



## FLOOD & DROUGHT MANAGEMENT TOOLS

Technical Training: Volta Basin  
Report (Accra)

16-18 April 2018

GIMPA Executive Conference Centre  
Accra, Ghana



## Table of Contents

<b>1. Executive summary .....</b>	<b>1</b>
<b>2. Project background .....</b>	<b>2</b>
<b>3. Technical training .....</b>	<b>3</b>
3.1 Overview of training .....	3
3.2 Technical training.....	3
3.2.1 Training Materials .....	4
3.3 Next steps .....	6
<b>Annex 1 – Agenda .....</b>	<b>7</b>
Volta Basin: Technical Training (Ghana Water) 16-18 April 2018, Accra, Ghana .....	7
<b>Annex 2 – Participants.....</b>	<b>9</b>
<b>Annex 3 – Evaluation form .....</b>	<b>10</b>
<b>Annex 4 – Feedback.....</b>	<b>12</b>

## 1. Executive summary

There is a growing sense of urgency around the need to improve resilience within river basins, and for this to become a critical part of water management plans. The increased frequency and unpredictability of floods and droughts is a priority concern across scales from transboundary to local, along with the other multiple drivers that cause depletion and degradation of shared water resources.

The Flood and Drought Management Tools (FDMT) project (<http://fdmt.iwlearn.org/>) is funded by the Global Environment Facility (GEF) International Waters (IW) and implemented by UNEP, with the International Water Association (IWA) and DHI as the executing agencies. The project is developing online technical applications which can be applied individually or together at the basin or local level to facilitate the inclusion of information about floods, droughts and future scenarios into Integrated Water Resources Management (IWRM) planning, Transboundary Diagnostic Analyses (TDA) and Strategic Action Plans (SAP), and Water Safety Planning (WSP). The project is being implemented from 2014 - 2018, and 3 pilot basins (Volta, Lake Victoria and Chao Phraya) are participating in development and testing.

The Flood and Drought (FD) Portal ([www.flooddroughtmonitor.com](http://www.flooddroughtmonitor.com)) is the main output of the project and has a series of technical applications supporting stakeholders to carry out baseline assessments using readily available satellite data, impact assessments through the analysis of the data, planning options and a means for disseminating information to relevant groups or individuals. Understanding how to use these tools is an important aspect of the future operational use and sustainability of the FDMT project, therefore, capacity on the use and application of the flood and drought portal, as well as giving stakeholders an opportunity to provide feedback on the functionality of the portal will go a long way to achieving this.

The project therefore held a technical training targeted at technical staff and junior to senior level water resource professionals of Ghana Water Company Limited as they are one of the key stakeholders identified in the Volta Basin for testing the tools and methodology developed.

The purpose of the training was to provide a basis for bringing water utilities together around a common planning tool with a special focus on Water Safety Planning, while being able to test and validate the technical applications (tools) available on the FD portal. Feedback from the workshop is being gathered and will be included in the final development and refinement of the tools in the FD portal.

The objectives of the technical trainings are to:

- Enhance stakeholders understanding of the tools on the FD portal
- Provide the stakeholders with an opportunity to give feedback on the functionality of the tools on the FD portal
- Refine the development of the FD portal and the associated tools based on stakeholder feedback

The training in the Volta Basin held in Accra was a 3 day training from 16-18 April 2018 with representatives from Water Quality and technology and innovation (GIS) department of Ghana Water Company Limited.

## 2. Project background

There is a growing sense of urgency around the need to improve resilience within river basins, and for this to become a critical part of water management plans. The increased frequency and unpredictability of floods and droughts is a priority concern across scales from transboundary to local, along with the other multiple drivers that cause depletion and degradation of shared water resources.

