FLOOD & DROUGHT MANAGEMENT TOOLS

Technical Training: Chao Phraya Basin (Basin) Report

11-14 June 2017

Pullman Bangkok King Power Hotel

Bangkok, Thailand

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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) 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 from basin level institutes, which are stakeholders identified in the Chao Phraya Basin for testing the tools and methodology developed.

The overall topic for the technical training will be water resources planning for flood and drought events on a basin level. The technical training will be a combination of lectures and hands on exercises, where the exercises will contain relevant issues from the Chao Phraya river basin.

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 Chao Phraya Basin held in Bangkok was a 4 day training from 11-14 June 2018 with representatives from basin level organisations, including: Electricity Generating Authority of Thailand (EGAT), Royal Irrigation Department (RID), Department of Disaster Prevention and Mitigation (DDPM), Department of Royal Rainmaking and Agricultural Aviation (DRRAA), Thai Meteorological Department (TMD), Office of the Natural Resources and Environmental Policy and Planning (ONEP) and Office of the National Water Resources (ONWR).

The technical training will be the last and final training on the tools from the Flood and Drought Management Tools project, but we are still very interested in feedback for how the tools could be further developed for use in Thailand in future projects.

The technical training will utilise the web based portal developed as part of the project. The portal is freely available for all stakeholders in Thailand and is accessible at: www.flooddroughtmonitor.com.

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[1] 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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[1] 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. basin organisations/water agencies and water utilities) 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 agencies operating at the catchment level around a common tool which can assist in planning considering information on floods, droughts and future scenarios. The training in Bangkok was a 4 day training from 11-14 June 2018 (See Annex 1 for the agenda) with representatives from basin level organisations, including: Electricity Generating Authority of Thailand (EGAT), Royal Irrigation Department (RID), Department of Disaster Prevention and Mitigation (DDPM), Department of Royal Rainmaking and Agricultural Aviation (DRRAA), Thai Meteorological Department (TMD), Office of the Natural Resources and Environmental Policy and Planning (ONEP) and Office of the National Water Resources (ONWR).

The training sessions reflected the developed functionality to date, using real data from the Chao Phraya Basin.

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 from catchment level organsiations, junior to senior level professionals as recommended by key stakeholders (see Annex 2 for full list of participants).

3.2 Technical training

The training is for technical staff and will focus on the capabilities and potential uses of the methodology and tools developed in the FDMT project with a special focus on water resources planning for flood and drought events on a basin level. The technical training will be a combination of lectures and hands on exercises, where the exercises will contain relevant issues from the Chao Phraya river basin.

The technical training will be the last and final training on the tools from the Flood and Drought Management Tools project, however feedback for how the tools could be further developed for use in Thailand in future projects will remain relevant.

The technical training will utilise the web based portal (see Figure 1) developed as part of the project. The portal is freely available for all stakeholders in Thailand and is accessible at: www.flooddroughtmonitor.com.
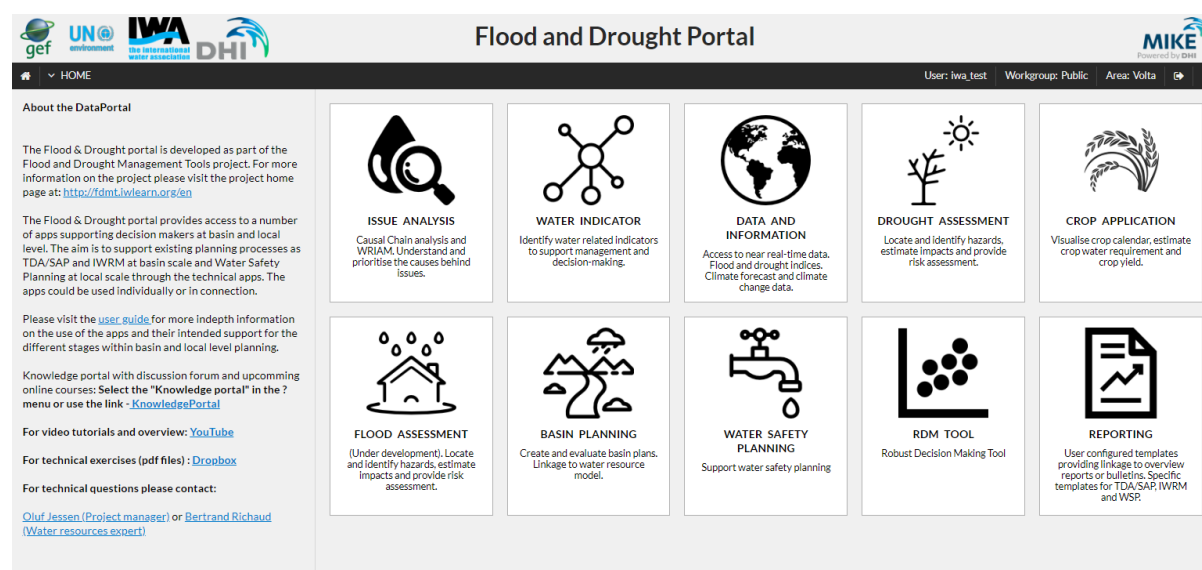

Figure 1. Flood and Drought Portal

The following section will provide a brief overview of the training.

all material (presentations, step-by step guides, etc.) can be accessed here.

