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Launch of the Non-Revenue Water Reduction Program in Africa

18-23 June 2012
Nairobi, Kenya



FABRI
USAID's Further Advancing the Blue Revolution Initiative

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LAUNCH OF THE NON-REVENUE WATER REDUCTION PROGRAM IN AFRICA

18-23 JUNE 2012

NAIROBI, KENYA

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ACRONYMS

ACWUA	Arab Countries Water Utilities Association
AfWA	Africa Water Association
ALC	Active Leakage Control
AMCOW	African Ministers Council on Water
DMA	District Metered Area
FABRI	Further Advancing the Blue Revolution Initiative
GWCL	Ghana Urban Water Limited
GWOP	Global Water Operators Partnerships
IWA	International Water Association
KM	Knowledge Management
PIP	Performance Improvement Plan
GUWL	Ghana Urban Water Limited
M&E	Monitoring and Evaluation
NRW	Non-Revenue Water
NWSC	National Water and Sewerage Company, Uganda
SEEG	Societe d'energie et d'eau du Gabon
STC	Scientific and Technical Council (of AfWA)
TF	Task Force
TOR	Terms of Reference
USAID	United States Agency for International Development

1. NON-REVENUE WATER REDUCTION PROGRAM IN AFRICA

Globally, two major problems facing countries are (1) how to close the gap between available resources and the demand and (2) how to fund system maintenance and service expansion. The joint program between the U.S. Agency for International Development's Further Advancing the Blue Revolution Initiative (FABRI) and the African Water Association (AfWA) to reduce non-revenue water (NRW) directly tackles these two key challenges.

Too frequently, countries try to close their water resources gap by promoting the new water production. In countries with access to large financial resources, seeking new water resources might be one reasonable alternative, but most countries do not have the necessary funds. Instead, they are far better positioned to improve the management of their existing resources. Their highest priority should be to ensure that they are making effective and productive use of as much water entering the system as possible by reducing water losses. Low cost interventions can yield disproportionate gains.

One of the major challenges facing water utilities in the developing world is the high level of water losses, frequently from leakage, theft, and problems with billing. The difference in volume between the water entering the distribution system and the water billed to consumers is currently called *non-revenue water* (NRW). High rates of non-revenue water significantly reduced water for allocation and impact the financial viability of water utilities through lost revenue and increased operational costs. NRW reduces a utility's capacity to fund service expansion, especially to the poor.

AfWA and FABRI are currently launching a new three-year program to reduce non-revenue water in 26 utilities in 19 countries in east, central, southern, and west Africa. The NRW program is introducing management and technical tools and systems that will enable water utilities – both national water boards and state and city entities – to reduce water losses.

The program has three phases: 1) diagnostic, 2) implementation, and 3) monitoring and evaluation. AfWA and FABRI have identified an initial group of 26 utilities to participate and plan to add more utilities over the next three years. One unique aspect of the NRW program is the involvement of AfWA senior management and members of the AfWA Scientific and Technical Council's NRW Task Force in the day-to-day management and guidance of the program. Fourteen Task Force members, representing member utilities across Africa, will play an increasingly important leadership role over the life of the program and beyond. Initially, Task Force members will participate as members of the diagnostic teams that will visit each of the 26 utilities during the next six months. Task Force members will also support the implementation, and monitoring and evaluation components of the program.

The NRW program approach will:



- Implement the program in close partnership with the AfWA/NRW Task Force
- Develop synergies with Africa Water Operator Partnerships
- Design and carry out the NRW program based on utility priorities
- Scale up efforts to include as many utilities as possible
- Reflect both physical and commercial losses
- Start immediately

To launch the NRW Reduction program, AfWA and FABRI convened a six-day meeting for 15 east, central and southern Africa utilities in Nairobi during the week of 18 June 2012, hosted by the Nairobi City Water and Sewerage Company, Ltd. The week was designed to:

- Provide technical background on NRW to managing directors and senior technical staff in east, central, and southern Africa
- Agree on the scope and terms of reference of a utility audit
- Agree on the composition, roles, and responsibilities of the Audit Team
- Design a draft schedule of audit visits and teams for utilities

The focus of each day during the week was the following:

- *18 June:* Final preparation for the week – Organizers and presenters met to review and finalize the agenda for the 3-day workshop.
- *19 June:* Start-up planning meeting for the AfWA STC NRW Task Force – The 14-member NRW Task Force met for the first time to clarify roles and responsibilities and define their scope of work to support the implementation of the NRW program.
- *20-22 June:* A three-day workshop to launch the NRW diagnostic phase.
- *23 June:* After action review – The core Task Force members met to assess the results of the workshop, highlight the results of the week, and plan for next steps, including the audit visits and the next workshop.

