

Report

Weather Smart – Water Resource Management



Nelspruit, April 2018

Introduction

Inkomati - Usuthu Catchment Management Agency (IUCMA) is responsible for water management in South Africa across the basin of the Komati and Usuthu rivers. The IUCMA is the first Catchment Management Agency (CMA) that is established in South Africa in 2004. The establishment of the other 8 decentralised bodies is in progress, however discussion arises upon the number of CMA's. The CMA's are responsible for Integrated Water Resource Management on the River Basin level. This basically means water quality and quantity management and water allocation to serve agricultural, domestic, industrial and ecological water users. The fair distribution of water, cooperation with stakeholders and ecological and economic aspects play a big role. Good water management and use of sufficient weather data leads to better decision making in water management and communication to stakeholders.

IUCMA and other CMA's in South Africa recently invested in dashboards to streamline the weather and water management data more efficiently. The tool Hydronet, developed by Hydrologic in the Netherlands, is one of these.

This training project builds on the existing cooperation of the Dutch Water Authorities (DWA) and CMA's in the Kingfisher project, which is a G2G cooperation in a colleague to colleague approach. DWA professionals are involved as trainers to bring in Dutch experience and inspiration. The training course is based on a similar course of World Water Academy in the Netherlands, and tailored to the local situation, based on information and experience in the Kingfisher project. Hydrologic is involved as partner in the Hydronet application for weather and water management, currently installed at the CMA's. The knowledge and expertise on the weather forecasting and the relation to water management is provided by the South African Weather Services.

Aims of training

The Tailor Made Training (TMT) of Nuffic aims to facilitate:

- Basic knowledge on the practical implementation of integrated water resource management including water quality, water quantity, water availability
- Smart use of decision support tools: how to benefit from these tools and to make WeatherSmart decisions
- How to benefit from weather information for more effective, efficient and reliable water allocation
- How to inform the farmers, municipalities, industry and other stakeholders on the availability of water and extreme weather conditions

Partners

The team executing this Nuffic-funded project consisted of Dutch and South African organizations:

- Inkomati - Usuthu Catchment Management Agency - Beneficiary
- AquaDactics (World Water Academy) - Lead
- Hydrologic
- South African Weather Services



Course *Weather Smart – Water Resource Management*

- Kingfisher partners (Water Authority Drents-Overijsselse Delta and Water Authority Limburg).

Trainers

Trainer	Organization	Expertise	
Bert Hendriks	Water Authority Drents-Overijsselse Delta	Water management - Water Quantity	
Ingrid Hilwerda	World Water Academy	Didactics	
Agnes Maenhout	AquaDactics / World Water Academy	Project leader and Didactics	
Tendai Sawunyama	IUCMA	Water management - Water Quantity	
Marcus Selepe	IUCMA	Water management - Water Quality	
Lee-ann Simpson	South African Weather Service	Meteorological Trainer: Forecasting	
Harry Tolkamp	Water Authority Limburg	Water management - Water Quality	
Helga Vuist	Hydrologic	Water management and Dashboards	

Nuffic NFP-TMT

The NFP-Tailor Made Training (TMT) programme is specially meant to enhance the overall functioning of an organisation by training a selected group of its staff members. A tailor-made training is designed to meet specific needs identified by the requesting organisation. The TMT programme is open to a broad range of organisations ranging from educational institutions, research institutes, ministries and non-governmental organisations to small and medium-sized enterprises.

Course development

Training cycle

The Training Needs Analyses is the most important and the most difficult step in the training life cycle. Demand and supply, that's the question. Usually a participant does not know exactly which knowledge he lacks. World Water Academy works according to the Instructional Systems Design or ADDIE model (see right) to build and deliver an applicable and practical programme. The model consists of the following steps:



The **Analyse** step defines the set of Knowledge, Skills and Attitude (K+S+A) of the different competences needed by the target group.

The **Design** step creates the outline of the full programme. The programme is divided in modules. The modules will be built like lego-blocks: combining modules to a full programme. A module combines contents, teaching methods, work practise, assignment etc..

The **Development** step creates the modules with theory, practical assignments, exams (by walking around), presentations, role play, cases etc..