Training workflow
The workflow used guides users through the basin planning process starting from the identification of causes behind issues until the evaluation of mitigation plans (see Figure 2).
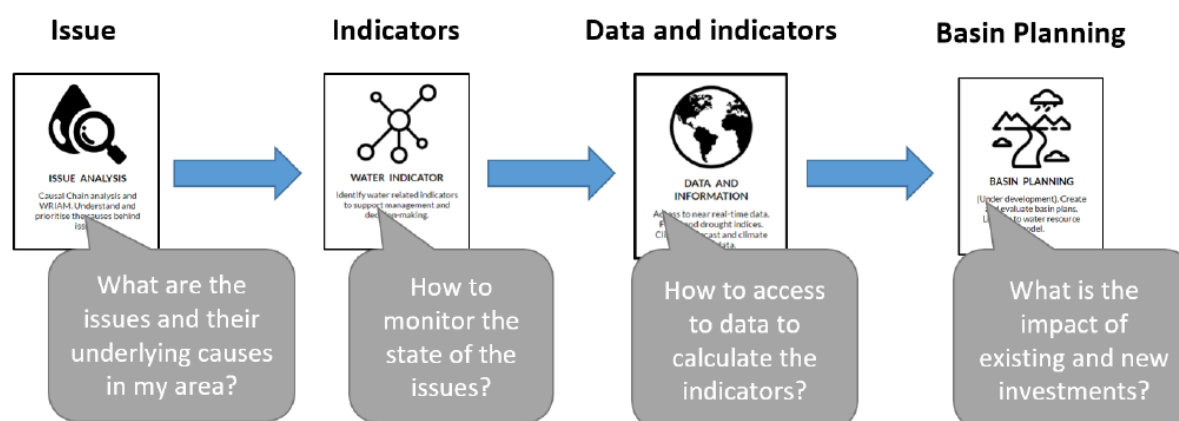

Figure 2. Example of workflow followed during the training course via the various applications of the F&D portal

Day 1. Causes behind flood and drought events and indicators to measure
Monday, 11 June 2018

The first day started with a welcome address and an overview of the workshop and FDMT project, looking at status of the Flood and Drought Management Tools project. The rest of the day focused on

introducing the drivers or causes behind flood and drought events, using indicators to measure the state of specific causes and an overview and of relevant data sets.

The Issues Analysis application was introduced. The application is based on the Causal Chain Analysis (CCA) method to identify the immediate, underlying and root causes behind an impact and the Water Resource Issues Assessment Method (WRIAM) to evaluate the key issues and prioritise the environmental impacts based on a rapid assessment.

The Water Indicator application is then used for the identification of water indicators for measuring the state of the identified environmental impacts related to drought and flood events. The application contains a large library of flood and drought related indicators where each indicator is associated with a detailed metadata sheet for the specific indicator. The indicators are used to measure the state of the causes for flood and drought in Thailand.

Participants were then introduced to the Data and Information application, to understand what available near real-time data for flood and drought assessment can be accessed. Exercises provided a hands-on approach to get a better understanding of the functionality of the different data types and how to view the data and use this for a flood and drought assessment.

Day 2. Data for drought assessment and reporting
Tuesday, 12 June 2018

Day 2 was a continuation to understand the data and information needed for flood or drought assessment.

Participants went deeper into understanding key indicators used for drought assessment to better understand where the droughts are. This part of the training allowed participants to explore the Drought Assessment application to locate and identify hazards, estimate impact and provide a risk assessment. The application is therefore based on two components, drought warning (highlight the areas that are affected by a specific hazard) and drought risk (assess risk based on hazards and vulnerability).

Participants were also demonstrated how to generate reports or bulletins for dissemination of information provided by the drought assessment. The Reporting application enables users to generate different types of (automated) reports. Users are able to customise the reporting for specific issues. For automation, reports are scheduled to be updated with a user specified frequency and an email is submitted to the user with a link to the report when a new report is available.

Day 3. Crop application, flood components of the portal and planned developments
Wednesday, 13 June 2018

Day 3 was spent on understanding the Crop application and the flood components of the portal. The Crop application provides users with an overview of suitable crops for the region and crop calendar information. The application provides a calculation of crop water demand and crop yield through the use of FAO AquaCrop model, and an evaluation of the robustness of specific planting dates.

Through the Flood Assessment application, the participants were able to understand how the medium range forecast could be used in flood management. An overview and status of the applications supporting flood management were also presented to the participants, as there is ongoing development to the application.

Day 4. Basin planning
Wednesday, 14 June 2018

The final day was spent introducing the basin planning approach to understand what the impact is of existing and new investments for the management of the basin based on a Multi Criteria Analysis (MCA) approach workflow involved. The approach is available through the Basin Planning application,

which targets decision makers without any modelling expertise. The overall concept is to utilise the refined water resources model, for evaluation of plans by stakeholders in the water and energy sectors. Use of the planning application rests on the following concepts: investments (investments decision makers want to implement within a specific plan), external factors (e.g. climate change and population growth), plans (a collection of investments and external factors combined into a plan or scenario), indicators (planning results are all indicators derived from the model result files) and strategies (weighting system attributed to indicators expressing different policy and strategic focuses).