2. MAJOR AGREEMENTS FROM NRW PROGRAM LAUNCH

AfWA STC NRW Task Force Creation

- Roles and responsibilities of members
- Draft protocols / operating procedures

Initial Audit Visits to 11 Utilities

- Composition of External Audit Teams
- Transition schedule
 - *Initial Audits*: Consultant + 1- 2 task force members from other utilities. If there is a task force member from the utility, s/he will serve as 2nd audit task force team member
 - *Interim Audits*: Consultant and 1 taskforce member
 - *Longer Term Audits*: Two taskforce members will conduct audits
- Utilities will also identify at least 1 full time representative from the utility who is responsible for NRW or technical operations to work with the external audit team throughout the visit and provide access to other staff as needed during audit.
- Tentative audit visit work plan
 - Days 1-4 Audit (water balance, operations assessments, leakage control, gaps)
 - Day 5 – Workshop (w/ Managing Director) Audit team to complete analysis, recommendations, finalize audit report & continue discussions on PIP recommendations
 - Day 6 – Debrief managing directors before team departs
- FABRI will cover costs of audit visits for consultants and task force members who are part of audit team

West Africa Phase 1 Diagnostic Workshop

- Scheduled for 27 October - 3 November 2012 in Ouagadougou, Burkina Faso, hosted by the Office National de l'Eau et de l'Assainissement.
- The remaining utilities that were not present in Nairobi will participate in the three-day diagnostic workshop.

Follow-up Meeting with Managing Directors

- Proposed meeting of all managing directors following the diagnostic phase to reflect on process, implementation plan, next steps, results of initial implementation activities, additional support needed. Tentatively scheduled for February 2013.

Implementation

- The program will begin implementation in each utility immediately after the audit and PIP visit

3. NON-REVENUE WATER PROGRAM LAUNCH

NRW Task Force Start-Up Meeting

On 19 June 2012, thirteen members of the newly formed AfWA Scientific and Technical Council's (STC) NRW Task Force met in Nairobi to 1) clarify the Task Force purpose, roles and responsibilities; 2) draft terms of reference and agree on operating procedures for the Task Force; and 3) clarify roles during the three day NRW workshops (East Africa and West Africa sessions)



Sylvain Usher, Secretary General of AfWA, and Peter Reiss, FABRI Project Director, co-chaired the meeting. Kathy Alison, FABRI, facilitated the meeting. Malcolm Farley, water loss management and leakage control specialist, was a major technical resource and who had designed and later led many of the sessions over the coming days.



The co-chairs briefed the Task Force members on the new AfWA and USAID FABRI Non-Revenue Water Program. Task Force members worked in small teams to define their Terms of Reference (TOR) and a representative from each group compiled a TOR that was then presented to the entire Task Force. (See Annex 1 for the names of the Task Force members, the TOR and draft operating procedures.)

The group also discussed the details of the audit visits that will take place during the Diagnostic Phase.

Phase 1 Diagnostic Workshop with Utility Representatives

Forty-three utility managers and senior technical staff from 15 water utilities in 13 east, central, and southern Africa participated in the three-day Diagnostic Phase Workshop. Senior representatives from AfWA, the African Ministers Council on Water (AMCOW), the Arab Countries Water Utilities Association (ACWUA), the Global Water Operators Partnerships Alliance (GWOP) and several representatives from the Africa Young Water Professionals Program also participated in the sessions. (See Annex 2 for the list of workshop attendees.)

The workshop provided an opportunity for representatives from participating utilities to review and discuss:

- Non-Revenue Water (NRW) Reduction Program objectives, expectations, approach, and their roles and responsibilities

- Role of the AfWA Scientific and Technical Council NRW Task Force in implementing the program
- NRW Reduction Management Techniques and Analytical Tools
- Phase 1 utility diagnostic plan, including schedule for audit visits to utilities

Workshop Themes

Day 1: Introducing Non-Revenue Water

Day 2: Using NRW Analytical Tools

Day 3: Preparing for Diagnostic Visits to Utilities

(See Annex 3 for the workshop agenda)

Highlights of the Workshop

Eng. Philip Gichuki, Managing Director of the Nairobi City Water and Sewerage Company, welcomed participants.

Kathy Alison discussed attendee expectations for the three-day workshop, followed by Sylvain Usher, Secretary General of AfWA and Peter Reiss, Project Chief of Party of FABRI who offered an overview of the new NRW reduction program in Africa.

Heather Skilling, Water and Sanitation Specialist for the Africa Bureau, USAID/Washington provided a briefing on USAID's interest in supporting the NRW reduction program in Africa.

Expectations of Utility Participants at the Nairobi NRW Workshop

- Build commitment at management level
- To learn
 - How to build a successful NRW program
 - Common terminology for NRW
 - Sources of technical losses and how good engineering can solve it
 - Water balance techniques
 - Use of EasyCalc
 - Tools for reducing NRW losses
 - How to deal with uncollected revenue
 - How to better utilize available resources and where to find additional resources
- Reflect on why NRW has remained a challenge.
- Explore challenges of managing NRW losses in high density areas
- Explore opportunities for using Water Operator Partnerships to support the NRW program
- Build commitment from utilities to take part in the long-term NRW program
- Enhance cooperation between ACWUA and AfWA



Anne Bousquet, Capacity Development and Training Office with GWOPA described the role that the Global Water Operators Partnerships Alliance could play in furthering the NRW Reduction program.

Cephas Oguah, Task Force Vice Chair from Ghana explained the Terms of Reference for the AfWA NRW Task Force in the implementation of the NRW Reduction Program.

Management and technical sessions on NRW reduction were led by Malcolm Farley, water loss management and leakage control specialist and co-author of *The Manager's Non-Revenue Water Handbook for Africa* that was produced under the USAID Advancing the Blue Revolution Initiative. The technical sessions included:



- Introduction to NRW Management
- Water Balance Components
- District Metered Area (DMA) Management techniques
- Planning for the Diagnostic Phase

Interactive group discussions, exercises and learning opportunities were designed to support the technical sessions. Kathy Alison, FABRI organizational development specialist and trainer facilitated the following group exercises:

- **A World Café.** Utility representatives shared their current efforts in reducing non-revenue water losses, describe their successes, and identify major challenges.

