2 Trends in the use and operation of the ICT application itself

MajiData was first conceptualised to improve urban poor service delivery but the need to incorporate other indicators, such as land tenure was also realised. The initial use was mainly by WSTF and its partners to improve quality of proposals and allow for equity in service delivery, the scope has increased to include performance reporting by WSBs and planning by key development practitioners working on urban poor settlements.

The first phase of the project targeted only the Lake Victoria south region but with increased funding the scope was extended to other areas. This process was demand driven based on the need for information by other stakeholders to design projects as WSTF did not have sufficient funds to cover the whole country.

WASREB also recognises the legitimacy of the database and uses it as baseline data in obtaining its performance statistics. Other sector stakeholders like CSOs use it for planning interventions and resource mobilisation because it is currently the most comprehensive database on urban poor.

Most of the ICT applications used by utilities in Kenya are aimed at improving business processes, such as meter reading and billing. The Jisomee Mita results and concept highlighted the contribution informal settlements can offer to improvement of NCWSC revenues, however, statistics on the urban poor are lacking and NCWSC relies on the customer updates done during registration. Currently, from discussions held there does not seem to be any inter-linkage between existing applications that require urban poor statistics and MajiData.

3.3.3 Disparities in data collection along income/wealth and gender distribution

MajiData considered the urban poor demographic segment and as such all settlements were considered to represent the lower wealth/ income bracket of the urban poor.

3.3.4 Any other gaps in data coverage

The first data set obtained for the MajiData database was collected in 2009, with the demographic and social economic changes taking place in these settlements, the data contained therein cannot be reliably used for current planning initiatives.

Settlements in the database are delineated by the project definition that is based on population density and is only limited to urban poor pockets. However, with the devolution process, planning should be done at county level and the boundaries of these settlements do not match county boundaries, which presents inconsistencies in defining county coverage statistics for the urban poor.

Data collected in the northern Kenya region which faced substantial insecurity at the time cannot be relied upon. Most of the data was obtained from village chiefs with no validation or other quality control mechanism employed.

3.4 Opportunities and Challenges

Collection of data for the MajiData initiative commenced during a period of political instability following the highly contested 2008 election and the field team had to deal with ripple effects of post-election violence. Data in some cases could not be reliably obtained due to insecurity, creating some gaps. In addition, the project started out in one region (Lake Victoria north) and the scale up process was not well defined as the criteria for inclusion was sometimes arbitrary. As with any data collection exercise, there was some data incompatibility, with missing field records or inaccurate records provided by local authorities and in some cases, data collection had to be redone. In the end the data collection exercise required substantial resources; this was exacerbated as much of the information assumed to be readily available, such as boundary lines and names of settlements, was not. This experience calls for adequate planning and the allocation of adequate human and financial resources during any data collection exercise.

Some MajiData indicators were not based on standard definitions, for example geographic boundaries. This situation was complicated further by the unclear geographic boundaries for villages and names of settlements. In some cases, the data collection exercise identified slums/ unplanned settlements which were not in administrative records and as such not recognized. Furthermore, MajiData has helped highlight the need for standard coverage definitions and indicators relating to urban poor particularly for the water sector. The disparity in coverage statistics, due in part to different definitions – JMP and MajiData, attest to this. Han Seur from GIZ reported that as a result, WSTF is refining definitions used by MajiData and discussions are being held with key sector stakeholders to have these standardized and adopted nationally.

MajiData has a restricted interface that is currently not interconnected with the different applications and /or databases used and managed by the different users. This presents the challenge of managing the interfaces between data collectors, developers, local authorities, water service providers and the WSTF. Additionally, the large quantity of tools in use by the water sector results in the collection of similar data, creating inconsistency of information, suboptimal use of resources and can compromise decision making. The similar data requirements coupled with the highly consultative development process of MajiData presents opportunities for inter-operability of existing applications. For example, the WASREB impact report which is developed using WARIS requires data on urban poor and so does NCWSC for planning and management of its Jisomee Mita and other pro-poor initiatives. However, what was apparent from discussions with different stakeholders was that most of the applications are donor financed and the integration process is not easy to achieve.

The original plan was to incorporate a feedback mechanism within MajiData but this did not take root for several reasons including the development of another application – Majivoice with financing from a different donor. Currently, WSTF is using social media and radio to obtain feedback with an incentive proposed for consumers who can locate the MajiData application on their mobile phones. However, the communication campaign was only recently launched and results have not yet been fully established. With already established and functional applications like Majivoice, the need for integration is apparent and should be considered during the design of the MajiData upgrade. Another opportunity lies in the use of KNBS data for making projections or trend analysis during analysis using MajiData. However, there are challenges with compatibility since KNBS data is sample based and considers a ten year horizon.

