



Partners for Water and Sanitation

Note on project reports

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Partners for Water and Sanitation

**Partners for Water and Sanitation visit report to
Wami/Ruvu Basin Water Office, Tanzania,
8 November to 13 November 2009**

Submitted by:

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Ms Catherine Moncrieff (Mott MacDonald)

14 December 2009

Contents amendment record

This report has been issued and amended as follows:			
Revision	Description	Date	Signed
1	Final Draft	16/12/09	SE/BHS
2	Final. Incorporating some changes suggested by WRBWO	2/2/10	BHS

Wami/ Ruvu Basin Water Office Report November 2009

1. Background

This visit follows a request from the Wami/Ruvu Basin Water Office (WRBWO) for support from Partners for Water and Sanitation (PfWS) in developing the water data, monitoring and water management aspects of the work of the office.

The key support areas were to include:

- Awareness raising on Integrated Water Resources Management (IWRM), the Development Plan and its implementation
- Water resources data collection and management
- Formation and strengthening of Water User Associations.

The visit was also designed to assess some capacity development need of WRBWO that can be met through PfWS.

A preparatory meeting was held prior to the visit in London under the auspices of PfWS attended by Brian Skinner from PfWS, Catherine Moncrieff from Mott MacDonald and Sandy Elsworth, an Independent partner. Aspects of the visit were briefly discussed during a tele-conference with Mr Julius Sarmett, the Basin Water Officer, and a programme was prepared and this was then sent to WRBWO for comment. A final Terms of Reference for the programme was also agreed as attached (Appendix 2).

2. Visit Programme

The training for the 5 days of the sessions was held in Morogoro at the offices of WRBWO, some 200km west of Dar es Salaam, in the centre of the basin. During this training period the PfWS staff were based at the Oasis Hotel in Morogoro.

During the week the PfWS trainers, with permission from the WRBWO staff, modified the original programme proposed by the WRBWO. We did this because the overall context for monitoring and data collection required the contextual background of Integrated Water Resources Management and because we recognised that particular topics were of greater importance than we had originally thought.

It is clearly necessary for the Partners who are providing the training to continue to be sensitive to needs on the ground and the requirements of the participants rather than be too rigidly bound to an irrelevant timetable. However, there will always be some level of tension between the Partners, who will have their own sense of context and value, and the course attendees, who can be much more focussed on immediate and critical issues. This can be accommodated through discussions, preferably before the start of the training programme, but also during the programme as well.

The final programme was as follows:

- overview and Introduction to the WRBWO and functions, delivered by WRBWO staff
- overview and introduction of Integrated Water Resources Management, dealing with
 - water supply balance;
 - key components;

- water resource assessment – water available for use;
- baseline data:
 - surface water;
 - groundwater;
- introduction to demand forecasting;
- baseline supply-demand balance;
- surface water monitoring:
 - introduction to flow duration curves;
 - introduction to flow naturalisation and resource assessment;
- groundwater monitoring:
 - introduction to groundwater levels and catchment management;
 - drought assessment and recharge evaluation;
- Water User Association (WUA): development and support for the WUA's.

Each day at the training office was divided into 4 sessions: 2 in the morning and 2 in the afternoon, each session separated by a coffee/tea break. The WRBWO hosted the training and provided an excellent and endless variety of refreshments which introduced us to the range of the Tanzanian cuisine. The facilities including the use of Power Point projection, flip charts and paper, as well as toilets and other facilities, proved to be entirely adequate with power backup during general power failure.

The Partners would like to express our sincere and grateful thanks to all the fantastic organisation and hospitality accorded to us during our visit, especially to Mr Sarmett and Mrs Pendo.

In the end the following sessions were delivered:

Day 1: Introduction and Overview of IWRM

Morning sessions:

- introduction to the work and functions of the WRBWO by Ms Kalugendo;
- strengths, weaknesses, challenges and strategies of WRBWO Mr Nahozya;
- introduction to WRBWO and SNV (the Netherlands Development Organisation) partnership by Agnes Sigareti. Note: SNV outlined key areas where further support was required as:
 - strengthening water user associations
 - water distribution plans
 - flow assessment: monitoring, information and use management
 - conflict prevention
 - collaboration between stakeholders
- introduction to PfWS (SE), and;
- overview of Integrated Water Resources Planning (SE).

The afternoon involved a field trip out to the river gauging station at Wami Dakawa where the manual and automatic water level measurement equipment was explained and the loggers downloaded. Mr Maximilian Sereka explained that the digital loggers logged hourly river levels and were downloaded on to hand held computers once per month by Hydrologists. Gauge board readers record the river levels from the gauge boards twice a day. This way the WRBWO recorded back-up level data in the event of a failure of the automatic digital logger.