Following the World Café Activity, Utility Representatives Reflected on the Results of their Discussions and Identified Important Advice for Others

- NRW needs a specific budget
- It is important to know the entire system in order to develop an effective NRW reduction plan
- Political will is critical
- Devoted staff are critical
- There is a need for clear direction, authority and power to implement the program
- Use of appropriate technology is important
- Barriers to NRW reduction need to be addressed
 - Incentives (currently there is no threat of disconnection)
 - Legislation (low fines need to be increased)
- Quick Examples:
 - Senegal, NRW is 20%. Leakages are fixed before there is a complaint. There is government support, resources to improve infrastructure and work in informal settlements.
 - In Kenya, there is an NRW target for all staff (from management to cleaning staff)
 - Uganda, NRW is 20%. Call Center provides fast response. Pressure reduction at night. Periodic meter reading checks.

- **Water Balance EasyCalc software practice.** The group received raw data from a utility and then practices using the EasyCalc software to calculate the utility's water balance.
- **DMA management initiatives case studies.** Utility representatives developed case studies using their own DMA experiences as examples, including what was done, barriers to setting up DMAs, management issues that arose, the impact of using DMAs, and one to two lessons to share with others



Following the DMA discussion, each group presented a brief summary of the management issues, impacts, and lessons in plenary. *See Annex 4 for the DMA case study powerpoint summaries presented by each group.*

Group discussion session on 20 questions related to NRW concepts and techniques. Utility representatives discussed the questions at their tables and used the workshop binder to find more information when needed

On the last day of the workshop, Sylvain Usher, Peter Reiss, and Malcolm Farley provided an overview of the plans for the audit visits to the 11 utilities that participated in the workshop. The audit visits, scheduled from August to December, will initiate the Diagnostic Phase and result in initial implementation plans for each utility. See Annex for the audit checklist and visit schedule.



Peter Kuguru, Board Chair of Nairobi City Water and Sewerage Company, joined the group on the last afternoon and closed the meeting by highlighting the importance of moving forward on the implementation of the NRW Reduction Program.

During the closing session, Nairobi Water generously provided beautiful souvenirs to each of the workshop attendees.

On Saturday morning, 23 June, three members of the Core Task Force plus Sylvain Usher, Peter Reiss, and Malcolm Farley met to review the results of the week and plan next steps.

Agenda

The agenda for the meeting included:

- Workshop Results: Learnings / agreements / to do list / next steps
- Audits
 - Visits to utilities
 - Audit and PIPs
 - Funds for visits
- Communications with group (newsletter, dropbox)
- Next NRW workshop in West Africa
 - Timing
 - Venue

Audit Information Required from Utilities

- **Audits Process**

See Annex 5 for the audit checklist and Annex 6 for an updated schedule of visits)

- **Tasks**

- Assess current improvement plan
- Do water balance
- Review data
- Conduct interviews

- **Products of Audit**

- Workshop to review findings and develop recommendations – managing director to attend
- Briefing with managing director and senior staff
- Performance Improvement Plan for utility (PIP) (2-5 years) –to be developed and led by utility
- Draft Action Plan / Implementation Plan for AfWA/FABRI to support PIP

FABRI Can Support

- Develop data base
- Collect data for water balance
- Provide technical training
- Provide related mgmt. training
- NRW experience training
- NRW technical expertise and institutional support
- Develop investment plans
- Support development of business plan
- Support linkages to donors, convene meetings with donors
- Cover travel costs of audit teams & travel to international conferences
- Convene conferences
- Help cover costs of AfWA conferences
- Support development of KM / communications tools
- Support operator partnerships

- Request utility to identify at least one full time representative from utility, from NRW or Fund small number of pilot projects
- Help start DMA or provide assistance to establish DMAs

FABRI Cannot Support

- Infrastructure replacements
- Large scale metering
- Leak detection equipment

- **Audit Team Will Provide to Utility in Advance**

- Audit Checklist: To do list to prepare for audit visit and list of logistical expectations
- Technical operations as a “full – time utility audit team member”
- Contact utility audit team member in advance to share expectations

- **Utilities Will Provide to External Audit Team**

- Selection of project area
- At least one full time representative from utility, from NRW or technical operations and who will be involved in implementation in the project area
- Others to be made available as needed
- Use audit checklist to prepare data package to provide to audit team upon arrival
- Provide additional data during visit as requested
- Logistical arrangements for visas and letter of invitation, hotel reservations, schedule meetings and workshops , and in-country transport

NRW Workshop in West Africa

- Next NRW workshop tentatively proposed in Burkina Faso
- Dates – Oct 27 – Nov 3, 2012

NRW Program Newsletter

- FABRI will design, AfWA to take over publication & distribution after first issue.
- Post on AfWA website, distribute via email and dropbox
- Publish monthly throughout program
- Content Options
 - Provide information on upcoming events / meetings. Malcolm will make occasional contributions to the Newsletter and keep us informed of upcoming international NRW events that can be posted in the newsletter
 - Updates on FABRI’s support to NRW effort in utilities
 - Audit visit schedule
 - Brief summaries of results of audits – what happened
 - Results of NRW workshop (photos, agreements)
 - Title Options: NRW –Africa Program Update