**The Flood and Drought Management Tools (FDMT)** project (<http://fdmt.iwlearn.org/>) is funded by the Global Environment Facility (GEF) International Waters (IW) and implemented by UNEP, with the International Water Association (IWA) and DHI as the executing agencies. The project is developing online technical applications<sup>1</sup> which can be applied individually or together at the basin or local level to facilitate the inclusion of information about floods, droughts and future scenarios into Integrated Water Resources Management (IWRM) planning, Transboundary Diagnostic Analyses (TDA) and Strategic Action Plans (SAP), and Water Safety Planning (WSP). The project is being implemented from 2014 - 2018, and 3 pilot basins (Volta, Lake Victoria and Chao Phraya) are participating in development and testing.

Understanding how to use the technical applications is an important aspect of the future operational use and sustainability of the FDMT project, therefore, capacity on the use and interpretation of the tool and their outputs, as well as giving stakeholders an opportunity to provide feedback on the functionality of the tools will go a long way to achieving this.

The project has been holding a series of technical trainings targeting technical staff and junior to senior level water resource professionals from key project stakeholder. Trainings intend to provide a basis for bringing the basin organisations and relevant basin level authorities, and water utilities together around a planning tool, while being able to test and validate the technical content of tools. Feedbacks from the trainings are integrated into the development and refinement of the tools.

The objectives of the technical trainings are to:

- Enhance stakeholders understanding of the methodology and tools developed under the FDMT project
- Provide stakeholders with an opportunity to give feedback on the technical content of the tools
- Refine the development of the methodology and tools based on stakeholder feedback

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<sup>1</sup> The term tools and technical applications are used interchangeably. Tools in this context are defined as the technical applications being developed by the project and are available at <http://www.flooddroughtmonitor.com/home>

## 3. Technical training

### 3.1 Overview of training

Technical trainings on the use of the tools are scheduled on a yearly basis throughout the project phase within each of the pilot basins. The technical training provides capacity building as well as an opportunity for different stakeholder groups (e.g. water utilities and basin organisations/water agencies) to give feedback on the functionality and use of the developed tools to date. The feedback is included in the further development and refinement of technical content of the tools.

The technical training provides a basis for bringing water utilities around a common tool which can assist in planning considering information on floods, droughts and future scenarios. The training in Accra was a 3 day training from 16-18 April 2018 with representatives from Ghana Water Company Limited in Accra, Ghana

See Annex 1 for the agenda.

The training sessions reflected the developed functionality to date, using real data from the Volta Basin. Later trainings will include the functionality of additional tools available in the Flood and Drought portal (<http://www.flooddroughtmonitor.com>).

#### Objective

The objective of the technical training was to:

- Enhance stakeholders understanding of the methodology and tools developed under the FDMT project
- Provide stakeholders with an opportunity to give feedback on the technical content of the tools
- Refine the development of the methodology and tools based on stakeholder feedback

#### Expected outcome of the workshop

The expected outcome of the technical training is for key stakeholders to understand the functionality, how to use the tools, and how the output from the tools could be used in decision making around flood and drought management and planning.

For the project, it was also an opportunity to gather valuable feedback on the functionality and how the developed tools could be used in decision-making.

#### Target group

The target group of the technical training is the technical staff within Ghana Water Company, junior to senior level professionals as recommended by key stakeholders. The 3 day trainings focused on staff from the Water Quality and Technology and Innovation (GIS) departments. (See Annex 2 for full participant list).

### 3.2 Technical training

From 16-18 April, 2018, the FDMT project held a 3 day technical training at the GIMPA Executive Conference Centre with technical staff of Ghana Water Company Limited. The training gave participants an overview of the latest developments of the methodology and associated technical applications, and the opportunity try out the applications and provide feedback to be used in finalising the applications.

The following section will provide a brief overview of each day.

### 3.2.1 Training Materials

All presentations, step-by step guides and additional material were made available for the training. The material was used to assist participants on the use of the portal and relevant technical applications.