The **Implementation** step is the roll out of the programme. Each participant will be tested at the start of the learning trajectory to define his/her knowledge and talents. The trainers for the class-based modules are experienced professionals or professors. They are trained as a trainer and prepared to deliver the programme and coach the participants.

The **Evaluation** step is to investigate the satisfaction of the participants. The effectivity of the learning trajectory will also be monitored. The results of the monitoring will be used to adjust the programme before the next delivery.

Target group

The target group of this course are relative new staff of the CMA. They have some working experiences, but need more training on the fundamental knowledge of weather and water management, combined with the use of information, dashboards and decision support systems. Skills as gathering, storing and analyzing information and the communication to internal and external stakeholders are also included.

Action-learning approach

World Water Academy uses the action-learning approach to design the modules and to develop the materials. World Water Academy has worldwide experiences in using the action-learning approach in practice. The learning efficiency and thus the learning result is proven to be higher when using this approach where participants are actively involved in the course delivery. They shared experiences and awareness on the topic of the integration of water quality and water quantity grew. As a result the participants showed great enthusiasm when they worked in groups on cases and assignments.

The following points were taken into consideration in the course development process to create an interactive and practical course:

- Trainers are subject matter experts (by experience, in practice)
- Lots of activating and interactive teaching methods are included: discussions, buzzing, group work, discussions, exercises and a role play
- Active participation is encouraged
- Subjects are tailored to the local situation and challenges. Examples and cases origin from their own organisation

Course design

The purpose of this three modular course of nine days was to train employees of the IUCMA in water resource management in combination of weather forecast, see Figure 1, and the use of dashboards such as Hydronet. In the first module the basic knowledge on water quality, water quantity and the relationship between both was discussed and applied to the situation in South Africa. In the second module on Weather & Water Management, participants predicted weather conditions and practiced with rain gauges. To ultimately be able to translate this information and knowledge into advise about how weather information can be used in water management. A third module was dedicated to the practical use of Hydronet as dashboard of the South African CMA's.



Figure 1: Design of the course in three modules

Module 1 has a set-up that splits the group in two tracks: a Water Quantity and a Water Quality group. These groups received tailored information on these topics and exchanged the learned knowledge with the other group in the last part of the course, see Figure 2. The main topics of each track can be read in Figure 3.