ANNEXES

ANNEX 1

AFWA STC NON-REVENUE WATER TASK FORCE

NRW Program Core Team

- Olivier Gosso (Cote d'Ivoire) (Chair)
- Cephas Oguah (GWCL / Ghana) (Deputy Chair)
- Tchagole Etienne (Societe Togolaise des Eaux)
- Mahmood Lutaaya (NWSC/Uganda)
- Sylvain Usher (AfWA)
- Peter Reiss (FABRI)
- Malcolm Farley (FABRI)
- Kathy Alison (FABRI)

NRW Task Force

- Olivier Gosso (Cote d'Ivoire) (Chair)
- Cephas Oguah (GWCL / Ghana) (Deputy Chair)
- Tchagole Etienne (Societe Togolaise des Eaux)
- Mahmood Lutaaya (NWSC/Uganda)
- Bilong Alain (SEEG/Gabon)
- Abdoul Ball (Senegaliase des Eaux)
- Peter Bhembe (Swaziland Water Services Corporation)
- Malusi Dlamini (Swaziland Water Services Corporation)
- John Ruhui (Nairobi City Water & Sewerage Company)
- Iderdar Lahcen (Camerounaise des Eaux)
- Mbali Matiwane (Johannesburg Water)
- Sonko Kiwanuka (NWSC/Uganda)
- Moumouni Sawadogo (Office National de l'Eau et de l'Assainissement / Burkina Faso)
- David Onyango (Kisumu Water and Sewerage Company. Ltd., Kenya)
- Sylvain Usher (AfWA)
- Peter Reiss (FABRI)

ANNEX B

TERMS OF REFERENCE FOR THE NRW REDUCTION TASK FORCE

Overall Goal

Promote NRW Reduction in Africa

Phase 1: Planning and Diagnosis

- Partner with FABRI and identified consultants to develop NRW program, scheduling, inputs, etc
- Sensitize and create awareness amongst the participating utilities of the objectives of the program and its benefits (advocacy)
- Lead the audit exercise
 - Finalize the assessment tools for the audits
 - Co-ordinate submission of required information with the utilities
 - Co-ordinate and conduct audit visits
 - Each member participate in at least 4 audit visits, including own utility during the course of the program
 - Help finalize the utility audit report
- Develop PIPs
 - Prepare the strategy for the development of the PIP
 - Help with the preparation of the PIP
 - Brief participating utilities on PIP to obtain their agreement

Phase 2: Implementation

- Develop TOR
- Design Framework for Phase II Implementation
- Develop Monitoring and Evaluation Plan
- Lead Implementation
- Monitor commitment and performance of participating utilities – identify implementation issues and roadblocks
- Identify NRW training requirements for utilities
- Represent AfWA in other events / venues (world water week, IWA conferences)
- Contribute to FABRI's annual workplan and progress reports
- Develop competition framework to recognize outstanding performance
- Develop an annual Task Force workplan to be reviewed and update bi-annually

Role of NRW Task Force in AfWA STC

- Lead liaison for NRW between their entities and Task Force and STC members
- Represent AfWA in other events / venues (world water week, IWA conferences)
- Identify NRW training requirements for utilities
- Prepare quarterly report for AfWA on status of NRW programs
- Help manage all AfWA NRW programs including scaling up / extending program to other areas and countries

- Disseminate knowledge products / identify best practices and tools and integrate them into programs
- Develop competition framework to recognize outstanding performance
- Develop an annual Task Force workplan to be reviewed and updated bi-annually
- Sensitize and create awareness amongst the policy makers of the objectives and benefits of NRW reduction (advocacy)
- Participate in quarterly STC meetings
- Take the lead in planning for sustainability beyond FABRI

Operating Procedures / Protocols for NRW Task Force Members

- How often to meet
 - At STC meetings (three times per year). Purpose – exchange information, participate in NRW training
 - Sub-group meetings (as needed)
- Communicate with each other
 - TBD
- How to replace a member
 - Continuity is key
 - Members have to deliver
- Sub-groups / sub-committees to be established
 - Training
 - Knowledge Management
 - Audit and M&E – responsible for analyzing reports from 26 utilities and developing tools for checking on indicators and competition framework
 - Planning – annual workplan preparation to be reviewed by TF
- Covering costs
 - STC meetings – utilities
 - Special meetings – FABRI and AfWA to be decided
- How many members should be present to make a decision (quorum)
 - 50 percent plus one
- If chair is not present, vice chair runs meeting
- Is chair permanent position or rotating? – TBD

ANNEX D

PHASE 1 DIAGNOSTIC WORKSHOP IN NAIROBI

AGENDA

Objectives: by the end of the three days, participating utilities will review and discuss:

- Non-Revenue Water (NRW) Reduction Program objectives, expectations, approach, and their roles and responsibilities
- Role of the AfWA Scientific and Technical Council NRW Task Force in implementing the program
- NRW Reduction Management Techniques and Analytical Tools
- Phase 1 utility diagnostic plan, including schedule for audit visits to utilities

