Inkomati Flows Quarterly

Inkomati Catchment Management Agency

June

2010

INKOMATI

CATCHMENT MANAGEMENT AGENCY

INSIDE THIS ISSUE:

Vision:

Water for all in Inkomati

Mission:

- Manage the water resources according to the National Water Act.
- Manage all water use to promote equity and efficiency.
- Protect the water resources to support biodiversity and local use by communities.
- Involve stakeholders in water resources decision-making.
- Contribute towards social and economic development in the Water Management Area.
- Support the cooperative management of the Inkomati basin as an internationally shared watercourse.

Values:

- Customer orientation (Batho Pele)
- Transparency
- Integrity
- Efficiency
- Accountability
- Inclusivity
- Diversity
- Innovation
- Professionalism

From the Editor

Wow! It's been quite a while since the last publication of Inkomati Flows Quarterly. The last financial year has been a tough one characterised with recession and budget cuts. The ICMA was no exception in feeling the pinch. Very few activities have taken place but slowly we are going through the recovery patch. I trust that a lot will be happening since the completion of the first draft of the Bible of the ICMA, the Catchment Management Strategy (CMS).

I hope some of you will remember the breaking news in one of our SABC channels. As I was watching the news not so long ago I was so surprised to hear that Giyani was to be declared a disaster area in terms of water shortage. The footage showed some villages very close to the town of Giyani in an area where there is the Klein Letaba dam. During my school days we learnt that the dam was the third largest dam in the then Transvaal, after Vaal dam and Hartebeespoort dam. What went wrong now? During those days villagers would fetch water from street taps not very far from their homes. It was not the best of arrangement but the worst was yet to come. All those taps are dry now, actually very dry as if no water ever came out of them. The infrastructure is either none existent or is seriously dilapidated. For villagers getting water in your own tap is a dream never to be dreamt.

The situation is not unique to Giyani. This is just a reality check. If water resources are not effectively and efficiently managed, those realities will ketchup with us. Thanks to the Crocodile River Decision Support System (DSS). This technology seeks to analyse data and give records that would be used in decision making for the management of the river Crocodile catchment. The ICMA will involve stakeholders in the process of managing the water resources in the whole water management area. This is well captured in more details this newsletter. Please see Brian Jackson's article on the same subject in this newsletter.

Another article not to be missed is the one based on the developments of the Sanitation project at Sincobile High School.

Lets join hands in keeping the Inkomati flowing!

Editor

Sylvia Machimana

Foreword from the Acting CE

The Inkomati CMA would like to welcome all its stakeholders/ readers back after a long period of not publishing the quarterly Inkomati Flows newsletter. The financial recession had a significant impact on the budget of the Inkomati CMA in the previous financial year, which has seen the institution implementing cost curtailment measures that included a moratorium on the production of the newsletter.

It must be mentioned though that notwithstanding the budgetary constraints that the institution experienced, some important objectives were achieved. The financial challenges actually compelled the institution to review and prioritise its activities to try and achieve optimal results with significantly reduced financial resources. This process was achieved with the assistance of Professor Rodgers and Ms Luton of the Wits University School and the process virtually galvanized all the divisions of the institution to rally around the activities that were identified.

One such activity is the Crocodile Real Time Decision Support System, which the Department of Water Affairs allowed the Inkomati CMA to operate on their behalf. The importance of this system is that it promotes transparent and consensual decision making by way of letting users become part of the decision making. Where the need arise for curtailment or restriction due to droughts, such a decision would be discussed and agreed by all parties before implementation. A platform for stakeholders to participate in this regard was established during the 2009/10 financial year. Another activity which was accomplished in the 2009/10 financial year is the development of a Catchment Management Strategy (CMS) for the Inkomati Water Management Area, which was subsequently submitted to the Minister for her consent. A full article on the process to promulgate the CMS will feature in the next edition of Inkomati Flows. Meanwhile, the ICMA has again obtained an unqualified audit opinion, for the fourth consecutive year.

The process to finalise the assignment and delegation of functions to the Inkomati CMA has gained significant momentum and is envisaged to take place during the 2010-11 financial year. The Minister's objective of ensuring that the current existing CMAs are supported to attain full functionality will hopefully come to fruition. Tremendous amount of progress has been achieved, but it must be mentioned that the assignment and delegations are still under discussion and will hopefully be finalised soon for submission to the Minister. It has been really interesting and encouraging to observe the change in approach and attitude towards this process, especially bearing in mind the extent of delay that has beset this process as a result of institutional realignment and various other factors.

CROCOC - Crocodile River Operations Committee

BACKGROUND

During the development of its Business Plan for 2009-2010, the ICMA changed focus from Institution Building to Implementation. Recognising our personal and resource constraints we decided to adopt a project based approach that reprioritised our objectives for the 2009/10 financial year.

The method used to achieve this was to engage in an **Adaptive Planning Process (APP)** - following the Strategic Adaptive Management methodology currently widely accepted in resource management circles as the best method for planning and managing complex systems such as water resources. The ICMA was assisted in this process by Professor Kevin Rogers from the University of Witwatersrand.

The ICMA believes that through this APP it is now focused on achieving real progress on its main objectives. The ICMA realises that it is bound by its defined initial functions at present and the outcomes of the Adaptive Planning Process focused on what can be done within our initial functions to best support DWAF's objectives as well as **allowing the ICMA to gain credibility** and meet some of the expectations of the Stakeholders. The main goal of the APP was to adapt and streamline our planning and activities to be more in line with these. I.e. **The ICMA endeavoured to properly identify its role.**

The initial functions of the ICMA i.t.o section 80 of the National Water Act are the following:

- ◊ to investigate and advise interested persons on the protection, use, development, conservation, management and control of the water resources in its water management area;
- ◊ to develop a catchment management strategy;
- ◊ to co-ordinate the related activities of water users and of the water management institutions within its water management area;
- ◊ to promote the co-ordination of its implementation with the implementation of any applicable development plan established in terms of the Water Services Act, 1997 (Act No. 108 of 1997); and
- ◊ to promote community participation in the protection, use, development, conservation, management and control of the water resources in its water management area

The requirement to investigate and advice as well as to co-ordinate the related activities of water users and of the water management institutions resulted in interactions and agreement between the ICMA and the relevant DWA divisions on the roles of the parties.