The hydrologists took velocity and stage recordings using a line and flow meter from the bridge every three months. These readings were taken in order to produce a regularly calibrated ratings.

The WRBWO informed us they had over fifteen functioning gauging stations with digital loggers.

Day 2: Focus on Surface Water

Morning sessions:

- Eng.Kigadye presented an overview of the Day 1 programme;
- Map drawing exercise to conceptualise the river basin [Ed Shields (ES)] – each of the three groups drew a schematic diagram of the Wami, Ruvu and Coastal rivers, annotating each one with the key pieces of information e.g. location of gauging stations, major abstractions and discharges etc.
- data records and the importance of data quality [Cat Moncreiff (CM)] – an overview of how to validate flow and level data;
- introduction to UK Catchment Abstraction Management Strategy (CAMS), including flow duration curves, naturalising river flows, setting environmental flow objectives (the “green line”) and using the interaction between abstraction data and the green line to manage abstraction. (ES)

Afternoon sessions:

- the use of GIS in the WRBWO by Mr Kigadye
- discussions in small groups on how the UK approach to CAMS could be applied to the Wami/Ruvu situation. .

Day 3: Focus on Groundwater

Morning sessions:

Following an overview of the Day 2 programme by Mr Mshana, participants were divided between:

- (1) hydrologists/surface water technicians, who worked with ES and CM to produce flow duration curves using actual data, including data quality checking and analysis, and;
- (2) hydrogeologists and other catchment managers for groundwater presentations. Presentations included the importance of groundwater monitoring for catchment management, drought and extreme event management, and resource assessment (SE)

Afternoon sessions:

- presentations of the morning workshops by participants. In particular, the derivation of actual flow duration curves from the actual data, and how to validate data.
- summary of rainfall patterns, relationship with resources and the impact on water resources.
- discussion regarding current data, how it is managed, and what further data would be required for a water resources plan.

Day 4: Supporting the Water User Associations (WUAs)

Arriving early at the offices, where a nourishing breakfast was provided, a presentation by Mrs Pendo on the formation, legal aspects and challenges of establishing WUAs, we travelled out to Kimamba to meet the Ilonga WUA. After a magnificently warm welcome from the WUA and villagers of Kimamba and a short tour of the River Ilonga from Mr. Laurent, the WUA Secretary, the WRBWO, WUA Secretariat and Partners made welcoming speeches focussing on the importance of working together to overcome the many problems of water resources management. We returned at 16:00 and had an opportunity to discuss ways the WRBWO could support the WUAs. This is discussed later.

Day 5: Summary and Conclusions

Morning sessions:

- a brief overview of what had been covered in the programme, key issues related to the development of a Water Resources Management Plan;

- every participant had the opportunity to answer four questions:
 - What did I find most useful from this training week?
 - What did I find difficult to understand?
 - How will my own job change because of what I have learnt from this week? and
 - What would I like further support on in the future?

Notes and summaries of the responses are included and discussed below.

3. Participants

A list of the participants is included in Appendix 1. Some were not with us for the whole week but the key department heads were available and supportive during the programme.

The WRBWO staff attending the training were from a wide range of disciplines, including hydrogeologists, hydrologists, community development officers, environmental engineers and technicians. Consequently we accept that some of the modules were not applicable to all the attendees. However, we believe that there was benefit from exposure to a wide range of water resources management topics, since this allowed for a much broader, more informed discussion on the wider aspects of water resource management.

Each day we tried to include within the programme a period of group discussion based on a set of questions which had been prepared beforehand. Some participants were less communicative during the discussions, probably due to a number of factors including: the use of English rather than Swahili; the presence of senior members of staff; their own sense of having little of value to offer; and finally, but just as important, a lack of understanding of the sessions.

4. Training Benefit

On the final day the participants provided comments on the programme which are summarised below.

4.1 What was found of value

- The interpretation of water level data
- The value of obtaining borehole level information
- A recognition that WUA members can be supported and their capacity built up through training.
- Understood the concept of the Baseline supply demand balance, and how to apply this to water resource planning
- Planning for water resources is very important, and that WR planning is a valuable tool for the basin
- How to use data from monitoring systems in managing abstractions
- How to apply these principles to groundwater
- A recognition that the WRBWO need to collect more data and apply the data to WR planning.
- The discussion on groundwater recharge balance was considered very useful.