<i>TUESDAY EVENING, 19 JUNE 2012</i>		
<i>1800 – 2000 PM</i>		
<i>AFWA & USAID RECEPTION</i>		
<i>INTERCONTINENTAL NAIROBI HOTEL</i>		
<i>DAY 1 – WEDNESDAY, 20 JUNE</i>		
<i>THEME: INTRODUCING NON-REVENUE WATER</i>		
Time	Session	Presenter
0800-0830-	Registration / coffee	
0830-0900	OFFICIAL WELCOME	Sylvain Usher <ul style="list-style-type: none"> • AfWA Secretary General Heather Skilling <ul style="list-style-type: none"> • USAID / Washington Philip Gichuki <ul style="list-style-type: none"> • Managing Director, Nairobi City Water & Sewerage Company, Ltd
0915-0945	WORKSHOP OVERVIEW <ul style="list-style-type: none"> • Get Acquainted / introductions • Objectives & Agenda of the workshop • Expectations for the workshop • Guidelines for working together 	Kathy Alison – Facilitator

<p>0945 – 1045</p>	<p>OVERVIEW OF NRW REDUCTION PROGRAM</p> <p><u>Session Objective:</u> Clarify the objectives and approach for the NRW Reduction Program in Africa (10 min each)</p> <ul style="list-style-type: none"> • AfWA’s vision & why NRW reduction is important / selection process for participating utilities • USAID’s vision for the NRW Reduction Program • Overview of FABRI and background on NRW Reduction Program <ul style="list-style-type: none"> ○ objectives ○ approach ○ expected results ○ resources available • WOP/Africa role in NRW program • Role of AfWA NRW Task Force in implementation of the NRW Reduction Program – Report from Task Force • Q&A / discussion 	<p>Kathy</p> <p>Sylvain Usher, AfWA</p> <p>Heather Skilling, USAID</p> <p>Peter Reiss, Further Advancing the Blue Revolution Initiative (FABRI)</p> <p>Anne Busquet, Global Water Operators Partnerships Alliance</p> <p>Cephas Oguah , AfWA STC Task Force Vice Chair</p>
<p>1045 - 1115</p>	<p>BREAK</p>	
<p>1115 – 1230</p>	<p>INTRODUCTION TO NRW MANAGEMENT</p> <p><u>Session Topics</u></p> <ul style="list-style-type: none"> • Understanding NRW • The Scale of the Problem • Real and Apparent (Commercial) Losses • The Effect of Time • The 5 Basic Questions <p style="text-align: center;">Q&A</p>	<p>Introduction to session - Kathy</p> <p>Malcolm Farley, NRW Expert</p>
<p>1230 – 13:30</p>	<p>LUNCH</p>	
<p>1330 – 1345</p>	<p>WORLD CAFÉ TASK</p> <ul style="list-style-type: none"> • Form groups of 5-7 (from different utilities) • Share information on the following: <ul style="list-style-type: none"> ○ What are you currently doing to reduce water losses? ○ Describe some successes you have had in reducing water losses ○ How are you involving government and/or consumers in reducing water losses? ○ What is ONE major challenge you are facing in implementing NRW programs? 	<p>Kathy</p>
<p>1345 – 1500</p>	<p>WORLD CAFÉ</p>	<p>Small Group Sessions</p>
<p>1500 – 1530</p>	<p>BREAK</p>	

1530-1600	REFLECTIONS on World Cafe	Kathy
1600 – 1700	WATER BALANCE <u>Session Topics</u> <ul style="list-style-type: none"> • Water Balance Components • Measuring and Estimating Components • Calculating Real and Apparent Losses • Software • Performance Indicators • Using Night Flow Data Discussion	Malcolm
1700 – 1715	WRAP-UP / HOMEWORK <ul style="list-style-type: none"> • TASK: tonight, consider which components of water balance are most difficult to measure or estimate and be prepared to discuss tomorrow morning 	Malcolm & Kathy
Evening	<i>Open – Dinner on your own</i>	

DAY 2 – THURSDAY, 21 JUNE		
THEME: USING NRW ANALYTICAL TOOLS		
Time	Session	Presenter
0830-0900	RECONVENE Overview of the day	Kathy
0900-1000	THE WATER BALANCE (contd.) <u>Water Balance Exercise</u> <ul style="list-style-type: none"> • Identifying Water Balance Components • Entering the data using WB EasyCalc • Calculating NRW and water losses • Performance Indicators 	Malcolm
1000-1030	Working Group Reports / Feedback	Malcolm & Kathy
1030-1100	Break	
1100-1230	IMPROVING PERFORMANCE <u>Technologies for NRW Management</u> <ul style="list-style-type: none"> • Zonal Monitoring and District Metered Area (DMA) • DMA Design and Installation • Pressure Management in DMAs • Leak Detection Technologies • Step Testing • Reducing Commercial Losses 	Intro - Kathy Malcolm

1230-1330	LUNCH	
1330-1530	DISTRICT METERED AREA (DMA) MANAGEMENT <u>Monitoring and Analyzing Night Flow Data</u> <ul style="list-style-type: none"> • Using Data to Manage Active Leakage Control • DMA exercises • Working Group Session and Feedback <u>Pressure Management</u> <ul style="list-style-type: none"> • Benefits of Reducing Pressure • Implementing Pressure Management • Case Study Examples 	Intro – Kathy Malcolm
1530-1600	Break	
1600-1700	DMA CASE STUDIES <u>Project Case Studies: Participant Experiences</u> <ul style="list-style-type: none"> • Working Groups (45 min) <ul style="list-style-type: none"> ○ Share your experiences doing DMAs <ul style="list-style-type: none"> ▪ What did you do? ▪ What were the barriers in setting up DMAs? ▪ What management issues did you have to overcome? ▪ What was the impact of using DMAs in your utility area? ▪ What 1-2 lessons would you share with others? ○ Capture management issues, impacts and lessons on ppt or flipchart ○ Be prepared to make 5 min summary 	Intro – Kathy
1700-1715	Wrap up / review of day / Adjourn	Kathy
EVENING	DINNER at CARNIVORE - HOSTED BY NAIROBI CITY WATER & SEWERAGE COMPANY, LTD	