The most important general agreements running through these interactions have been:

- ⇒ The ICMA should concentrate on assisting DWAF with the implementation and operation of the various project deliverables and outcomes.
- ⇒ DWAF is responsible for Water Resources Planning issues including the development of operating rules and the ICMA can assist through the operations of the developed

rules, which also fulfils the ICMA's initial functions.

The ICMA is the coordinator of all Stakeholder engagement in the Catchment. The MOU between DWAF and the ICMA also states this.

The ICMA thus focused its attention on a project based approach during the development of the 2009-2010 Business Plan with the aim of not duplicating activities, little cost implication on DWA and significant progress on achieving some implementation of key objectives**. This resulted in identified Priority Projects for Implementation using based on the following principles:**

Involve and deliver to stakeholders
Capitalise on existing expertise/ champions/resource
step beyond current restraints and "do it!"
Quick impact long shelf life
Delivers to as many National objectives as possible

Operate the Crocodile River System

The ICMA APP prioritisation process identified this as the main focus activity for the year for a number of reasons:

⇒ Many current DWA priority projects are coming to an end and require implementation. They all focus on the Crocodile River.

⇒ While all rivers have "problems" that cannot be ignored, the Komati is well supported by KOBWA, the reserve is largely met in the Sabie under current practices and AWARD is an effective watchdog in the Sand. The Crocodile, on the other hand, is the most stressed river with a wide range of pressing problems.

⇒ DWA will need support from the ICMA to successfully implement these project outcomes.

⇒ The relevant DWA directorates and PCC's have already agreed that the ICMA should be the central place for the implementation and operation of these rules as it is best placed.

⇒ Implementing this flagship project will also meet most of the vital attributes of the catchment documented in the Business Plan.

⇒ It does not have large cost implication on DWA as the Irrigation Boards and alternate funding sources will be used as much as possible and new resources in the ICMA will be limited.

⇒ ICMA needs to take over from DWA and implement, with the aid of the proto CMA (CME) staff, the many rules that have been passed.

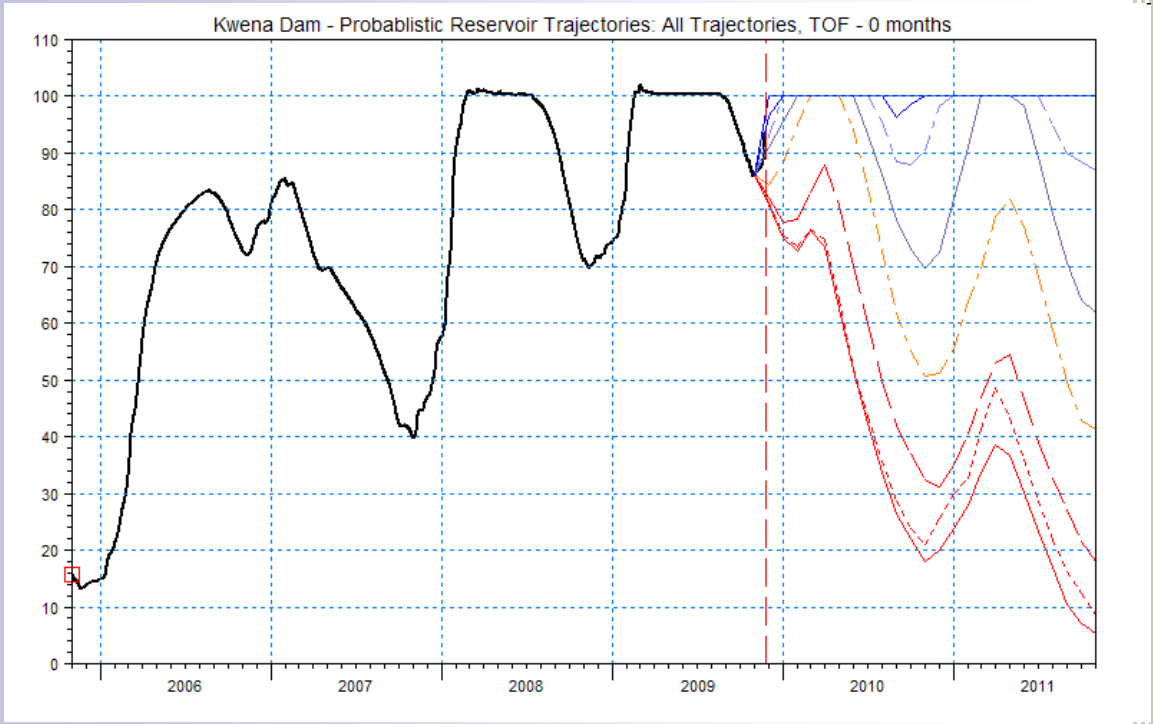
THE CROCODILE RIVER DECISION SUPPORT SYSTEM

During 2009, DWA completed the project to develop new real time operating rules and a decision support (DSS) system for the Crocodile River. A Decision Support System is the software, monitoring and information required to enable informed decision making.

This DSS consists of computer software to model the catchment and provide information to decision makers on the