*\*all material (presentations, step-by step guides, etc.) can be accessed [here](#)*

#### Day 1. Project overview, FDMT project, issues and indicators

Monday, 16 April, 2018

The first day started with a welcome address and an overview of the workshop and FDMT project. A brief presentation on the status of [WSP implementation considering climate change scenarios](#) was presented by GWCL. This was followed by a presentation on general functionality of the Flood and Drought Portal with an exercise on setting up working groups. The working groups concept seeks to ensure that information is kept confidential or only shared with a specific group of users.

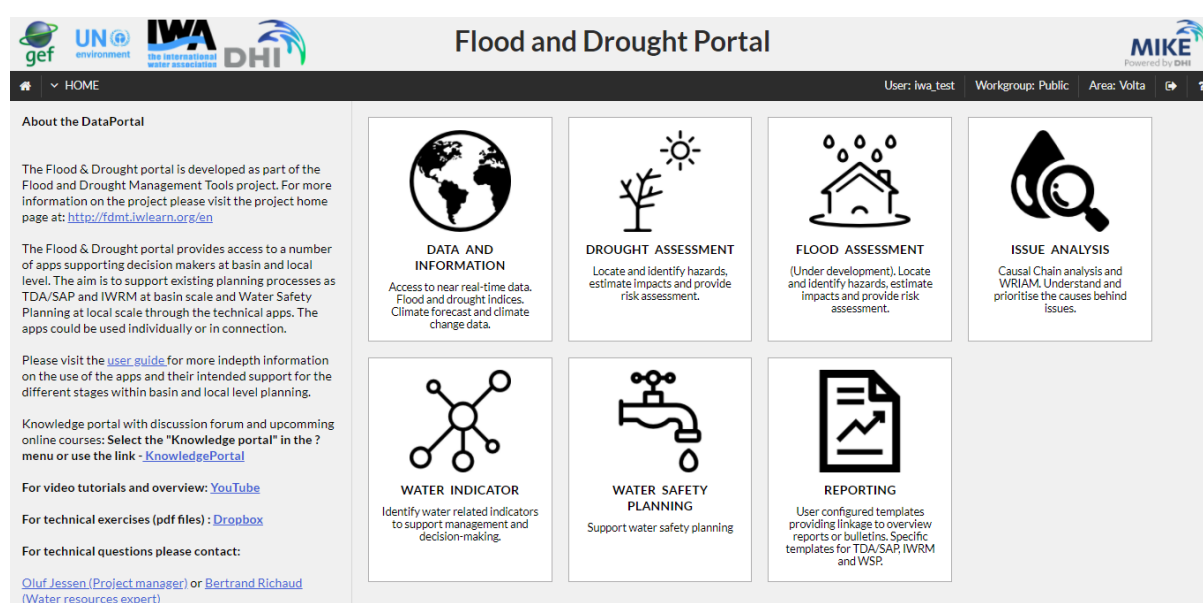


Figure 1. Flood and Drought Portal

The issue analysis application was presented by participants during the morning session. The application aims at analysing environmental issues and the causes behind the impacts from the environmental issues. The application is based on the Causal Chain Analysis (CCA) method to identify the immediate, underlying and root causes behind the impact and the Water Resource Issues Assessment Method (WRIAM) is used to evaluate the key issues and prioritise the environmental impacts based on the a rapid assessment. Participants explored the application by identifying common environmental issues faced in their utility and assessed their impacts using the CCA and WRIAM methods. Some common issues identified by participants were water shortage and water quality degradation.

Towards the end of the day, the water indicator application was demonstrated to participants. The water indicator application is a library of indicators providing information about the indicators, the relevance of the indicator and how it can be used for planning and decision making. Default frameworks have been developed which users can use as a starting point when developing their own framework for their respective organisations, users are also able to start from scratch. Also the issue analysis has been linked to the water indicator application to allow users select appropriate indicators to measure the environmental issues identified. An opportunity was given to participants to test and explore the link between the two applications as well as provide an impression of how to add and remove indicators.