DAY 3 –FRIDAY, 22 JUNE		
THEME: PREPARING FOR DIAGNOSTIC VISITS		
Time	Session	Presenter
0830-0845	RECONVENE / OVERVIEW OF DAY 2	Kathy
0845-1030	20 QUESTIONS TO TEST YOUR KNOWLEDGE OF NRW	Kathy
1030-1100	Break	

1100-1230	PLANNING FOR THE DIAGNOSTIC PHASE - discussion <ul style="list-style-type: none"> • Quick Overview of Diagnostic Stage • Managing NRW Audit Visit • Joint development of Performance Improvement Plans (PIPs) to implement NRW reduction programs 	Kathy Malcolm, Peter, Sylvain,
1230-1330	Lunch	
1330 - 1430	UTILITY PLANNING FOR DIAGNOSTIC STAGE <ul style="list-style-type: none"> • Discuss plan for the following: <ul style="list-style-type: none"> ◦ Define project area ◦ Schedule of the audit visit week's program (meetings, field visits, interviews) ◦ Mobilize Utility Team <ul style="list-style-type: none"> ◦ Who will be on team & briefing schedule ◦ What will be their specific roles and responsibilities ◦ Role in data analysis & audit report preparation ◦ Logistics support ◦ Identify stakeholder groups (MD, Board, senior management, utility staff) who need to be involved during audit visit <ul style="list-style-type: none"> ◦ Develop plan for briefing Stakeholders in advance ◦ Prepare data needed by audit team ...(refer to checklist provided) <ul style="list-style-type: none"> ◦ Who will do what 	Kathy Sylvain & Peter
1430-1530	Join 2 other utilities, share your plans for the audit visit, discuss what is missing (30 minutes total) Refine & finalize plan to share with AfWA & FABRI (on computer) (30 min) Be prepared to share examples in plenary	Utility Teams
1530-1600	Break	
1600-1700	FINAL WRAP-UP <ul style="list-style-type: none"> • Examples of audit visit plan • Next Steps <ul style="list-style-type: none"> • AfWA • FABRI • Closing Comments 	Kathy Sylvain Usher Peter Reiss Peter Kuguru, Board Chairman, Nairobi City Water & Sewerage Company
Evening	HOSTED DINNER – FABRI	

ANNEX E

DMA CASE STUDY SUMMARIES

GROUP MEMBERS

- Peter Bhembe (Swaziland)
- Peter Reiss (FABRI)
- Moses Jura (Kenya)
- Mbali Rose Matiwante (South Africa)

MANAGEMENT ISSUES

- i. Budget allocation (more meters, valves, etc)
- ii. Trial and error during actual operations to close and open valves (service interruption)
- iii. Staff structure readjustment (establishing water loss units)

IMPACT

- i. Data accuracy enhanced
- ii. Direct allocation of budget to priority problematic areas
- iii. Reduction of non revenue water (eg. 40 – 26%) in one of the areas
- iv. Helps in identification of technically viable interventions to reduce losses by monitoring the DMAs (night flow analysis)

LESSONS

- i. Water loss can be reduced systematically
- ii. Improved revenue through cost savings from the water loss

Team members

- | | |
|------------------|----------|
| □ Khumbo | – Malawi |
| □ Hassan Hussein | – Kenya |
| □ Lydia | – Kenya |
| □ Susan | – Zambia |
| □ Chris | – Zambia |
| □ Mahmood | – Uganda |
| □ Dennis | - Kenya |

Management issues

- Reviewing the structure inline with the DMAs –staffing, targets, incentives, other resources
- Formation of the NRW task force
- Financing of the required DMA tools and equipment (meters, leak detection equipment etc)
- By-in all the other staff and staff training

Impact

- **Reduction of NRW through**
 - Focused NRW reduction intervention
 - Coordinated monitoring of NRW
 - Improved data quality and quantity

Lessons

- DMAs are a means not an end to NRW reduction
- Management commitment
- Full participation by all stakeholders especially staff
- Proper physical planning
- DMAs also assist in addressing other operations issues
- DMAs can be established and can work at anytime. Utilities do not have to wait for an idea situation

Group Members

- Pheona Well
- Cephas Ogush
- Mustafa Nasreddin
- Karen Mlungu
- Melusi Dlamini
- Phoebe Luvum
- Carolyn Nyangweso

Barriers in DMA Use

1. Terrain has to be considered (topography) which will consequently have DMAs overlapping
2. Cost
3. Lack of maps and knowledge of the network (blueprints)
4. Some utilities are still occupied with other priorities like metering all existing customers