4.2 What was found difficult

- The recharge calculations for groundwater
- The calculation of the flow duration curve for rivers.
- The calculation of the environmental flow levels (our green line), and how to collect the necessary information for this.
- How to specifically apply this to calculate the water available in a river
- How to forecast the demand for water and the water use
- How to apply this information at the river basin level
- A commitment to use the data and apply it, analyse it using the methodologies.

4.3 Where further support is needed

- The provision of equipment and computers
- Further training on the water balance calculations was mentioned by many participants
- Specific guidance on the assessment of the Makatapora Basin (this was partially provided following the end of the training course by SE)
- Further training on Water Resources in general
- How to forecast the demand for water
- Support on the contract for IWRM currently out for tender
- Guidance on the collection of data
- More general technical support on the application of IWRM principles
- Assist in finding other sources of finance for the work of the WRBWO.

5. Review of the programme

The following are the outcomes from the participant's discussion sessions held each day:

5.1 Catchment Abstraction Management (Tues 10th Nov)

Q1: What are at least three good benefits of the UK approach to developing the Wami/Ruvu ?

1. Status of water resources.
2. Helps in allocation of water.
3. Tool for balancing environmental, social and economic needs.
4. If understood, it can be used as a scientific tool to discourage misuse of water.

Q2: What are the most difficult issues about applying this approach to the Wami/Ruvu catchment? How could these be dealt with? Who would be responsible?

1. Availability of data – inappropriate data at present.
2. Community awareness (to change the mindset).
3. Environment degradation (water pollution).
4. Institutional capacity to analyse data.
5. Means of data collection:
 - metering;
 - motivated gauge readers (training and pay);
 - vandalism.
6. Enforcement.
7. Water fee collection.

Q3 What can be used from the UK approach in the Wami/Ruvu catchment and how would it be applied? What would need to be done in doing this?

1. Split basin into sub-catchments.
2. Collect data on water resources abstraction.
3. Assess river flow and current abstraction in different seasons.
4. Prioritise water uses.
5. Build awareness among water users.
6. Facilitate the formation of WUAs.

5.2 Baseline Data Situation Discussion (Wed 11th Nov)

Current Data Collection in WRWBO

Data	Who
River Level + Flow	Gauge readers, technicians, hydrologists
Rainfall	Field readers, technicians, hydrologists
GWL (in Mukutupora only)	Gauge readers
Water Quality	Technicians, chemists
Abstraction Data (daily) (from Muktopota)	Gauge readers
Sediment data	Hydrologists
Automatic weather station data, Manual weather station data	Technicians, field readers
Permitting Data	Technicians/hydrologists

Actions relating to Data Collection in WRWBO: New groundwater monitoring sites

- Explore whether groundwater could be monitored by WUAs.
- Water point and water use inventory – unlicensed abstractions.
- Extend borehole category.
- Extend sediment data collection programme.
- Aquifer mapping.
- Collect data on dams – volume, operation etc (possibly available from “dam safety” unit).
- Further work on the Environmental Flow indicators – get data from recent report and do more work to establish the “green line”.
- Socio-economic data – to include population, livelihoods, economic activities, livestock.
- More data on actual abstraction, especially in Dar es Salaam.
- More data on actual discharges.
- Need data from UWASAs (Urban Water and Sewerage Authorities) - monthly reports.
- Environmental impact assessments for new projects.

5.3 Discussion on Support to WUAs (Thurs 12th Nov)

What ways can WRWBO support WUAs?

- Visiting – attend WUA meetings.
- Information (rainfall, river levels, water quality, GWLs) – produce simple quarterly reports to disseminate.
- Support on enforcing bylaws.
- Suggesting options for effective water use.
- Advice on how to manage boreholes.
- Advice on how to protect sources and river banks from over grazing by livestock – make use of the Environment Day (annually in June).

What information can the WUA share with WRBWO?

- Information on water levels.
- Information on water use.
- Information on water use conflicts
- Information on water sources degradation
- Information of fish poisoning or water pollution in general

5.4 Wrap-up discussion (Fri 13th Nov)

On the final day the participants provided comments on the programme which are summarised below.

5.4.1 What was found of value

- The interpretation of water level data.
- Water Resources Planning – how to use the information to talk to water users.
- Flow duration curves – how they are useful in allocating resources.
- The value of obtaining borehole level information - how to measure water levels without the influence of pumping and how to maintain and rehabilitate existing boreholes (e.g. capping boreholes to prevent damage to pumps).
- A recognition that WUA members must be supported and their capacity built up through training and regular visits.
- Understood the concept of the baseline supply-demand balance, and how to apply this to water resources planning.
- Planning for water resources is very important, and that WR planning is a valuable tool for the basin in meeting targets.
- Environmental flows and how they are important for planning.
- How to use data from monitoring systems in managing abstractions.
- How to apply these principles to groundwater.
- A recognition that the WRBWO needs to collect more data and apply the data to WR planning.
- The discussion on groundwater recharge balance was considered very useful.
- Increased visibility of Wami/Ruvu basin office.