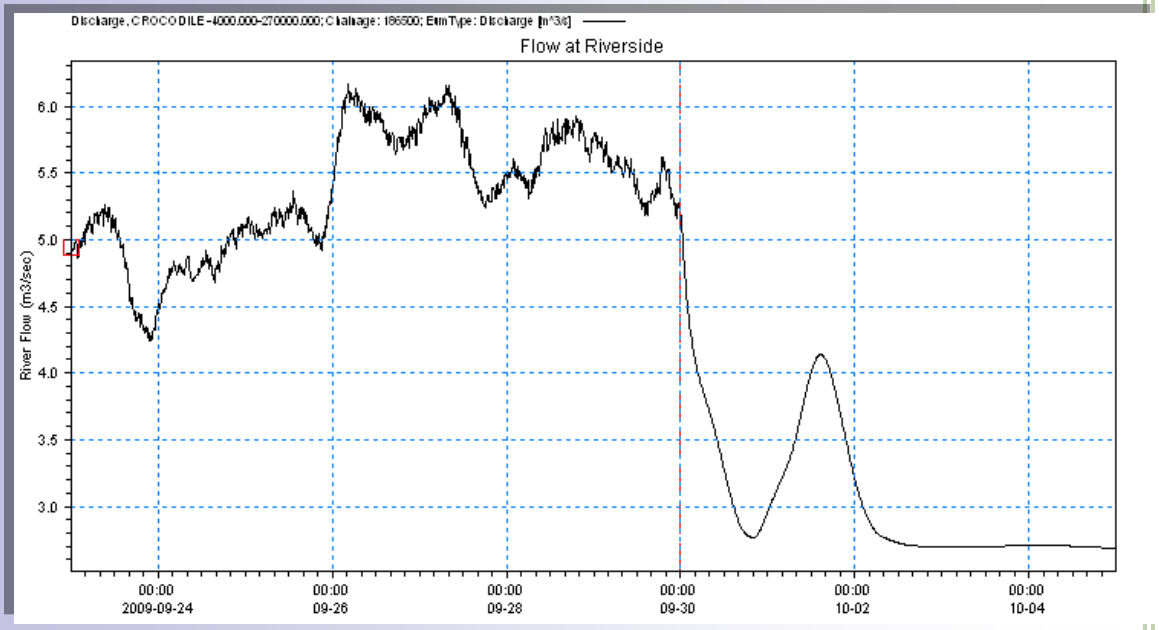
Long Term Water Resources Planning Model (WReMP). This model is used to predict the longer term (up to 18 months) behaviour of the Kwena Dam.

Historic Dam Levels and Possible future Dam Levels from Long Term Model:



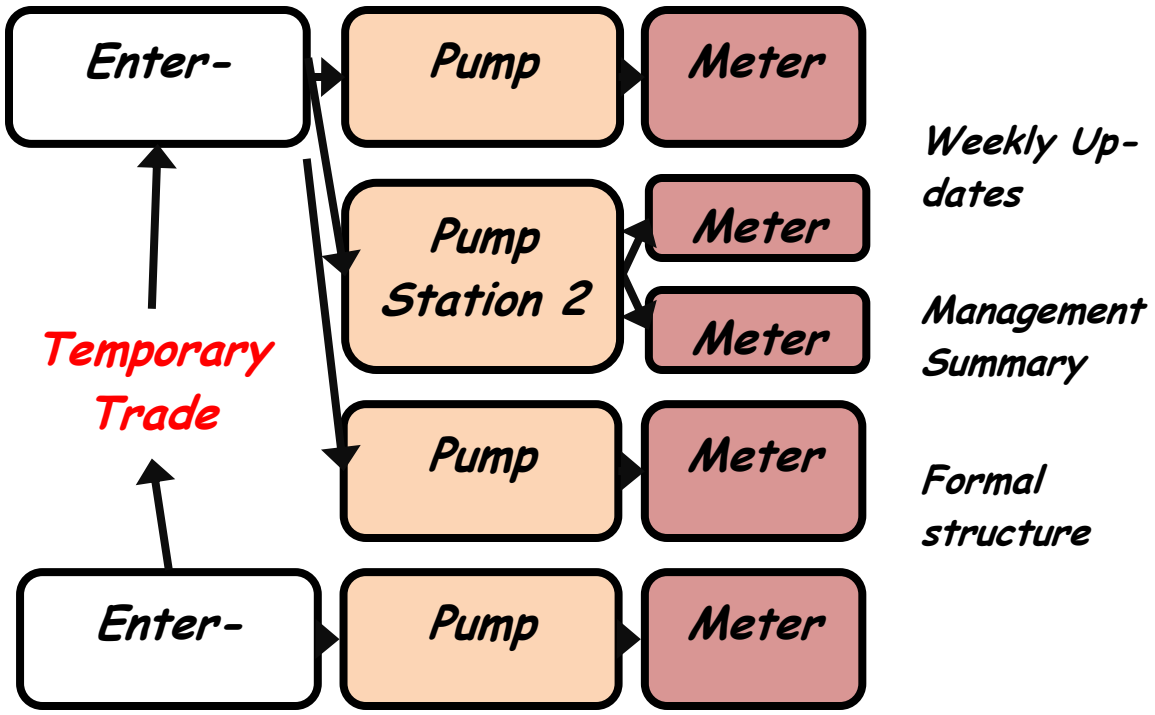
Short Term Hydraulic Model (MIKE 11). This model is used to track and predict the short term (1 week) river flows at various points in the Crocodile System.

Recent past river flow and Predicted future river flow from Mike 11:



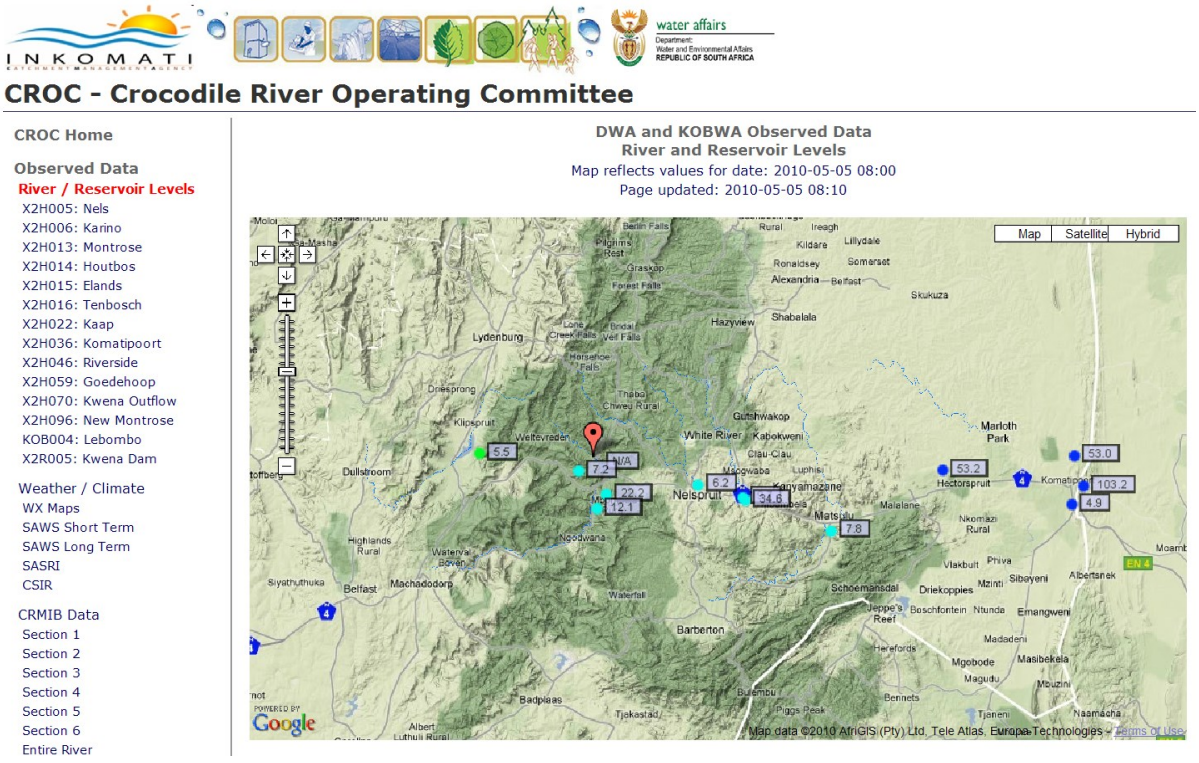
⇒ A spreadsheet application to assist the Irrigation Board to import their water order and water use information into the DSS.