WSTF has had three previous failed attempts to develop an M&E system, most of which were project driven and focused on results monitoring for trust fund projects. Involvement of different user departments in WSTF including top management and the different stakeholders amplified the need for this data as well as creating opportunity for additional financing to the initiative. MajiData is used by CSOS and WSPs in resource mobilization and planning. This has contributed to an improved

quality of proposals, increased visibility of unplanned settlements translating into more people actually served, equity of access and quantification of the actual needs. It was also reported that World Bank-WSP utilises MajiData to design subsidies as part of its programs supporting improved service delivery to the urban poor. The MajiData platform facilitated increased community, county and WSP interaction on issues of targeting and equity of service provision. Interest has been expressed by other stakeholders, including the Ministry of Health, to utilize a similar platform to MajiData, or use the MajiData platform to extend parameters to include data on clinics.

As noted in the above discussion, there is no clear sustainability plan for MajiData, which is currently hosted by WSTF, albeit the recognition of usefulness of information by sector stakeholders. The major missing links relate to financing and institutional arrangements for managing the MajiData platform. WASREB, which also maintains its mandate in all the reform provisions seems better placed to take on the hosting role in the long term. This will allow for better integration and synergies in applications used to report on sector performance. The ministry of water, as a neutral party in the development of the application should also take a leading role managing this transition, providing the necessary oversight.

4. CONCLUSION

Experiences from MajiData and WARIS show that the costs of data collection are very high and the quality and quantity of data available is often overestimated. All information management initiatives should therefore be adequately planned for and well-resourced if reliable data is to be obtained and the benefits of informed planning attained.

The majority of the ICT applications in Kenya are externally financed and development partners (DP) always have unique interests that need to be harmonised. Public institutions that are recipients of DP support thus need to develop sufficient capacity to facilitate dialogue and levelling of expectations so that common objectives are mutually agreed upon and sector needs are put at the forefront. DPs also have a great influence on the sustainability of ICT use as their support is time bound and continuity is dependent on institutionalisation of the interventions.

Technology often requires a mindset change towards ICT and institutional capacity to enhance the momentum with which it is taken on. Support of top management is a critical catalyst to successful introduction of ICT in the sector as it involves organizational change. It was reported that Kenyans are willing to pay for good service, based on the high rate of mobile phone penetration and experience with Majivoice where residents incur the cost of the SMS. This opportunity can be capitalised upon when up scaling any of the above applications and/ or in the introduction of new ICT applications in the WASH sector.

The local private sector is the perceived leader in ICT in terms of capacity and should be adequately engaged. For example, including considering concession arrangements where private sector can finance the development of applications as with the Hackathon experience.

The devolution process is still evolving with roles of different sector actors still unclear, the water bill 2014 is still under deliberation yet it has provisions that may require changes in the way some of the institutions work. The transition plan should thus be well communicated. Proposed institutional arrangements for any ICT application will need to be aligned with the new provisions and should evolve as the institutional mandates are confirmed and capabilities strengthened.

ANNEX A: LIST OF STAKEHOLDERS CONSULTED

The case study report has been prepared based on consultations with key water sector stakeholders in Kenya, along with literature on ICT for development and the sampled applications. The table below provides a list of the stakeholders consulted as part of this field study.

NAME	DESIGNATION	INSTITUTION
Toni Sittoni	Communication Specialist	WSP - World Bank
Patrick Nduati Mwangi	Senior Water and Sanitation Specialist	WSP - World Bank
Eng. Nelson Bosuben	Senior Programme Officer (Urban)	WSTF
Ali J. Boru	Technical Auditor	WSTF
Kegga Muthoni	Quality Assurance Officer	WSTF
Han Seur	Advisor to WSTF	GIZ
Eng. Robert Gakubia	Chief Executive Officer	WASREB
Herbert Kassamani	Director, Consumer and Public Affairs	WASREB
Joshua Waweru	MajiVoice consultant	WASREB
Brenda Anzagi	ICT	WASREB
Samson Shivaji	Chief Executive Officer	KEWASNET
Martin Nang'ole	ICT Director	NCWSC
Owen Wanjala	Systems Analyst	NCWSC
Eddah Gacholi	Executive Officer	WASPA
Job Kangicu	National Technical Advisor	WASPA

ANNEX B: PICTORIAL OF FIELD MISSION



Consultation with the Staff of WSTF



Consultation with the Staff of WASREB



Consultation with the Staff of NCWSC

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