5.4.2 What was found difficult

- The recharge calculations for groundwater.
- The calculation of the flow duration curve for rivers.
- The calculation of the environmental flow levels (the green line), and how to collect the necessary information for this.
- How to specifically apply this to calculate the water available in a river.
- How to forecast the demand for water and the water use.
- How to apply this information at the river basin level.
- A commitment to use the data and apply it, analyse it using the methodologies.

5.4.3 What do you plan to do differently following the partners visit?

- Make sure WUAs understand why we need to collect information on flow and water level.
- Think about how we can conduct simple WR planning for village WUAs.

- Plot flow duration curves for all gauging sites.
- Conduct investigations so that we know the supply and demand baseline.
- Collection of more information on water use.
- Check data quality (otherwise we will have garbage in and garbage out).

5.4.4 Further support needed

- Assistance with producing a simple information booklet for WUAs.
- Support for Water Resources planning in villages/WUAs.
- The provision of equipment and computers (e.g.. borehole dippers, current meters, automatic level recorders in GW boreholes).
- Guidance on the collection of data.
- More technical support on data use.
- Further training on the water balance calculations was mentioned by many participants (including working group sessions and support using relevant programmes and software).
- Specific guidance on the assessment of the Makutupora Basin (this was partially provided following the end of the training course by SE).
- Further training on Water Resources in general, including practical sessions and training for technicians.
- Further training on derivation of environmental flows.
- Support on how we can adopt the UK planning process to the situation here.
- How to forecast the demand for water.
- Support on the contract for IWRM currently out for tender.
- More general technical support on the application of IWRM principles.
- Assistance in finding other sources of finance for the work of the WRBWO.

6. Achievement of the visit's objectives

This section reviews the extent to which the original four objectives for the visit, as stated in the Terms of Reference, were achieved.

1. **To further identify and assess the capacity building needs of WRBWO that can be met through PfWS and discuss appropriate interventions.**

Comment on progress:

The discussions throughout the week clearly outlined a range of critical issues requiring further support, and detailed a list of additional training and capacity building needs. These have been discussed above and are further explored below in the Way Forward section.

Comment on lack of progress:

Although a substantive list of very practical action points was drawn up following the visit (including recommendations for further support) specific interventions on a range of issues was not necessarily addressed. It is hoped that some of the discussions on the Makutupora Basin, and the practical workshop on surface water analysis has gone some way to meeting the full scope of this objective.

2. To update WRBWO staff with practical skills in water sources data collection, storage and management.

Comment on progress:

A full day was spent on the practical aspects of surface and groundwater data collection and analysis. CM and ES spent a further half day working with a group of hydrologists and technicians on surface data quality checking and analysis..

Comment on lack of progress:

Although a day was used to discuss groundwater data, the collection, analysis and application of this, little practical application was possible given the paucity of data. However, one of the Partners (SE) spent an additional 2 hours with the Heads of the two departments applying the theory to the practical problems at Makutupora Basin, and it is hoped that this went some way to meeting this objective in groundwater. Much time was spent understanding their current systems of data collection and management (e.g. visiting gauging stations, understanding their GIS and hydrological data base systems).It was important to do this before practical skills could be transferred, but meant that less time could be spent on updating practical skills as perhaps originally planned.

We also identified that the technician grade of WRBWO staff did not have regular access to computers. Consequently the Partners had to teach some basic computer skills, particularly, using an Excel spreadsheet and the touch pad on a laptop. Future programmes would do well to focus training needs more appropriately, for example by identifying the responsibilities of individual staff so that we can more fully meet their requirements. For example, we should question the value of teaching advanced computer skills to technicians who only have limited access to computers. Heads of Department at the WRBWO could assist greatly by providing a full list of their staff, the day-to-day responsibilities of each staff member and the specific training needs of their staff.

3. To share experiences on IWRM with key WRBWO staff in the context of WRBWO plans and strategies.

Comment on progress:

The whole programme was introduced and embedded in the context of IWRM, with much of the first day and final day given to the principles and functions of IWRM.

Comment on lack of progress:

Unfortunately, given the shortage of time available, it was not possible to introduce and detail the full scope of IWRM for the staff. In particular, the issues of dealing with alternative water supply options, demand forecasting, producing a final Water Resources Plan, environmental considerations, economic aspects, etc. were not detailed, but only introduced.