Spreadsheet Application Concept for Water Use Data:



A Webpage where the output from models is displayed for any stakeholders to see. This information is updated daily.

The website is http://crocdss.inkomaticma.co.za/Website/Obs.River.Reservoir.html



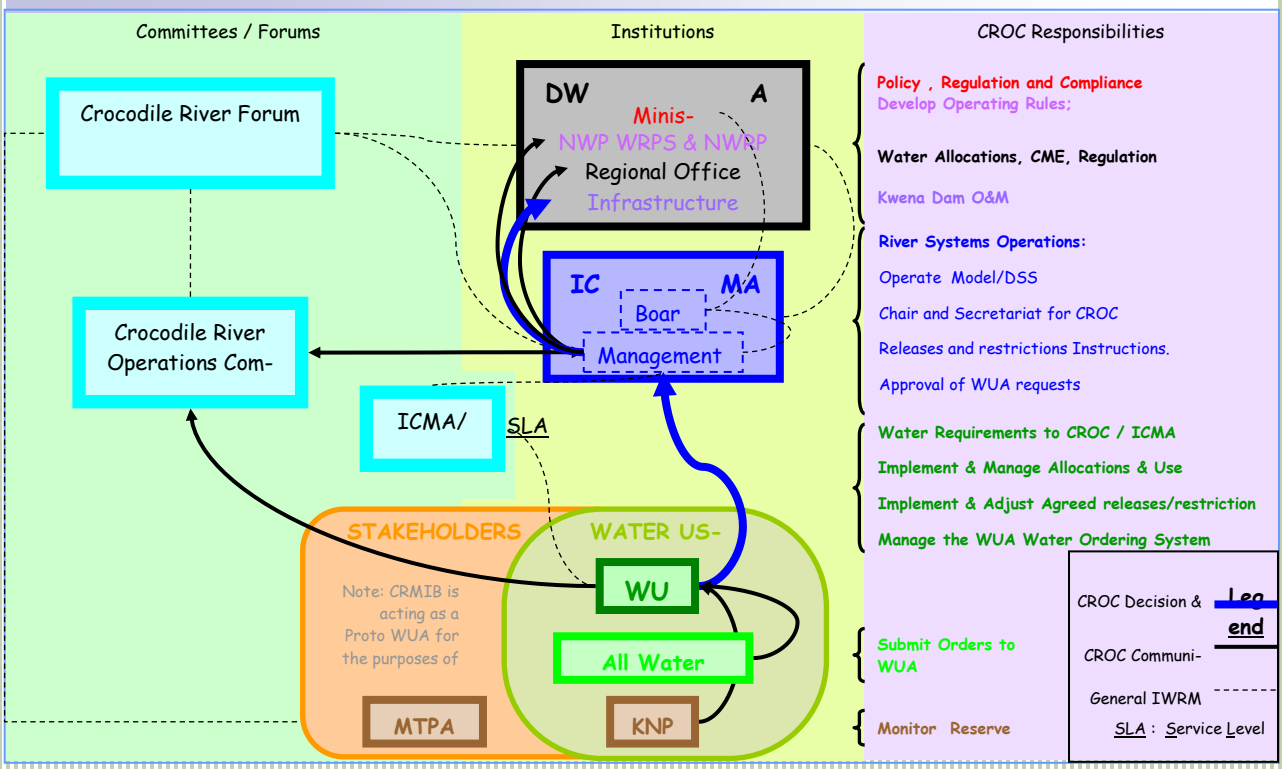
CROCODILE RIVER OPERATIONS COMMC

The ICMA has obtained permission from DWA to assist it with the implementation of the Crocodile River Operating Rules and decision support system. In line with this, the ICMA has set up the Crocodile River operations Committee or CROC for short. This is seen.

The real time Decision Support System for the operations of the Crocodile River, and the decision-making system that the ICMA has begun to build around it, is an example of the approach that the ICMA would like to develop for integrated planning and operations of river systems. This approach is referred to as a Decision Making System (DMS) which refers to the agreed roles between the various responsible authorities and stakeholders as well as the timeframes and processes for the various decisions required for flow.

The DSS and CROC are designed to assist decision making by providing better information more often from the DSS in conjunction with stakeholders through the CROC to support consensus driven decision making. 4 CROC meetings have been held to date with very good attendance.

The diagram below illustrates the structure of a decision making system for managing flow that is being developed for the Crocodile River. It indicates the various institutions involved, their responsibilities regarding decisions and information as well as some aspects of stakeholder engagement in decision making .