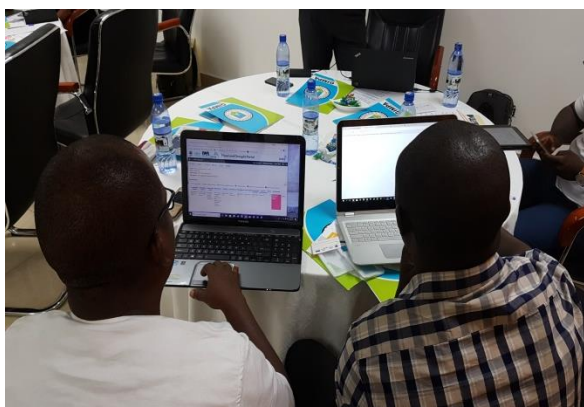


Figure 2. Participants assessing environmental impacts with the issue analysis application



Figure 3. Participants discussing during group assignment with the indicator application.

## Day 2. Data and Information Application and WSP

Tuesday, 16 April, 2018

Day 2 focused on the Data and Information application which provides users with access to near real-time satellite data (freely available). The application provides climate information such as rainfall, temperature, information about flood and drought indices, climate hazard, climate forecast and climate change. With the onset of climate change, historical weather patterns which most utilities largely depend on to gauge future water supplies is expected to be disrupted bringing about uncertainty. For this reason, utilities need to understand how climate change affects water supply while ensuring continues supply to consumers. The information from this application can be used to inform long-term planning in which climate change impacts can be considered. There were demonstrations on the Flood and drought Portal to display some of these climate information and discussions on how to interpret such data together with how it can be applied by the utility.

Towards the end of the day the Water Safety Planning Application was introduced to participants to explain how the project is supporting utilities with their development and implementation of water safety plans (WSP). As part of the Flood and Drought Portal, a water safety planning supporting application has been included for development and documentation of the WSP process. The application is the main entry point for water utilities. Through the application, water utilities are prompted to think about climate change impacts on their supply system and for hazard identification in order to ensure their WSP are climate resilient.

The application supports the 11 modules (steps) identified in the WSP manual (<http://www.wsportal.org/what-are-water-safety-plans/>), each representing a key step in the WSP development and implementation process. Each module contains a brief overview and provides assistant for each key step on the development of the WSP.



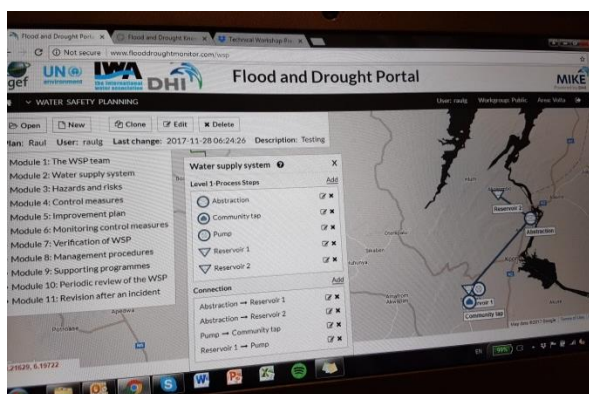


Figure 4. Water Safety Planning supporting application

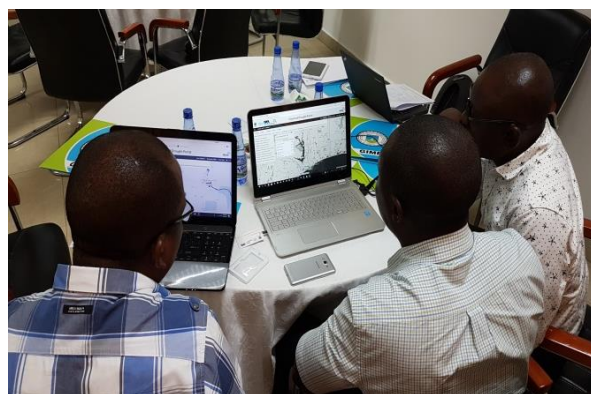


Figure 5. Participants explore the use of the Water Safety Planning supporting application

### Day 3. Water Safety Planning and Reporting Wednesday, 17 April, 2018

Day 3 was spent on exploring the modules of the WSP application and group work on feeding the application with plans from the different treatment plant from Ghana Water Company Limited.