4. To discuss strategies for enhancing formation and strengthen of Water User Associations in the Wami/Ruvu Basin and PfWS possible technical assistance.

Comment on progress:

The meeting with the Ilonga WUA was valuable in identifying the problems associated with the application of broad IWRM principles on the ground. It is considered that the list of action points drawn up following the visit and presented above go some way to meeting this objective.

Comment on lack of progress:

The issue of technical assistance from PfWS was not directly addressed on this specific topic but was rather included within the wide range of other topics.

Overall, the Partners consider that the visit has been successful in meeting the majority of the expectations as noted in the objectives, although, as recognised from the start, presenting the full scope of Integrated Water Resources Management would take more than the 5 days provided. In particular, the request from WRBWO to focus specifically on data management and application rather than IWRM shaped the programme. It is hoped that the hands-on practicals and discussions on data has met the core needs of the WRBWO staff as requested.

7. Recommendations

We make the following recommendations for the work of the WRBWO. It must be recognised that these are only very limited, given the minimal time for the visit, and therefore should be treated cautiously.

7.1 Surface Water

All the Partners were impressed at the extent of the river gauging setup across the Wami/Ruvu Basins. We recommend that WRBWO staff:

- a. download automatic water level data at least once per month;
- b. check and validate these data against the manual measurements (which should be reported at least monthly) and any relevant rainfall data, in order to eliminate data anomalies.
- c. produce ratings curves for all gauging sites, determine the curve equations and importantly, calibrate and reproduce these ratings curves and equations for each site, every three months following each visit to collect calibration data (velocity and bank profile data).
- d. use the validated water level data and the three-monthly calibrated ratings curves to produce flow data for each gauging site.
- e. use the flow data to produce a flow duration curve for each gauging site.
- f. produce brief reports on a quarterly basis for each gauging station. These reports should display the flow hydrograph with nearby rainfall data, identify any issues related to data quality and therefore data collection, and comment on implications of river flow for surface water resources in the next quarter.

7.2 Groundwater Monitoring

We recommend that WRBWO staff:

- a. establish a groundwater monitoring network using boreholes out of the influence of major pumping sites such as Makutupora. These boreholes can be ones which are not used because of lack of output, quality, or otherwise not required. At present the WRBWO does not have sufficient staff to collect data from many boreholes; staff of WUAs and UWASAs could be trained to collect and share groundwater level data. Groundwater hydrographs should be routinely produced and reported (every quarter).

7.3 Rainfall and Weather data

We recommend that WRBWO staff:

- a. continue to collect and analyse rainfall data – we discussed the importance of rainfall and weather to recharge calculations however, there is some way to go to be able to apply the data for such purposes. The rainfall records, however, are valuable in understanding trends and relationships with river levels and groundwater levels.

7.4 Demand and Usage Records

Currently no water usage information exists, with the exception of some pumpage data from DUWASA (Dodoma Urban Water and Sewerage Authority). We recommend that WRBWO staff:

- a. establish relationships with the Urban Water and Sewerage Authorities (UWASAs) in order to obtain information on population numbers and estimated demands. A memorandum of understanding (with legal powers following Water Resources Management Act no 11 (2009)) between WRBWO and the UWASAs, might assist with water-use data sharing.
- b. Collect and analyse permitting data, including quantities and locations permitted under water resources permits and annual quantities actually abstracted. Water use records and abstraction information form the basis for abstraction management and therefore river basin planning. The Act no 11 (2009) gives powers to WRBWO to prosecute over-abstractions and set time limits for abstractions. Therefore it is important that WRBWO begin to collect and analyse this information so that compliance can be monitored .

7.5 Support for the WUAs

As discussed on the final day, it was recognised that a range of support for the Water User Associations was possible. We recommend that WRBWO staff:

- a. Consider the best way to manage the potential large number of WUA members and WUAs.
- b. Provide regular visits by technical staff to discuss specific water-related concerns;
- c. Produce and provide a quarterly report to include rainfall information, river flow data and groundwater level data in a format accessible and understandable to WUA members;
- d. Train key WUA members through the provision of simple instruction booklets and aids to help them understand the basic principles of river flow, borehole operation and maintenance, rainfall, and water resources management.
- e. Train key members of the WUA in water level data collection.
- f. Train the WUA in how to implement river bank and source protection measures, for example maintaining a grazing buffer strip of 20 metres and educating water users in water quality prevention measures like using soap for washing clothes, away from the river.
- g. Further define the roles and responsibilities of the WUA relative to that of the WRBWO, possibly outlined in a Memorandum of Understanding between the two.
- h. Train key WUA members to assess and monitor demands and water use, within each WUA in order to provide useful demand data for water resources planning and also for economic analysis of water use demands to help develop a plan to achieve financial sustainability of the WUA through potential use of water use charges/fees.