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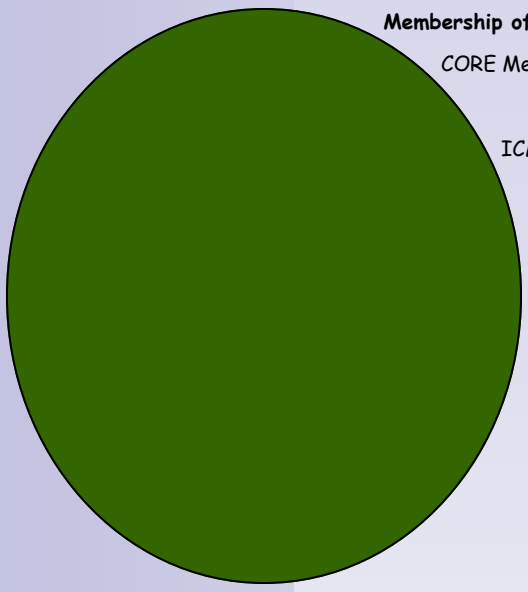
A Terms of Reference has been developed by the CROC. It indicates the roles, responsibilities, decision making system and membership. It is available on request. The Membership of the CROC is shown below



Membership of CROCOC

CORE Members:

ICMA :

Proposed member Chairperson – Brian Jackson (water Resource Planning and programmes)

Secretariat – Dumisani Nxumalo (Institution and Participation)

DWA:

- ⇒ Celiwe Ntuli - WRPS
- ⇒ Ronqiu Cai - WRPS
- ⇒ Neil van Wyk - DWA NWRP
- ⇒ Barbara Weston - DWA RDM
- ⇒ Patrick Ntabeni - DWA Mpumalanga (Nelspruit)
- ⇒ Johan van Aswegen – DWA Mpumalanga Region
- ⇒ William Matsabe - DWA Infrastructure Branch
- ⇒ Kobus Pretorius – DWA Infrastructure Brunch

Crocodile Irrigation Board:

- ⇒ Dawie van Rooi – Chair
- ⇒ Ronelle Putter – Secretary
- ⇒ Willie du Toit - Technical
- ⇒ Andre van der Merwe

Kruger National Park:

- ⇒ Thomas Gyedu-Ababio
- ⇒ Craig Mchloughlin

Mpumalanga Tourism & Parks Agency:

- ⇒ Francois Roux
- ⇒ JS Engelbrecht

Silulumanzi:

- ⇒ Yolande van Staden

Mbombela Municipality

- ⇒ Dolphin Malokela - Technical Services

Nkomazi Municipality :

- ⇒ Dumisani Mzolo - Technical Services

Observers

KOBWA - Sidney Dlamini

2. ICMA - Sylvia Machimana (Communications)

Moses Makhweyane - Ehlanzeni District Municipality
ARA-Sul(Mozambique)

- Mpumalanga Dept - Marius van Rooyen (Agriculture Engineering services)

There are a also variety of information and decision needs that are required for operations over different time scales (for example quarterly, monthly, and weekly/daily requirements). These information and decisions are summarised below:

Information and Decisions Needs for the Crocodile River:

ANNUALLY

INFORMATION NEEDS	DECISIONS REQUIRED
Previous Year Water Use vs. Order	Annual Water Allocations
Water Orders & Distribution- current year	Probability & Magnitude of Restrictions on Allocation
Forecast of expected conditions	History of Previous Decisions
Dam, River & Rainfall Levels & compare to history	Discuss / Review Operating Rules
Scenarios (reserve, IIMA, new dams, WCDM, all towns strategies)	Learning Strategy, reflection
Bio Physical TPC info Learning: Technical, social, sustainability, economic Reflection/Evaluation of progress with new system and change/adaptations required	Impact of Reserve implementation on River Health On track to longer-term plan/target for Reserve implementation

QUARTERLY

MONTHLY

INFORMATION NEEDS	DECISIONS REQUIRED
Water Orders and Use (demands)	Review of Prevailing Catchment conditions
Report Back on Weekly operations, actions, decisions etc.	Review Long term model output
Prevailing Catchment Conditions	Review year-to-date Water Use vs Order
Dam Levels	Review Demands
	Possible Restriction Scenarios Probable Dam releases
	Data and information Exchange
	International Obligation implementation
	Reserve Status

WEEKLY / DAILY

INFORMATION NEEDS	DECISIONS REQUIRED
Prevailing Conditions (flows, rainfall, releases, restrictions, levels, trajectories, reserve benchmark etc.)	Dam Releases
Short Term Forecast of expected conditions	Short term restrictions on users
Short term water demands Communications regarding decisions and actions	When to invoke the rapid response system within KNP: Worry levels

THE INCOMAPUTO AGREEMENT

(Compiled by Sylvia Machimana in consultation with Mr. Pedro Cambula of TPTC– TT-Maputo)

South Africa

Mozambique

Swaziland

Background

The Incomati and Maputo watercourses are shared by Mozambique, Swaziland and South Africa. The need for co-operation by the parties to ensure the best joint utilisation of the water goes back a number of decades to an agreement on the best joint utilisation of rivers of common interests between South Africa and Portugal in 1964, to which Swaziland acceded in 1967.

In 1983 the Tripartite Permanent Technical Committee (TPTC) was created by the three member states to advice the governments on matters relating to utilisation, development and management of water resources of common interests. Its members comprise of senior officials from the respective water departments of the three countries.

The Terms of Reference (ToR) of the TPTC are somewhat limited as it is restricted mainly to an advisory capacity to the three governments. It does not posses legal powers and this makes it difficult to fund studies and projects.

The water resources of the two watercourses are already highly utilised and water shortages are experienced in all the three countries on a regular basis, resulting in agreements that are complex and sensitive in nature.

In February 1991 the Tripartite Piggs Peak Agreement prepared by the TPTC was signed by the Ministries responsible for the water resource concerned with the Incomati basin. As a result, this enabled South Africa and Swaziland to sign the Komati River Basin Treaty and implement the first phase of the Joint Komati River Development. This gave rise to the formation of the Komati Basin Water Authority (KOBWA). It also paved way for the joint basin study on the Incomati basin, known as the Joint Inkomati Basin Study (JIBS) and in addition, specified a minimum cross-boarder flow in the Incomati River to Mozambique at Lebombo/ Ressano Garcia.