The reporting application concluded the training and this application provides configured templates that provide linkage to overview reports or bulletins. Reports are critical for easily disseminating technical information in a more accessible way. The applications allow users to generate automated reports (defined by the user) addressing key issues such as drought status, flood status, WSP status, etc.



Figure 6. Closing remarks from GWCL



Figure 7. Participants in a group photo

### 3.3 Next steps

The project is in its final stages and all the applications are being worked to completion based on feedback from participants. Learning materials and guidance documents will be provided to users. Tutorials, videos and a user guide will provide the required information on the tools to enable users to build their capacity around the use of the technical applications.

The knowledge portal (<http://www.flooddroughtmonitor.com/knowledgeportal/>) is expected to serve as a platform for users to interact with other users through the online discussion boards and also provide relevant material and information about all the available application through the online courses.

Once all the applications are completed, the focus of the remaining time will be on consultation to ensure better uptake of the methodology and technical applications.



## Annex 1 – Agenda

### Volta Basin: Technical Training (Ghana Water) 16-18 April 2018, Accra, Ghana

16 April 2018 – Day 1: Full day	
Time	Item
09:00-09:10	Welcome and introduction
09:10-09:30	Overview of workshop and FDMT project
09:30-10:00	Presentation – Ghana Water (15 mins) <ul style="list-style-type: none"> <li>WSP implementation in a context of climate change and future changes</li> </ul> Q&A – 15 mins
10:00-11:00	General functionality of the Flood and drought Portal  <i>Exercise 1: Setting up a workgroup</i>
11:00-11:30	Break
11:30-13:00	<b>Flood and Drought – Causes and impact</b> Presentation: Issue analysis application  <i>Exercise 2: Identify and prioritise the key environmental impacts from flood and drought events within the utility</i>
13:00-14:00	Lunch
14:00-16:00	<b>Assessing the state with indicators</b> Presentation: Water indicator application  <i>Exercise 3: Identify relevant indicators for the underlying causes of flood and drought in Ghana</i>
16:00-16:30	Break
16:30-17:00	<i>Exercise 3 (continued)</i>
17:00	Wrap up and expectations for Day 2
17 April 2018 – Day 2: Full day	
Time	Item
09:00-09:10	Recap of Day 1 and reminder of expectation for Day 2
09:10-10:45	<b>Data and Information</b> Presentation: Climate overview  <i>Exercise 4: View and evaluate climate data</i>
10:45-11:15	Break
11:15-12:15	Presentation: Climate hazard (temperature and rainfall)  <i>Exercise 5: Identify historic and current climate hazards</i>
12:15-13:15	Lunch
13:15-14:15	Presentation: Rainfall forecast  <i>Exercise 6: Forecasting climatic conditions</i>
14:15-15:15	Presentation: Climate change  <i>Exercise 7: Projecting climate change for long term planning</i>
15:15-15:45	Break
15:45-16:15	<b>Water Safety Planning and supporting application</b> Presentation: Climate resilient WSP and WSP supporting application
16:15-16:45	<i>Exercise 8: Module 1 (assembling the team)</i>
16:45	Wrap up and expectation for Day 3

**18 April 2018 – Day 3: Full day**

<b>Time</b>	<b>Item</b>
09:00-09:10	Recap of Day 2 and reminder of expectation for Day 3
09:10-10:10	<b>WSP supporting application</b> <i>Exercise 9: Module 2 (design the supply system)</i>
10:10-10:30	<i>Exercise 10: Module 3, 4, 5 (Hazards, control measures and improvement plans)</i>
10:30-11:00	<i>Break</i>
11:00-12:30	<i>Exercise 10 (continued)</i>
12:30-13:30	<i>Lunch</i>
13:30-14:00	<i>Exercise 10 (continued)</i>
14:00-14:30	<i>Exercise 11: Module 6,7,8 (Monitoring, verification and management procedures)</i>
14:30-15:00	<i>Exercise 12: Module 9,10,11 (Supporting programmes and reviews)</i>
15:00-15:30	<i>Break</i>
15:30-16:00	<b>Reports and bulletins</b> Presentation: Reporting application
	Link with WSP
16:00	Wrap up (next steps)