7.6 Catchment abstraction management:

We suggest that the WRWBO take the first steps towards CAMS with the steps outlined in points 1 to 5 above supplemented by:

- a. Collection and analysis of abstraction data for sub-catchments.
- b. Derivation of environmental flow curves using flow duration curves.
- c. Calculation of target abstraction volumes in different months.

8. Way Forward

Based upon the notes made by the participants at the main training sessions and the focussed sessions, there are a number of areas which the WRBWO will be progressing. Subject to their comments, it is worthwhile providing a follow up programme to specifically track those areas which have been identified in the sessions and see how the programme is progressing.

In particular, the activities which the WRBWO can start immediately include:

1. **Catchment Monitoring:** Demarcate sub-catchments in all the basin areas. Identification and commencement of dipping of a selection of monitoring boreholes in the catchment units;
2. **Surface Water monitoring:** the development of the analysis of river monitoring through data collection, review and flow analysis in specific catchments. Apply the flow duration curve calculations to all the flow monitoring points. Compile the details for all the points and begin to compare flow curves from the various parts of the catchment;
3. **Water Supply Analysis;** the collection of data on water usage in specific Wards under threat of water deficit working with other programmes and the WUAs.

Future areas of capacity development which the Partners for Water and Sanitation might be able to support include:

1. **Groundwater:** Borehole water level and recharge analysis. Calculations of Potential Recharge.
2. **Surface Water:**
Further river and basin assessment.
Further support in data checking and assistance in producing a quarterly report for key gauging stations. Support with the development of environmental flow objectives for the resource assessment and abstraction scenario curves for abstraction management (this will rely on the provision of abstraction data).
3. **Water Supply and Forecast:** Support can be provided to guide the provision of information to support the work of the WUAs in terms of the presentation of data in a simple format. Also to support the application of participatory water resource planning and management at the WUA level. This could include, for example, training in simple data collection, the development of WUA bylaws, and how to assess and agree on different options for water resources management.

4. **Water Resource Management Plan:** The Ministry of Water and Irrigation has a tender out for the development of a WRMP¹ for the Basin. If appropriate and requested PfWS could provide some support to this process.²
5. **Permits and Licences:**

The WRBWO are exploring the legal and water resource management aspects of water abstraction and discharge licensing. It is considered that PfWS, in particular from the Environment Agency, could provide further guidance on the following related to licensing:

 - a. What abstraction and discharge information to collect and how best to collect it.
 - b. Key information to present in an abstraction/discharge permit.
 - c. Taking a risk-based approach to compliance and enforcement of water permits.
 - d. Permit administration, including licence expiries, successions and variations.
 - e. Managing abstraction and discharge data.
 - f. Analysing abstraction and discharge data.
6. **GIS Training:** Assistance with adding water abstraction data and pollution source data, and linking the two data sets.
7. **Support in forging relationships with UWASAs** – initially linking PfWS DUWASA's work in Dodoma with the Wami/Ruvu support work. Establishment of an MoU for data sharing.

It is recommended that a new programme of support from PfWS should not commence less than six months from this recent training programme to give sufficient time for the implementation of the various schemes of work and projects to be implemented. That is, the tentative plans in the original Terms of Reference for a second visit in February/March 2010 need to be moved forward to May/June 2010.

9. Acknowledgements

We would like to thank the many people involved with arranging this visit, in particular those who opened their doors, offices and files to us and responded to our questions.

¹ It is the Ministry of Water and Irrigation (not WRBWO) has tendered for the development of the WRMP. The ministry has a Ministerial Tender Board (MTB) which does the selection process of an appropriate contractor who wins the tender in accordance with the TORs of the contract.

² A potential role for us is to work alongside the contractor who win the tender to develop the Water Resources Management Plan to make sure that the WRBWO staff understand the process of its development and the implications of its implementation. For example in Nigeria PfWS have worked alongside the contractors of an EU funded programme for reform of the water sector. Specifically, PfWS have worked with staff to help them understand and prepare for the sector reform. PfWS's Nigeria Country Manager can be consulted on this.