The IncoMaputo Interim Agreement (IIMA)

During the world summit in Johannesburg in August 2002, the three Governments' representatives again signed the Interim IncoMaputo Agreement (IIMA). The primary objectives of IIMA are to promote co-operation between parties as well as ensuring protection and sustainable utilisation of the water resources of the IncoMaputo water courses. IIMA aims at:

- ⇒ Integrated Water Resource Management
- ⇒ Protection of the Environment
- ⇒ Sustainable utilisation of the Water Resources
- ⇒ Monitoring of Water Quality and prevention of Pollution
- ⇒ Disaster Management i.e. floods, droughts, accidental pollution.
- ⇒ Exchange of and access of information.
- ⇒ Involvement of stakeholders
- ⇒ Notification of potential Transboundary impacts
- ⇒ Capacity building
- ⇒ Settlements dispute

Implementation Activity Action Plan (IAAP)

The TPTC appointed a Task Team (TT) to develop an action plan for the implementation of IIMA. The IAAP provides the TPTC with a detailed set of activities that are necessary to implements the IncoMaputo Agreement and also identified responsible authorities required to perform the activities.

The IAAP consists of **4 groups** of work packages, with specific projects under each group:

Group 1: Implementation of IIMA before conclusion of Comprehensive Agreements

Project1 phase 1: Shared Watercourses Institutions

Project 2: Review of National policies and Legislation

Project 3: Integrated Water Resource management

Project 4: Augmentation of Water supply to the city of Maputo and its Metropolitan Area

Project 5: Disaster Management in the Inkomati and Maputo Watercourses

Project 6: Transboundary Impacts in the Inkomati and Maputo Watercourses

Project 7: Exchange of and Access to Information

Project 8: Capacity and confidence building

Project 9: Stakeholder Participation and Communication

Project 10: Systems Operating Rules for the Inkomati and Maputo Watercourses

Group2: Preparation of Comprehensive Agreements

Project 11: Preparation of comprehensive Agreements

Group3: Complementary Activities

Project 1 phase 2: Complementary Shared watercourse Institutions and Activities

Group4: Management and Support Services

Project 12: Managing the Implementation of IIMA aimed at the finalisation of Comprehensive Agreements

PRIMA Programme

In order for the TPTC to fulfil objectives of IIMA, PRIMA (Progressive Realisation of the IncoMaputo Agreement) was established. The National Directorate of Water (DNA) in Mozambique implements the activities of the PRIMA programme on behalf of the TPTC.

PRIMA seeks to realise the objectives of IIMA by supporting the parties and ensuring the protection and sustainable utilisation of the IncoMaputo water courses. The first phase of the PRIMA Programme is to implement project (as indicated above) 4, 5, 7 and 8. The second phase will see the implementation of project 3, 9.and 10.

Conclusion

The objectives of the TPTC are in line with the general principle of the Revised Protocol on Shared Watercourses in the SADC Region, signed in Windhoek on the 7th of August 2000 which are:

- Sustainable Utilisation
- Equitable and reasonable utilisation, and participation principle
- Prevention principle
- Co-operation principle

Proper implementation of the projects as listed earlier will see the three member states equally benefiting from the Watercourses and thus addressing the issue on Transboundary Water Management as anticipated by the three countries.

WATER FOR ALL IN INKOMATI!!

Driekoppies Dam in South Africa

Corumana Dam in Mozambique

Maguga Dam in Swaziland

The Map showing the Drainage Area of the Inkomati and Maputo Watercourses

VALIDATION AND VERIFICATION OF WATER USE IN TERMS OF SECTION 35 OF THE NATIONAL WATER ACT, Act 36 of 1998 (NWA)

Background:

Registration of Water Use

In terms of Section 3(b) of Regulation 1352 dated 12 November 1999, a person who uses water as contemplated in section 21 of the National Water Act, 1998 (Act No. 36 of 1998) must, when called upon by the responsible authority to do so, register their water use. The request for the registration of water use in the Inkomati Water Management Area was published under notice 32 of the Government Gazette, number 21969 of 12 January 2001. The registration process required that all water uses, regardless of the legal status thereof, had to be registered. The only registration requirement was that it must be a use that existed, whether lawful or not.

Benefit:

Proper water resource management is for the benefit of all and the cost of such a function will be borne by the user. To avoid a situation where the law-abiding water user who did register his/her water use is paying, and someone else is using but not paying, the validation of water use is necessary to identify unregistered water use and to check the correctness of registered use.

The Department of Water Affairs: Mpumalanga Region has appointed consultants to assist them in the validation and verification of registered water use in the Inkomati water management areas. PD Naidoo and Associates Consulting Engineers were appointed for the validation and verification in priority catchments of the Inkomati Water Management Area.

Validation Process:

The first step in the process is the validation of water use within the various water management areas. During the validation of water use, various sources of information will be used to determine the **preliminary** extent and lawfulness of such use and to identify unregistered water use. Some of these sources include: (a) Published water rights, (b) Restrictions and proclamations, (c) Existing water rights (including Water Court orders), (d) Permits and other authorisations, (e) Field survey data, (e) Aerial photography, (f) Satellite images and (g) Direct contact with water users.

Purpose of Validation:

The purpose of validation is firstly to determine the extent of water use as it existed during the period 1996 to 1999 (in terms if the NWA this is referred to as the "qualifying period"). Secondly, to determine the extent of the present water use and thirdly, the determination of the lawfulness of the water use(s). Water uses that will be validated are (i) the taking of water, (ii) the storing of water and (iii) forestry. The validation of water use can therefore be described as the internal and "informal" investigations undertaken by the Department to determine the extent of water use.

The project team recognises that some water uses (irrigation practices) can change drastically over a short period and that it may be difficult to establish the irrigation practices during the qualifying period (1996 – 1999). The results of the validation process will form the basis of the verification of existing lawful use (in terms of section 35 of the NWA) and it is imperative that the preliminary results are as accurate as possible.