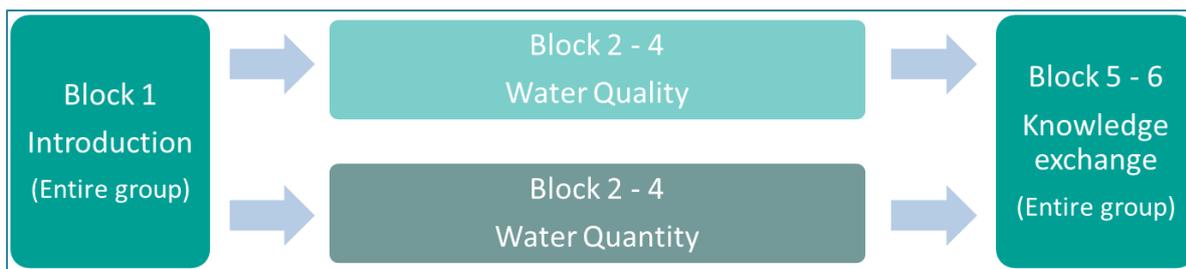


Figure 2: Overview of Module 1

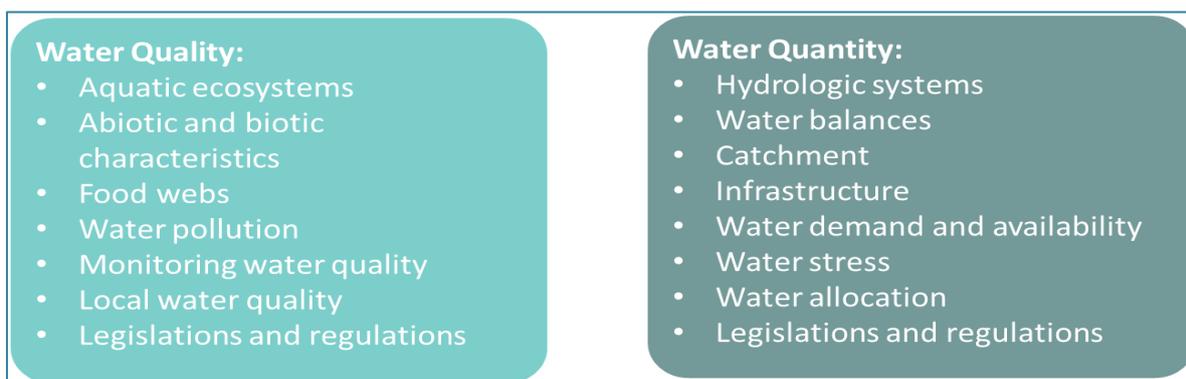


Figure 3: Topics of Module 1

The main topics of the second and third modules are presented in Figure 4.

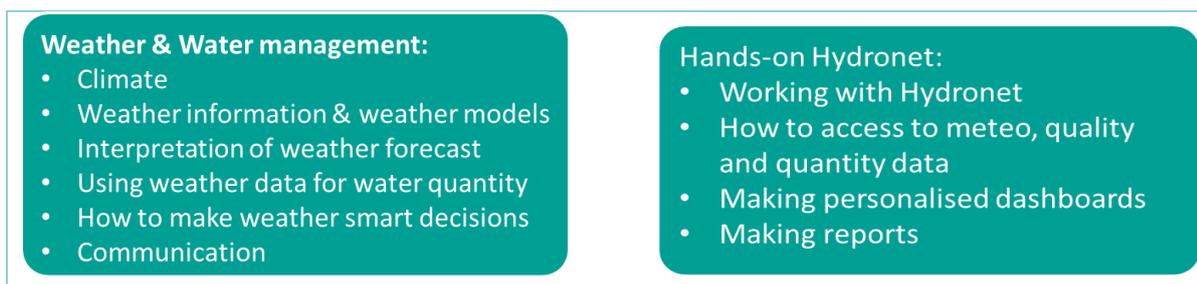


Figure 4: Topics of Module 2 (left) and Module 3 (Right)

The design phase resulted in the specific learning objectives and the course description (appendix 1), used for communication and PR.

Development of the course materials

After the design phase and the confirmation of all partners in South Africa and The Netherlands (especially the beneficiary IUCMA), a more detailed programme was drawn. The didactical experts managed the process of the development of the materials by the trainers. The Dutch trainers created the draft presentations and the South African experts tailored these to the South African context. All communication was done through a shared drop box. The didactical experts of WWA supported the trainers in including methods in the presentations in the philosophy of activating-learning.

Logistics

The logistic arrangements as well as the communication to the participants was done by IUCMA. The venue of the course was outside the office, in a nice and calm environment. The venue was far from their office and participants were fully dedicated and concentrated to learn.

Course delivery in Nelspruit

The course is designed, developed and delivered according to the proposal. The effort to create a balanced programme was huge. Two extra travels were made to ensure local input in the programme and to ensure the well connection of the Dutch and the South African trainers.

18 participants attended the course; 4 with a quantity background and 14 with a quality background. The first days were delivered in split groups. Due to governing issues in the further establishment of the CMA's, the input of IUCMA in the training was less than planned. The trainers were able to add information on the spot. Finally, there was a lot of interaction and reflection of the South African situation during the training. The group activities and interactive teaching methods were highly appreciated. The enthusiasm was really rewarding for the trainers. It is recommended to coach the new trainers in their first training experiences. This coaching is important to keep the interactive part. New trainers want to be in control; and being in control means being the presenter instead of the moderator. In fact the sequence of basic knowledge of water resource management, weather and water management and the use of the Hydronet tool is a strong package. By introducing the knowledge part, the tools may be more effectively used.

Water Resource Management & Weather and water management



Figure 5: Action learning: method demonstration



Figure 6: Action learning: method group work



Figure 7: Interaction trainer and participants



Figure 8: Trainers discussing participants input

Training of Trainers

The aim of this project is to roll-out the course to all CMA's in South Africa. That is why a Train the Trainer course was developed and delivered for a select group of staff of IUCMA. Seven staff

Course Weather Smart – Water Resource Management

members attended the Train the Trainer course. The participants experienced how to perform well as a trainer, how participants learn, how to keep an audience listening and how to manage the time! The impact of good preparation, passionate training delivery, using activating methods and time management was highlighted. The IUCMA is willing to enable these staff to train their peers of the other CMA's all over South Africa. Besides these staff members, the management of IUCMA and the trainer of SAWS is able to roll out the training.