Appendix 1

List of Participants

Name	Role	Educational background
Joyce Ndesamburo (SNV)	Advisor in water and sanitation. Only first day to lunch.	
Agnes Sigareti (SNV)	Advisor in water and sanitation. Only first day to lunch.	Environmental Engineer
Pendo Hyera	Community Development Officer	Development Studies
Maximillian Sereka	Hydrologist	Civil and Water Resources Engineer
Florence Mahay	Hydrologist	Civil Engineer
Abdallah Mshana	Environmental Expert	Environmental Engineer
Stanley David	Chemist	Food Scientist
Misigaro Kigadye	Water resources and GIS expert for the Office	Electrical Engineer
Praxeda Kalugendo	Head of Water Resources and Monitoring Dept	Hydrogeologist
Hhau Sarwatt	Community Development Officer	Development studies
Emmanuel Nahozya	Head of Water Resources Protection Dept	Hydrogeology
Martha Masangya	Data collection technician	Hydrogeology
Deotila Mgoli	Data collection technician	Hydrogeology
Tumaini Lukanazya	Data collection technician	Hydrogeology
Jais Makanjira	Data collection technician	Hydrogeology
Absalom Ng'ana	Data collection technician	Hydrogeology
Lucy Makanjira	Data archiving	Civil technician
Peter Mokiwa	Data collection technician	Survey
Petro Mollel	Head of DSM field office	Hydrogeology
Mr Julius D Sarmett	Basin Water Officer	Hydrology
Mr Ernest Lema	Principal Technician	Hydrology
Ibrahim Hamis	Data collection technician	Hydrogeology

Appendix 2



PROJECT TERMS OF REFERENCE

PROJECT NO:	
Project Title and Reference	Capacity Building for Wami/Ruvu Basin Office Tanzania
Background and Justification	<p>The Wami/Ruvu Basin is one of nine (9) water drainage basins into which Mainland Tanzania has been divided in relation to integrated water resources management. It covers an area of approximately 66,820 square kilometres, encompassing Wami and Ruvu rivers and a number of other smaller rivers flowing into the Indian Ocean in the eastern part of the country, and covering the capital city - Dar es Salaam, as well.</p> <p>The Wami/Ruvu Basin Water Office (WRBWO) was established in July 2002, together with its semi-autonomous Water Board. The Basin Water Office is charged with the responsibility of monitoring water availability in the Basin, regulating its use and reports to Director of Water Resources, Ministry of Water and Irrigation on technical issues.</p> <p>WEB Office and SNV - which has been supporting Wami/Ruvu Basin Water Office since 2008 - have invited Partners for Water and Sanitation to collaborate in capacity building for the Basin.</p> <p>Discussions held with the management of WRBWO and SNV since May 2009 have indicated the following as areas for immediate capacity development:</p> <ul style="list-style-type: none"> • Awareness raising on Integrated Water Resources Management (IWRM) and Development Plan and its implementation • Water resources data collection and management • Formation and strengthening of Water User Associations
Objectives	<ul style="list-style-type: none"> • To further identify and assess the capacity building needs of Wami/Ruvu Basin Office that can be met through Partners for Water and Sanitation and discuss appropriate interventions. • To update WRBWO staff (gauge readers, technicians and professionals) with practical skills in water sources data collection, storage and management. • To share experiences on IWRM with key WRBWO staff in the context of WRBWO plans and strategies. • To discuss strategies for enhancing formation and strengthening of Water User Associations in Wami/Ruvu Basin and Partners for Water and Sanitation's possible technical assistance.

Deliverables	<ul style="list-style-type: none"> • A practical workshop on water resources data collection and management for key staff. • A seminar on Integrated Water Resources Management with senior WRBWO staff • A report on the visit activities carried out, people met etc. during the visit and identification of further areas for Partners for Water and Sanitation support.
Impact	<p>This support will:</p> <ul style="list-style-type: none"> • Facilitate development of a collaborative capacity building programme between Partners for Water and Sanitation and WRBWO. • Provide practical water resources data collection and management knowledge and skills to WRBWO staff. • Provide technical advice to the Water Basin management and technical staff on various aspects of integrated water resources management and raise awareness of good principles of Integrated WRM. • Facilitate development of strategies for formation and strengthening of water user associations in Wami/Ruvu Basin.
Scope	<p>The Partners for Water and Sanitation team will:</p> <ul style="list-style-type: none"> • exchange technical experiences and lessons on water basin management with key WRBWO staff. • jointly analyze capacity constraints facing the WRBWO and propose appropriate solutions. • provide technical skills awareness raising on river data collection and management. • discuss with WRBWO and other key stakeholders on how Partners for Water and Sanitation can assist in formation/strengthening of Water User Associations.
Organisation and methodology	<ul style="list-style-type: none"> • An initial visit is required to facilitate detailed discussions with WRBWO and agree focus of future capacity building. • Meetings will be held with the WRBWO management team, SNV and other key stakeholders. • Site visits will be made to river gauging stations to review the operations and through a workshop, update the knowledge and skills of the field staff on data collection and management. • The Partners for Water and Sanitation Country Manager will collect information on the current level and skills of field staff beforehand and inform those who visit about the identified capacity development needs. • At the end of the visit, the Partners for Water and Sanitation team will present recommendations for further key steps in the project implementation. A final technical report will be forwarded through the Partners for Water and Sanitation Country Manager to WRBWO and key stakeholders. • The Partners for Water and Sanitation team will be made up of UK partners with experience in integrated water resources management, practical water resources data collection and management; and preferably with skills in community mobilization.