Public Participation

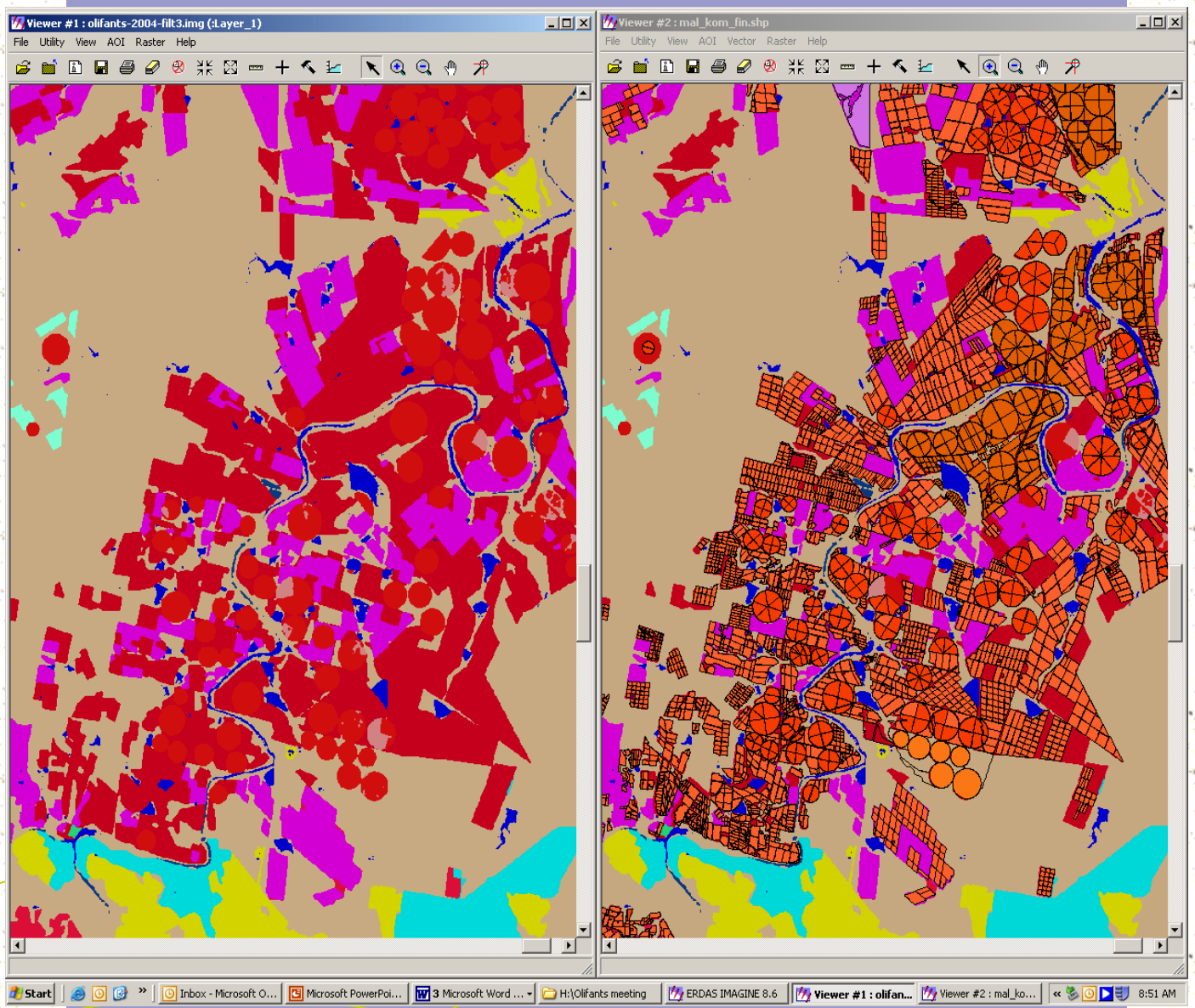
Therefore, in order to eliminate unnecessary correspondence during later stages of the process and to address obvious discrepancies as early as possible, communication and interaction with water users is of utmost importance. During the validation process the team may make direct contact with a water user to gather additional information relating to a specific water use. It was further decided to organise field visits to the water users in a specific geographical area. These field visits will be in the form of informal contact sessions at arranged venues during which the water users (irrigators) will have the opportunity to confer with the study team on a one-to-one basis to analyse and help confirm the interpretation of the available remotely sensed images. If it becomes evident that the registered information is incorrect, water users will be able to apply for a correction of their registered water use(s) at these sessions. Water users with unregistered use will also be able to register their use. Water users will be informed of the dates and venues of the contact sessions.

Purpose of Public Participation:

The Department is busy with the development of a detailed public participation program which includes general information sessions within the study area. The cooperation of water users and managers during the development of the public participation program and the rest of the project is indispensable and the Department would like to take this opportunity to thank water users in advance for their assistance, support and cooperation during the course of this project.

By Dumisani Nxumalo
Institutions Specialist

Example of Satellite Information and Field delineation data used in the validations process



The crocodile forum consist of all stakeholders in the crocodile river catchment viz. ICMA, DWA, Irrigation boards, municipalities, water services authorities, consultants, DARDLA, mines, academia, Kruger National Parks and the Mpumalanga Wetlands forum. We want to appreciate all stakeholders and member's effort in attending the forum meetings.

It should be noted that the secretariat of the forum is provided by the ICMA in other for stakeholders not to feel as if they are packed with administration issues of the forum

The forum meets bi-monthly and elaborate on issues of water quality, water availability and pollution incidents in the river catchment. We also take some time during our meetings to look at issues of interest for the forum like celebrating calendar days (National Water week, Arbor day) as part of our programme as a forum.

I must say that the forum also take interest on how our stakeholders do their business in particular on compliance with pollution. We took a field trip early this year after our January forum meeting to the Barberton mine wherein forum members were taken on an underground tour to one of the mines shaft in Sheba mine. It was an experience of a lifetime to some forum members who have never seen or been to the inside of a mine. This exercise assists our stakeholders to always be in compliance with the National Water Act.

It should be noted though that some stakeholders are not attending the forum meetings consistently that the letter of reminder for them to attend are issued because we feel that if stakeholders attend we are able to forge one common vision

The forum has also resolved to involve cross-border stakeholders in Mozambique, specifically the ARASUL to participate in future meetings to be abreast with the endeavors of the up-stream users on IWRM and compliance with the NWA, as well as operationalising the PRIMA Project at basin level. We are looking forward having them in our meetings.

Stakeholders must look out for the Crocodile River forum pasted in the Inkomati CMA's website as this is one of the things that we think will popularize the Crocodile forum to our stakeholders and general public.

Thank you.

Leketso Khaile:

Community Officer

Sincobile School Project

Sincobile Secondary School is located in Block C at ka-Maqhekeza (Naas) in Nkomazi. There are just under a thousand learners at the school, and it is under the leadership of Mrs Happy Mangane. There are currently two projects at the school, which are 1) the pilot project for new sanitation techniques based on the re-use of nutrients, energy and water and 2) Permaculture garden. These projects are part of the objectives of the Twinning Project between the Inkomati CMA and Waterschap Groot Salland. Under the flagship of the Twinning, the School also has a working arrangement with Windesheim University of applied sciences based in the Netherlands. However, this report is based on the sanitation project as the Permaculture garden is still in its initial stages of implementation. I trust that I will be able to cover it in the next edition of this newsletter.