\* all material (presentations, step-by step guides, etc.) can be accessed here: <https://goo.gl/FgBvE7>

## Annex 2 – Participants

First Name	Organisation	Email
<b>Staff</b>		
Brenda Ampomah	IWA	<a href="mailto:Brenda.Ampomah@iwahq.org">Brenda.Ampomah@iwahq.org</a>
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William Amoah	Ghana Water Company Limited	<a href="mailto:Amoh_william@yahoo.com">Amoh_william@yahoo.com</a>

## Annex 3 – Evaluation form

### Evaluation of Flood and Drought Management Tools Technical training

Name:

Organisation:

What was your overall impression of the training?

Excellent <input type="checkbox"/>	Good <input type="checkbox"/>	Acceptable <input type="checkbox"/>	Below expectations <input type="checkbox"/>
<b>Comments:</b>			

General	Too high		Acceptable		Too low
How did you find the technical content of the course?	1	2	3	4	5
	Agree			Disagree	
There was sufficient hands-on support during the training	1	2	3	4	5
<b>Comments (specifically on the technical level of the training):</b>					
	Too long				Too Short
The duration of the training was...	1	2	3	4	5
The time for discussions and group work was...	1	2	3	4	5
The time for hands-on use of the tools was...	1	2	3	4	5
<b>Comments (specifically on length of the training and time provided to do each exercise):</b>					

Presentations and demonstration of Flood and drought management tools	Agree			Disagree	
I have a good overall understanding of the Flood and Drought Management Tools project and what it is trying to achieve	1	2	3	4	5
The presentations of the Flood and Drought Portal and the technical applications were clear and understandable	1	2	3	4	5
The demonstration of the Flood and Drought Portal and the technical applications were clear understandable	1	2	3	4	5
The written guidance and exercises for the Flood and Drought Portal and the technical applications were clear understandable	1	2	3	4	5
<b>What could be improved and made clearer when presenting and demonstrating the tools?</b>					
<b>Which tool are you likely to use and how?</b>					

**Would you use the climate data presented in the data and information tool? How would you use this data?**

<b>Exercises and group work</b>	Agree					Disagree				
The exercises for each of the tools were easy to follow	1	2	3	4	5					
The exercises helped increased my understanding of the technical applications	1	2	3	4	5					
I feel that I will be able to use the technical applications after the training	1	2	3	4	5					
<b>What did you like or not like about the exercises for the tools?</b>										
<b>What could be improved and made clearer?</b>										

<b>Course practicalities</b>	Agree					Disagree				
The venue was satisfactory	1	2	3	4	5					
Lunch and refreshments were satisfactory	1	2	3	4	5					
The training was well organised	1	2	3	4	5					
I received practical information well in advance	1	2	3	4	5					
<b>Comments:</b>										

## Annex 4 – Feedback

### Utility training

<b>General</b>					
Questions	Response				
	Excellent	Good	Acceptable	Bellow Expectation	
What was your overall impression of the training	2	7			
Comment	Training applies directly to my work schedule . Very important tool for utilities to apply for their operations . Very educative and necessary for my work . Very informative content, applicable to my area of work. Rain forecast is a Very useful tool . The trainers always had time to ensure participants understood every topic introduced				
	Too high		Acceptable		Too low
	1	2	3	4	5
How did you find the technical content of the course?	1	7	1		
	Agree			Disagree	
	1	2	3	4	5
There was sufficient hands on support during the training	5	3	1		
Comment	Satisfactory. Terminologies used were mostly familiar and explanations were clear . The technical level of the training was adequate . Very educative and necessary for my work . Very high technical level useful to our work . The technical level of the training programme is normal				
	Too long			Too short	
	1	2	3	4	5
The duration of the training was...		2	6	1	
The time for discussion and group work was...		4	5		
The time for individual hands-on exercises was...		4	6		
Comments (specifically on length of the training and time provided to do each exercise)	It was adequate . For proper understanding and application of the tool the time should have been 5 days . Acceptable duration but could be extended to 4 days in order not to rush through the course . The time provided was optimal, except that the volume of the entire training programme was hug and needed an additional day for slow learners				