In short, the application helps to assess the impact of existing and new investments as well as external factors such as climate change in the basin though the use of basin planning application.

Figure 3. Participants (and staff) during the 4 day training

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

Technical training – day 1
Introduction to the drivers or causes behind flood and drought, use of indicators to measure the state of specific causes and overview and knowledge of relevant data.

Time	Item
09:00-09:30	Registration
09:30-09:45	Welcome and presentation of the objective with the technical training
09:45-10:00	Presentation of participants
10:00-10:30	**Status of the ongoing Flood & Drought project** Outcome: Objective and current status of the project.
10:30-13:00	**Flood and Drought – impact and causes** *Identify and prioritize the key environmental impacts from drought and flood using a Chain Causal Analysis and WRIAM approach* • Group work based on the Issue Analysis app. • Discussion on the identified and prioritised causes. Outcome: Identification of prioritised impacts and the underlying causes of flood and drought events in Thailand.
13:00-14:00	*Lunch*
14.:00-16:00	**Indicators – assessing the state through indicators** *Identify relevant indicators for measuring the state of the causes for flood and drought in Thailand.* • Group work based on the Water Indicator app. • Identification of relevant indicators for the key underlying causes behing flood and drought in Thailand. Outcome: Identification of indicators and the required data for assessing the state of flood and drought in Thailand.
16:00-16:45	**Data and information** *Overview and understand available near real time data for flood and drought assessment.* • Hands-on exercises – based on the Data and Information app. • Basic introduction to the functionality and the different data types. Outcome: Knowledge and understanding of available data to be used for flood and drought assessment.
16:45-17:00	Discussion and wrap up

Breaks in the morning and afternoon will be organised around 11.00 and 15.00. Exact time will depend on the progress of the sessions.

Technical training – day 2
Continue to understand the data to be used for flood or drought assessment, how to disseminate information from the system to stakeholders and details on drought indicators of relevance for Thailand.

09:00-09:30	Reflection and follow up on day 1
09:30-13:00	**Drought indicators** *In depth understanding of key indicators to be used for drought assessment in Thailand.* • Hands-on exercises – how key indicators could be used for drought assessment. • Specific examples from Thailand. Outcome: Capacity and knowledge to use key indicators for drought assessment in Thailand.
13:00-14:00	*Lunch*

14:00-15:00	**Reporting application** *Understand how reports or bulletins for dissemination could be generated. Use of QGIS for high-resolution maps.* • Hands-on exercises – use and setup of the reporting application. • Generate maps using QGIS. Outcome: Capacity and knowledge to use key indicators for drought assessment in Thailand.
15:00-16:45	**Drought – early warning** *Objective and workflow for drought early warning in Thailand.* • Hands-on exercises – based on the Drought Assessment app. Outcome: Practical understanding on application of drought early warning in Thailand.
16:45-17:00	Discussion and wrap up

Breaks in the morning and afternoon will be organised around 11.00 and 15.00. Exact time will depend on the progress of the sessions.

Technical training – day 3 Focus on the flood components of the portal and overview of the planned developments. Work on a use case from Thailand to better understand how to apply the project outputs on drought related issues within Thailand.	
Time	**Item**
09:00-09:30	Reflection and follow up on day 2
09:30-13:00	**Crop application** *Objective and workflow with the crop calendar and yield estimate calculation tool.* • Presentation of the crop calendar and yield estimate. • Hands-on exercises based on the crop application. • Decision with uncertainty. Outcome: understanding of the concepts behind the crop application.
13:00-14:00	*Lunch*
14:00-15:30	**Flood application** *Understand how the medium range forecast could be used in flood management. Overview and status of the applications supporting flood management.* • Hands-on exercises – based on flood related datasets and indices. • Flash flood concept presentation and discussion. • Hydrological model presentation. Outcome: Knowledge and understanding of flood related data and indices as well as state and uncertainty of short-term forecast.
15:30-16:00	Discussion and wrap up

Breaks in the morning and afternoon will be organised around 11.00 and 15.00. Exact time will depend on the progress of the sessions.

Technical training – day 4 Focus on the flood components of the portal and overview of the planned developments. Work on a use case from Thailand to better understand how to apply the project outputs on drought related issues within Thailand.	
Time	**Item**
09:00-09:30	Reflection and follow up on day 3
09:30-13:00	**Basin planning – introduction** *Introduction to basin planning and assessment of investments and changes in a basin.*

	• Introduction to the planning application. • Hands-on exercises – bases on cases from the region. Outcome: Capacity and knowledge to use key indicators for drought assessment in Thailand.
13:00-14:00	*Lunch*
14:00-15:00	**Basin planning – application**
15:00-16:00	Discussion and wrap up

Breaks in the morning and afternoon will be organised around 11.00 and 15.00. Exact time will depend on the progress of the sessions.

Annex 2 – Participants

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