Evaluation

The participants received a certificate of attendance after following the course.

An evaluation amongst the participants was executed after the course to learn from the course and adapt if necessary. WWA used a standardized evaluation form that are used for the Dutch and international courses for this evaluation. The participants get closed questions, which they need to score between 1 (lowest) and 5 (highest). The table gives the results. WWA strives to a minimum score of 3.75 for all criteria.

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Table 1: Average score on different criteria for Module 1 and 2

Criteria	# Partic.	Average module Water Resource Management	Average module Weather and Water Management
Opinion course as a whole (q 11)	17	4.24	4.63
Content (q 1)	17	4.24	4.88
Depth and details (q.3)	17	3.71	4.56
Related to daily work (q 6)	17	4.31	4.38
Applicability (q 7)	17	4.53	4.44
Up to date (q 8)	17	4.29	4.75
Venue (q 9)	17	4.35	4.63
Trainers	17	4.2-4.8	4.8-4.9

Each module scored excellent. The average scores were between 3.7 and 4.8 (scale 1-5). The points mentioned as the best were the outline of the programme, the teaching methods and assignments, the correlation in the programme and the group interaction. The separate tracks of quantity and quality and finally the integration were expressed as good. The introduction of weather knowledge in water management was valued high!

Participants gave enthusiastic feedback on the course. They highlighted the content provided and the interactive way in which this course was delivered. Some participants remarked: “We were all kept busy and it was really interesting”. Recommendations for improvement were to extend the training with some days, to add video’s and bringing even more exercises and Dutch examples.

The participants wrote more feedback in the open questions. Below some of those quotes:

- *“I enjoyed mostly, on the types of dashboards that can be used to assist with our daily work.”*
- *“I also enjoyed the module on communicate: it was an eye opener that it is very vital, including the tournament and not to forget the legal required documents of the NWA.”*
- *“The group interactions/exercises, because they help share the knowledge and understand the modules learn better. We learnt more through explaining to each other.”*
- *“I would suggest that the training days be extended as we couldn't ask questions because of time constraints.”*

A selected group attended the Train the Trainer course. Table 2 gives an overview of the evaluation results. The participants got more insights in roles as trainer, the target group, the didactical model and preparing, using a script and they had to practice.

Table 2: Average score on different criteria for the Training of Trainers

criteria	# partic.	Average score Training of Trainers
Opinion course as a whole (q 11)	7	4.75
Content (q 1)	7	4.60
Depth and details (q 3)	7	4.20
related to daily work (q 6)	7	4.40
Applicability (q 7)	7	3.80
Up to date (q 8)	7	4.60
Venue (q 9)	7	4.40
Trainers	7	4.67-4.75

Course Weather Smart – Water Resource Management

All participants conducted a mini-lesson to get some first experiences in training. They were happy to be trained as trainer. They expressed positive feedback on the do's and don'ts of a trainer and of the methods used. They are all willing to train the colleagues of IUCMA and other CMA's, however they expressed to need more practice.

Ingrid Hilwerda (one of the trainers) stated: 'Participants gave enthusiastic feedback on the course. They highlighted the content provided and the interactive way in which this course was delivered. We, as trainers, look back at an exciting and energizing week with a big smile on our face.'



A meeting exercise



Job done! Dr. Thomas came in to hand the certificates



Figure 9: The course participants after the certification

Follow-up

The outcome of the training is that the Inkomati –Usuthu staff is more knowledgeable in the implementation of integrated water resource management. They can use hydrologic information as well as weather information in operational management to better forecast the water situation and to make better informed proposals. The board can make better informed decisions on water allocation in future episodes of scarcity of water or other extreme conditions.

AquaDactics will stimulate the roll-out and maintain the quality of the course materials and trainers. The best performing trainers will become part of the AquaDactics Trainers Pool.