Management Issues

- Capacity building and training
- Understanding and political will for DMAs

Impacts of using DMAs

1. Able to measure water losses
2. Able to measure consumption
3. Able to measure night flows and hence detect leaks and thefts
4. It has eased leakage detection and handling
5. Reduced NRW by 20% in 4 years
6. Helps in forecasting demand
7. Helps in water allocation and budgeting and pressure control
8. Helps in isolating problem areas

Lessons Learnt

1. You need a good GIS system
2. Applying it afresh is easier than an already existing area
3. You need training and capacity building
4. It is better to include the operating staff from the onset rather than trying to involve them after implementation

Team Members

- Aagon Silver Emudong (Uganda) (facilitator)
- James Muchedek (Kenya) (reporter)
- Arnott S. Chilweza (Zambia)
- Anthony Wangua (Kenya)
- Jane Mumbui (Kenya)
- Joseph Karji (Kenya)

DMA Experiences

- Measure supply going in a DMA
- Monitor if more loss there in
- Demarcate the zones
- Meter all supply to reservoir before and after
- Bulk Meters read every morning
- Can detect any change in recording and move in to see if there are any bursts or illegal usage or even the function ability of the meters

Challenges

- in billing cycle if the billing is done daily or monthly
- Identifying the places to install the bulk meters to avoid double counting, so the technical team must identify the supply network thoroughly.
- Cost of the bulk meters was expensive
- Distortion on supply thereby inconveniencing clients and also failure to meet the revenue targets.
- Resistance to ethical issues on some clients who had done the illegal connections/corruption

Management Issues

- Top management commitment and prioritizing expenditure.

Lessons

- Monitoring tool enables utility to know their NRW LOSSES
- Immediate results are indicators of success
- Can educate customers of a given area on water saving tips and proper use of water
- All the customers must be metered in the DMA
- Customers are also able to repair their leaks
- Every customer is now metered

Groupe

- ABDLOUL BAL
- IDERDAR
- ALAIN
- ALLAFUZA

Sectorisation dans zone test à DAKKAR

- Sectorisation pour des besoins de gestion du rationnement de la distribution mais sans comptage

Plans des réseaux de distribution non à jour

- Investissements élevés
- Difficulté de la répartition des abonnés par secteur
- Vannes inaccessibles et non étanches

Pression faible et/ou réseaux déficitaires (Saturation production)

- Non maîtrise des consommations des abonnés pendant la nuit
- Fuites visibles encore importantes
- Etat vétuste des conduites et branchement

Récupérations des volumes non facturés de certains grands consommateurs

- Orientation des opérations de recherche des fuites
- Localisation des fuites importantes

Prioriser les actions préalables

- Mise à jour des plans
- Mise à niveau du comptage de gestion
- Réparation des fuites visibles
- Réhabilitation du réseau (Conduite et branchements)

DMA_s
(Groupe Francophone)

- OUMAR MAHAMAT OUMAR STE – TCHAD
- TCHAGOLE ETIENNE TdE – TOGO
- KEOU CELESTIN CDE – CAMEROON
- SAWADOGO MOUMOUNI – ONEA BURKINA-FASO

IMPACT DE L'UTILISATION DES DMA_s

- Maîtrise des paramètres du réseau dans la zone définie (débits, pressions)
- Meilleure connaissance des pertes d'eau (qualification et quantification)
- Plus grande responsabilisation des agents

DIFFICULTÉS RENCONTRÉES PENDANT L'ÉTABLISSEMENT DES DMA_s

- Méconnaissance du réseau
- Difficultés de localisation des consommations
- Rigueur dans la gestion des vannes du réseau défini
- Gestion du changement (mentalité, comportement)
- Correspondance des DMA avec les zones de facturation

LECONS TIRÉES A PARTAGER

- Amélioration et maintien du rendement du réseau
- Engagement ferme du top management pour obtenir les résultats escomptés (Investissement conséquents)

Group Members

- Rachael (Kenya)
- John (Kenya)
- David (Kisumu)
- Khaldon (ACWUA)
- Edward (Zambia)

Management Issues

- Identification of Problem
- Management decision to charge connections from G1 to PolyPipe
- Rehab of network in Cirec
- Interaction with other players (police, municipality)
- Staffing issue: costs, training
- Capital investment: meters, valves

Impact

- Reduction of NRW from <50% to 8%
- Increased revenue
- Improved water quality
- Customers more open to concept and billing
- More equitable supply

Lessons

- Need to involve all stakeholders
- Helps water supply and sewerage management
- Management has good indication of the network performance. Good tool for NRW management

ANNEX F

UTILITY AUDIT CHECKLIST DURING DIAGNOSTIC STAGE

Discussions with Senior Utility Staff: CEO, MD and Relevant Department Heads

- To establish an overview of current policies and practices, staffing structure, and the 'management' view on the current NRW level and strategies for addressing it - this may differ from the current situation viewed from operations staff perspective
- Review of utility management, operating practices and procedures – and policies

Review of the Infrastructure and Network Characteristics

- Pipe materials, diameters and age etc, whether adequate record drawings are kept
- What is the policy for pipe renewal (rehabilitation or replacement)?
- Knowledge and drawings of location of plant and fittings in the system (valves, hydrants, meters etc)
- System pressures (if known), any challenges for delivering customer demand
- Hydraulic problems, high/low pressure areas, shortage of supply
- Water Treatment Works and supply zones
- Condition of WTW supply meters and bulk transfer meters - if installed
- Assessment of sub-zoning (DMAs) if applicable

Review of Water Balance

This will determine the total water losses, real and apparent losses, and NRW. A preliminary water balance can be carried out using data available at the time, and gaps in the data noted for rectifying in a later water balance. The WB EasyCalc spreadsheet will be used to calculate the water balance. Is there a capability for a water balance calculation?