<b>Presentations and demonstrations of flood and drought management tools</b>					
Questions	Response				
	Agree			Disagree	
	1	2	3	4	5
I have a good overall understanding of the Flood and Drought Management Tools project and what it is trying to achieve	2	6	1		
The presentations of the Flood and Drought Portal and the technical applications were clear and	1	6	2		



understandable					
The demonstration of the Flood and Drought Portal and the technical applications were clear understandable	3	5	1		
The written guidance and exercises for the Flood and Drought Portal and the technical applications were clear understandable	4	5			
What could be improved and made clearer when presenting and demonstrating tools?	. I believe the presentation and demonstration of tools were good . The application could be simplified and applicable to other basins . Detailed explanation of the climate data, especially the climate forecast will help. Also a forecast could be made on day 1 for the last day to prove a point . The internet connectivity could be improved				
Which tool are you likely to use and how?	. The water indicator application . WSP tool, climate tool very applicable to GWCL operation for important decision making . All the tools are very useful - WSP (crucial to me) . Issue analysis, identifying issues within the network and try to get deeper causes of the issues . WSP tool, it will help in the risk assessment and management. This will be done by accessing the various modules provided . Data and information . WSP, reporting . Will apply everything I have learnt in the course to any work, especially climate forecast and WSP . WSP, reporting template				
Would you use the climate data presented in the data and information tool? How would you use this data?	. Yes. To access more information to improve knowledge relating to catchment management . Yes. For planning for future events and WSP implementation . Yes. To project climate changes for long term planning . Yes. Historical rainfall and climate pattern for Tema . Yes. I will integrate with my data for broader analysis . Yes, to provide inputs in decision making especially concerning WSP . Yes, it will help me to plan for spilling my dam				

<b>Exercises and group work</b>					
Questions	Response				
	Agree		Disagree		
	1	2	3	4	5
The exercises for each of the tools were easy to follow	4	4	1		
The exercises helped increased my understanding of the technical applications	4	5			
I feel that I will be able to use the technical applications after the training		7	2		
What did you like or not like about the exercises for the tools?	. Internet access was a challenge . Application of the WSP and climate tools very informative . Like the supporting step-by-step guide to the exercises . Time given for exercises were on point and the breaks given also were very good . A few technical inconsistencies (workgroup during WSP (Module 2)) . Relevance to our work - interactive tools - too few exercises . I really liked all the exercises we went through for the tools				
What could be improved and made clearer?	. Home assignments could be considered . Climate change tool forecasting could be made more simple . More user friendliness (e.g. when mouse icon hovers over a particular tool (e.g. previews, edit) the function should be highlighted) . More time and more exercises . The basin should cover local basins in Ghana of which most of our treatment plants we take the source water from				

n

9

Course practicalities						n	9
Questions	Response						
	Agree		Disagree				
	1	2	3	4	5		
The venue was satisfactory	5	2	1	1			
Lunch and refreshments were satisfactory	5	4	1				
The training was well organised	5	4					
I received practical information well in advance	3	2	3	1			
Comment	'. Generally satisfactory. However, the internet availability could be improved . Very good portal for application for utilities. The features should include other basins to help the utilities to apply to other systems . Successful training organised . Getting other departments/unit from the various plants could help since they mainly do the field work . The course is generally informative and appropriate for our work . The training programme was very good and useful to me and it has really improved my knowledge base						