Agnes Maenhout (project leader): “We as organisers felt rewarded through the enthusiasm of the group. The passion of the trainers together with the power and eagerness of the participants created an amazing vibe! Congratulations to IUCMA with such a powerful staff. I really hope that the new trainers will share their knowledge and experience with passion with the colleagues of the CMA’s to be established.”

More information: Agnes Maenhout (Agnes@AquaDactics.org.za)

Weather Smart –Water Resource Management

TARGET GROUP

- Management of IUCMA (River operations and data management, water resources planning, coordination and utilisation, resource protection and waste)
- Supervisors (River operations and data management, water resources planning, coordination and utilisation, resource protection and waste)

ENTRY LEVEL

BSc+ / MSc

DURATION

7 days

PARTICIPANTS

16

TRAINERS

South African and Dutch experts, certified by *World Water Academy*

CONTEXT

The Inkomati Usuthu is a closing basin, which means that the demand is exceeding the (clean) water availability. There is inadequate storage capacity for the catchment that supplies a large number of users, including Mozambique. Climate change aggravates this constraint. Practical knowledge on the implementation of integrated water resource management (IWRM) and the availability and use of (near)real time information can improve decision making on coping with insufficient water. Improved monitoring of water use, water quantity, water quality and weather information results in better insights in the current and forecasted availability of water. This insights support profound proposals and decisions in integrated water resource management including water allocation.

GOAL

After attending this training, participants are aware of the chain from monitoring to decisions can communications. They know how quality and quantity can be integrated in proposals for the board. They experienced how data and support systems and contribute to a better performance. This knowledge and inspiration will better serve agriculture and other stakeholders. Participants can effectively communicate expected water resources and extreme weather conditions to stakeholders.

CONTENTS

The course covers following topics:

- Basic knowledge on the practical implementation of integrated water resource management including water quality, water quantity, water availability
- Smart use of decision support tools: how to benefit from these tools and to make WeatherSmart decisions
- How to benefit from weather information for more effective, efficient and reliable water allocation
- How to inform the farmers, Municipalities, Industry and other stakeholders on the availability of water and extreme weather conditions

COURSE MATERIAL

Concise course book and hand-outs of the presentations

TRAINING APPROACH

In addition to classroom presentations interactive and innovative training methods are used in the course, as group work, discussions, practical exercises, demonstrations, presentations, role-plays, tailored to the objectives of the training. This course includes a field visit.

EXTRA

Participants will present their assignment for the assessment

Training of Trainers

TARGET GROUP
ENTRY LEVEL

Professionals who train other professionals
Experienced in one or more water-related topics, furthermore the professional must be enthusiastic and motivated to exchange his/her knowledge and experiences with other professionals.

DURATION
PARTICIPANTS

20 April 2018 (8:30 – 15:30)

6-8

VENUE
TRAINERS

Nelspruit, South Africa

Didactical trainers, certified by World Water Academy

INTRODUCTION

Capacity development in the water sector is a hot topic in the global water sector. One challenge is about sharing existing (mainly local) practical knowledge and expertise with the young generation. A proven method for capacity building on practical matter is: 'capacity building for professionals by professionals'. Water professionals have the first access to the most up to date information. They are proud of their job, motivated and excited to share their experience. Besides, the water professionals know what kind of knowledge and skills are required to perform the water jobs.

A water professional will need didactical skills and tools (teaching methodology) to share his/her expertise to become a professional trainer. A professional trainer is able to train and exchange his knowledge and experiences with other professionals adequately, so that the trainee can directly use the trained knowledge and skills in the daily practice.

GOAL

After passing the course, the professional has the basic didactical skills and tools to become a professional trainer.

CONTENTS

The course exists of the following topics:

Learning process of professionals

- Learning objectives
- Prior knowledge of participants
- Activating teaching methods
- Lesson plans and trainers guide
- Multimedia and good presentation slides
- Practice by preparing and executing mini lessons
- Evaluation and reflection

COURSE MATERIAL

Concise course book and hand-outs of the presentations

TRAINING APPROACH

Besides classroom presentations this course exists of activating and innovative teaching methods, as group work, discussions, practical exercises, demonstrations and giving a presentation. The teaching methods are tailored to the learning objectives of the training.

⇒ Participants get an assignment to prepare an 8 minutes mini-lesson, to present during the training