The sanitation pilot consists of the following:

- Re-build two pit latrines into biological toilets with urine separator
- Re-build 24 flush toilets, partly with urine separator, and with septic tank converted into anaerobic/ bioreactor for manufacturing bio-gas.
- Re-use of water from water taps
- Rain water collection from the open areas (or storm water) of the school for re-use of the water in the garden

As the investigation and preparation of the new sanitation techniques was one

of the activities identified in the twinning Agreement, Sincobile school presented itself as an opportunity for us to do so, given the situation as outlined hereunder. The school had originally two pit latrines (with 4 seats each), one for girls and the other for boys, and 24 flush toilets. The flush toilets (or waterborne toilets) were not in use as the water pressure was too low and made flushing a nightmare. They had to relay on the two pit latrines. You will agree with me that for that number of learners the pit latrines were not sufficient.

Consultation has been done with the local Department of Education (Circuit office), the Local Community and the School itself. It was agreed that the pilot project would be appropriate for the school. Both the projects are financed by the Embassy of the Netherlands based in Pretoria. The Sanitation project is implemented by Mr. Antonie Overbeek based in Nelspruit, while the garden project is implemented by Food and Trees for Africa based in Gauteng. Technical support is provided for by Mrs Susan van Heerden also based in Nelspruit. Coordination remains the responsibility of the Inkomati CMA.

The sanitation project was structured such that unskilled labour will be sourced from the local community while skills are transferred during construction. The same goes with the Permaculture Garden Project. I have included herein the phase one completion report compiled by Mr Antonie Overbeek.

SINCOBILE SECONDARY SCHOOL PHASE 1 COMPLETION REPORT.

The following aspects of the work have been completed:

1. **Site establishment.**

   ⇒ The site office has been erected and the solar panels will be installed.

   ⇒ A stove that works with briquettes made of waste coal dust has been provided to the ladies responsible for food preparation for testing.

2. **Pit latrines.**

Because suitable units could not be found the following was designed for this project as to provide for the volumes required

   ⇒ Openings were made in the back wall and soil compaction was done on the inside up to desired level.

   ⇒ A 150mm concrete lab was cast.

   ⇒ Walls were built up to desired level.

   ⇒ The bag holder and sliding system was installed.

   ⇒ Urine piping was installed.

   ⇒ Two urine collection tanks that are linked were installed

   ⇒ The air extraction towers were installed.

   ⇒ The old pit latrine pedestals were removed.

   ⇒ UD pedestals with a decent toilet seat were installed.

   ⇒ Steel lids were installed providing easy access.

   ⇒ The air flow dynamics was tested.

3. **Flush toilet conversion.**

As no UD flush toilets could be sourced in South Africa the UD section had to be build manually.

   ⇒ Urine piping was installed.

   ⇒ Holes were drilled and urine piping was coupled to urine drain system

   ⇒ A ceramic division was installed using acrylic base industrial putty and manually shaped into a bowl.

   ⇒ The broken water feed pipe line was repaired and water supply restored.

   ⇒ The flush units were serviced and modifications done as to supply smaller amounts of water per flush

Septic tank conversion into bio-gas reactor.

4. The following was done to convert septic tank into bio-digester:

- ⇒ The septic tank was emptied by sewage truck.
- ⇒ The soil left was removed manually and the entire inside was washed out.
- ⇒ All rotten wood was removed.
- ⇒ Inside was plastered, sealed and coated with a cement base water proofing
- ⇒ All wash water effluent and urine effluent pipes were removed as to allow only toilet flush water to flow to bio-digester unit.
- ⇒ The inlet to bio-digester was lowered and this also increased the inlet-pipe gradient.
- ⇒ A hole was made in the lid and a 160 mm pipe that will act as a biomass shoot was installed.
- ⇒ The inside end was secured.
- ⇒ The entire inside was sealed with rubber-seal paint.
- ⇒ The outside end of shoot was cemented and manually shaped into funnel.
- ⇒ The walls were built higher as to create a bin where organic material can be added and pushed down into bio-digester. With the wall at the bottom this will also help to stir the contents.
- ⇒ A hole was drilled as to fit biogas piping.
- ⇒ Biogas outlet was installed and a small concrete pillar cast around it for protection.
- ⇒ Putty was placed in grooves of manhole holder.
- ⇒ Manhole was replaced and pushed down as to provide airtight seal.
- ⇒ All wash water effluent and urine effluent pipes were removed as to allow only toilet flush water to flow to bio-digester unit.
- ⇒ The inlet to bio-digester was lowered and this also increased the inlet-pipe gradient.
- ⇒ A hole was made in the lid and a 160 mm pipe that will act as a biomass shoot was installed.
- ⇒ The inside end was secured.
- ⇒ The entire inside was sealed with rubber-seal paint.
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- ⇒ Biogas outlet was installed and a small concrete pillar cast around it for

protection.

⇒ Putty was placed in grooves of manhole holder.

⇒ Manhole was replaced and pushed down as to provide airtight seal.

5. Boy's urinals.

⇒ The water flush urinal was removed.

⇒ The floor and wall was repaired after the removal of piping.

⇒ Eight ceramic urinals were installed and urine piping installed to septic tank that was repaired to collect all the urine from this specific ablution block. The entire ablution block was also painted.

6. Additional work done.

⇒ The old rubbish pit was closed.

⇒ A new improved waste pi t was dug.

⇒ A trench was dug all along the top perimeter of the food garden.

⇒ The trench was filled with old bricks, concrete and stones before being covered. This will act as rainwater runoff canal and soak pit for grey water runoff thus providing for increased moisture content in the gardening plots.

⇒ The old septic tank in the field was cleaned out.

⇒ The septic tank was repaired and is now used as urine collection sump.

⇒ A trench was dug around the old septic tank and the piping that used to flow through it diverted into the trench.

⇒ This trench was then converted into a basic reed bed treatment system.

By Sylvia Machimana



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