- Do staff understand the meaning and significance of a water balance?
- Is there information on the basic components of water balance (water into supply meters and customer billing records)?
- What are the challenges for getting information on other components?

Data and Information, Over an Annual Period (Or Shorter Period if Necessary) Will Be Required f

- System input volumes (corrected for any known meter errors)
- Metered volumes if meters are in place, otherwise estimated values – or use of temporary meters
- Customer consumption volume
- Number of connections (registered customers)
- Meter accuracies
- Estimates of other components (metered/unmetered use, billed/unbilled etc)
- Estimates of illegal connections
 - Sample studies to determine customer meter accuracy/illegal connections if time permits
 - System pressure range

- 24 hour or intermittent supply?

Review of Customer Records

- Are customers charged for water?
- What is the customer metering policy (meter change-out frequency)
- What types of meter are used and is the accuracy known?
- Are adequate billing records kept with accurate house counts?
- Is there a record of registered/unregistered accounts?
- Are illegal connections and theft significant issues?
- How are service connections made and maintained?
- Is leakage from customer service pipes greater volume than from mains?
- What is the repair policy for service pipe leaks – is there adequate QA?

Review of Active Leakage Control (ALC) Operations

The audit will examine the options for supporting the existing staff skills and knowledge:

- What is the current knowledge of ALC – what is practiced?
- Are there DMAs in place?
- Is leak detection carried out based on DMA night flow data?
- What is the skill base in the leak detection department?
- What leak detection equipment is available and is it used?
- What is the leak repair policy?
- Demonstration of equipment types and limited field training'
- Examination of 'defunct' or non-working equipment to assess potential for repair/replacement/upgrading
- Demonstration of the principles of night flow monitoring in small zones (DMAs) to carry out leakage estimation from aggregated night flows (bottom-up approach)
- Review of the feasibility of dividing up large zones into smaller zones, and installation of meters and PRVs for future DMA management

Workshops

Workshops are useful for consolidating findings during the review period, for sharing findings with staff, for listening to ways of meeting challenges, and for dissemination of information that they may not be aware of. They include:

- A short 'awareness' workshop for key staff and engineers (0.5 days)
- A training workshop for engineers, technicians and selected operations staff (0.5 – 1.0 days)
- Discussion groups to identify challenges for specific issues and implementation for the future
- Action plan devised by delegates for improving and strengthening their utility

ANNEX G
DRAFT SCHEDULE OF AUDIT VISITS AND TEAM COMPOSITION

MOIS/MONTH	SOCIETES / UTILITIES	COUNTRY	EQUIPE DE L'AUDIT/ AUDIT TEAM			
			TEAM /EQUIPE		UTILITY / SOCIETE	COUNTRY/ PAYS
AUGUST /AOUT 2012						
13 to/au 18	NORTH WESTERN WATER SUPPLY AND SEWERAGE COMPANY	ZAMBIA	Consultant			
			Malusi Dlamini		SWSC	Swaziland
			Sonko Kiwanuka		NWSC	Uganda
20 to/au 25	LUKANGA WATER	ZAMBIA	Consultant			
			Sonko Kiwanuka		NWSC	Uganda
			Task Force member			
27 to/au 01 sept.	SWAZILAND WATER SERVICES CORPORATION	SWAZILAND	Consultant			
			Cephas T. Oguah		GUWL	Ghana
			Peter Malusi		SWSC	Swaziland
SEPTEMBER/SEPTEMBRE 2012						
3 to/au 8	NOTHERN REGION WATER BOARD	MALAWI	Consultant			
			Peter Bhembe		SWSC	Swaziland
			David Onyango		KWSC	Kenya
10 to/au 15	KISUMU WATER	KENYA	Consultant			
			Peter Bhembe		SWSC	Swaziland
			David Onyango		KWSC	Kenya
17 to/au 22.	NAIROBI WATER	KENYA	Consultant			
			Sonko Kiwanuka		NWSC	Uganda
			John Ruhui		NWSS	Nairobi
OCTOBER/OCTOBRE 2012						
15 to/au 20	STE	CHAD	Consultant			
			Ilderdar Lahcen		CDE	Cameroon
			Bilong Alain		SEEG	Gabon

22 to/au 27	NWSC	UGANDA	Consultant			
			Sonko Kiwanuka Mahmood Lutaaya		NWSC	Uganda
			John Ruhiu		NWSS	Nairobi
NOVEMBER/NOVEMBRE 2012						
12 to/au 17	CDE	CAMEROUN	Consultant			
			Moumouni Sawadogo		ONEP	B. Faso
			Olivier Gosso		SODECI	C. d'Ivoire
26 to/au 1 ^{er} dec	JOHANNESBURG WATER	SOUTH AFRICA	Consultant			
			Mahmoud Lutaaya		NWSC	Uganda
			Mbali Matiwante		JW	S. Africa
DECEMBER/DECEMBRE 2012						
10 to/au 15	SEEG	GABON	Consultant			
			Etienne Tchagole		TDE	Togo
			Abdoul Ball		SDE	Senegal