Milestone plan	<ul style="list-style-type: none"> • 9 – 13 November 2009: Visit to Tanzania – Dar es Salaam and Morogoro. • Early December 2009, submission of the draft technical report of the visit. • February/March 2010 – Follow up visit including capacity-building workshops as shall be agreed.
Resource estimate	<ul style="list-style-type: none"> • 1 day preparatory reading and planning in the UK • 2 days travel (to and from Tanzania) • 5 days input in-country • 2 days input in the UK, on technical report writing.
Dependencies	<ul style="list-style-type: none"> • Availability of key WRBWO management and technical staff. • Approval and support from Ministry of Water and Irrigation. • Knowledge on existing programmes of support and scope of other donor interventions (documents will be provided on this beforehand). • An understanding of the context (i.e. equipment, constraints etc) regarding data collection beforehand so the workshop can be appropriately targeted. • Availability of funds for implementation of the planned activities.
Issues/Risks	<p>Issue/Risk: Clash of visit timings with other important WRBWO/Ministry of Water and Irrigation activities. Mitigation: Timing of visit to be agreed with WRBWO and Ministry of Water and Irrigation.</p> <p>Issue/Risk: WRBWO may lack financial resources to meet local costs for suggested skills updating for field and office staff. Mitigation: Early discussions and agreement about possible cost-sharing with Partners for Water and Sanitation.</p> <p>Issue/Risk: Unclear roles of other programmes and development partners. Mitigation: Discussions and coordination to clarify roles and responsibilities.</p> <p>Other: A full risk assessment will be carried out before the visit.</p> <p>The WRBWO will keep Partners for Water and Sanitation informed on any negative changes on risk levels</p>
Other Active Donors	<ul style="list-style-type: none"> • SNV has been supporting Wami/Ruvu Basin Water Office since 2008 under its <i>'Responsive and Accountable Local Government'</i> practice area, which aims at enhancing local organizations capacities to sustain development efforts and have invited Partners for Water and Sanitation to collaborate in capacity building for the Basin Water Office. • IUCN has provided technical assistance to WRBWO to carry out a situational analysis of the basin in March 2009 which is to serve as baseline document in undertaking different interventions in the Basin e.g. strategic capacity building plan, participatory water resources management, research and development, financing options for water resources management.

	<ul style="list-style-type: none"> • JICA have provided training for some senior technical staff to facilitate their support for District Water and Sanitation Teams in the context of the Rural Water Supply and Sanitation Project funded under WSDP. • USAID and Coca Cola Atlanta supported Wami/Ruvu Basin Water Office to conduct Initial Environmental Flow Assessment for Wami River. • World Bank/African Development Bank are providing financial support to WRBWO under the Ministry of Water and Irrigation's WSDP, currently covering Basin Level Water Resources Management, Preparation and Implementation of Integrated Water Resources Management & Development Plan and selected priority capital and human resources development investments.
Communications Strategy	<ul style="list-style-type: none"> • Communication between the Partners for Water and Sanitation team, the Country Manager, and the Partners for Water and Sanitation secretariat will initially be by e-mails and phone calls if required. • Communication with WRBWO and other key local stakeholders will be coordinated by the Country Manager. Clarification on scope of the capacity building support and project information will be through e-mails/telephone. • Information required from WRBWO or other local partners will be collected and relayed by the Country Manager.
Review Mechanism	<ul style="list-style-type: none"> • Partners for Water and Sanitation and WRBWO will review the draft report document before final production. • The Partners for Water and Sanitation team will be updated on any relevant subsequent developments by the Tanzania Country Manager and WRBWO management.
Approvals (as appropriate)	Brian Skinner, Partners for Water and Sanitation UK Project Manager covering Tanzania.
Compiled by	Julius Sarmett, Wami/Ruvu Basin Water Officer, Ministry of Water and Irrigation, Tanzania. Pius Mabuba, Tanzania Country Manager, Partners for Water and Sanitation.
Date	7 August 2009