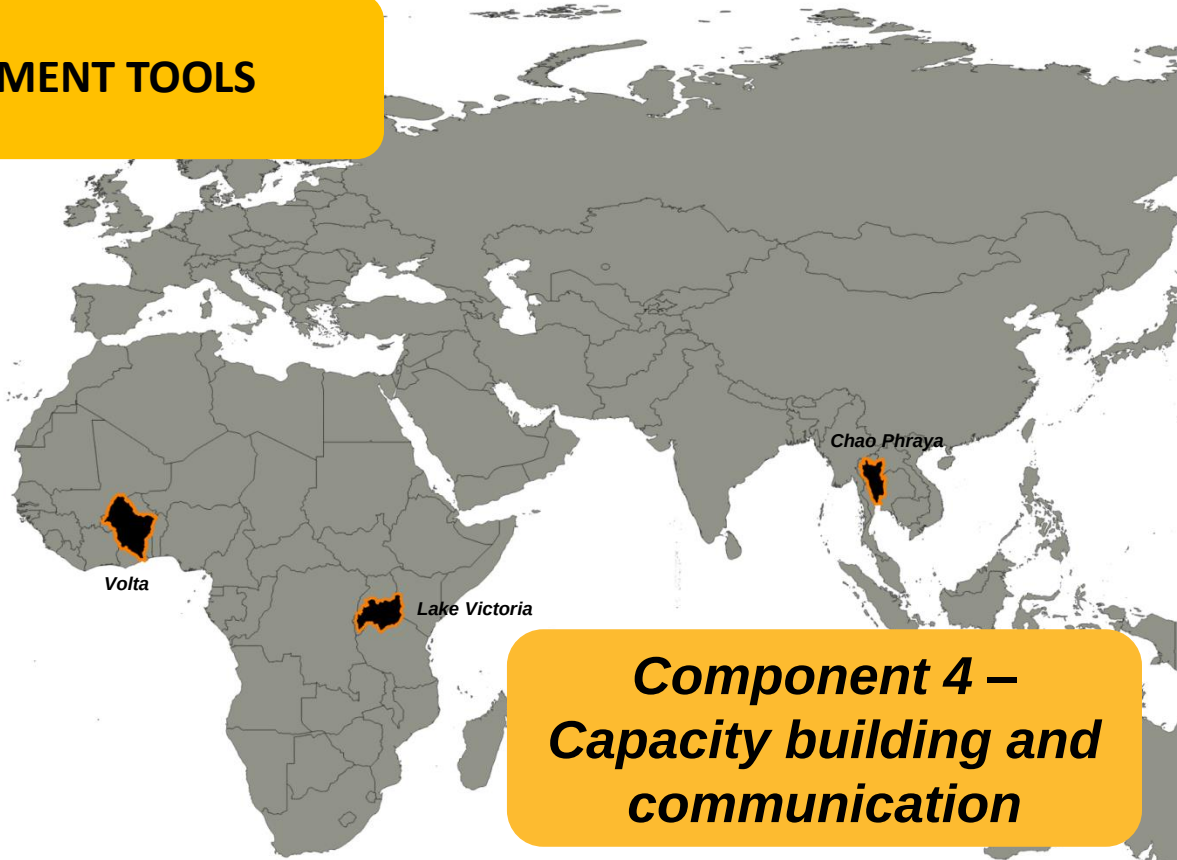


FLOOD & DROUGHT MANAGEMENT TOOLS



Component 4 – Capacity building and communication

Contacts:

Oluf Zeilund Jessen, DHI
ozj@dhigroup.com

Katharine Cross, International Water Association
(IWA)
Katharine.cross@iwahq.org

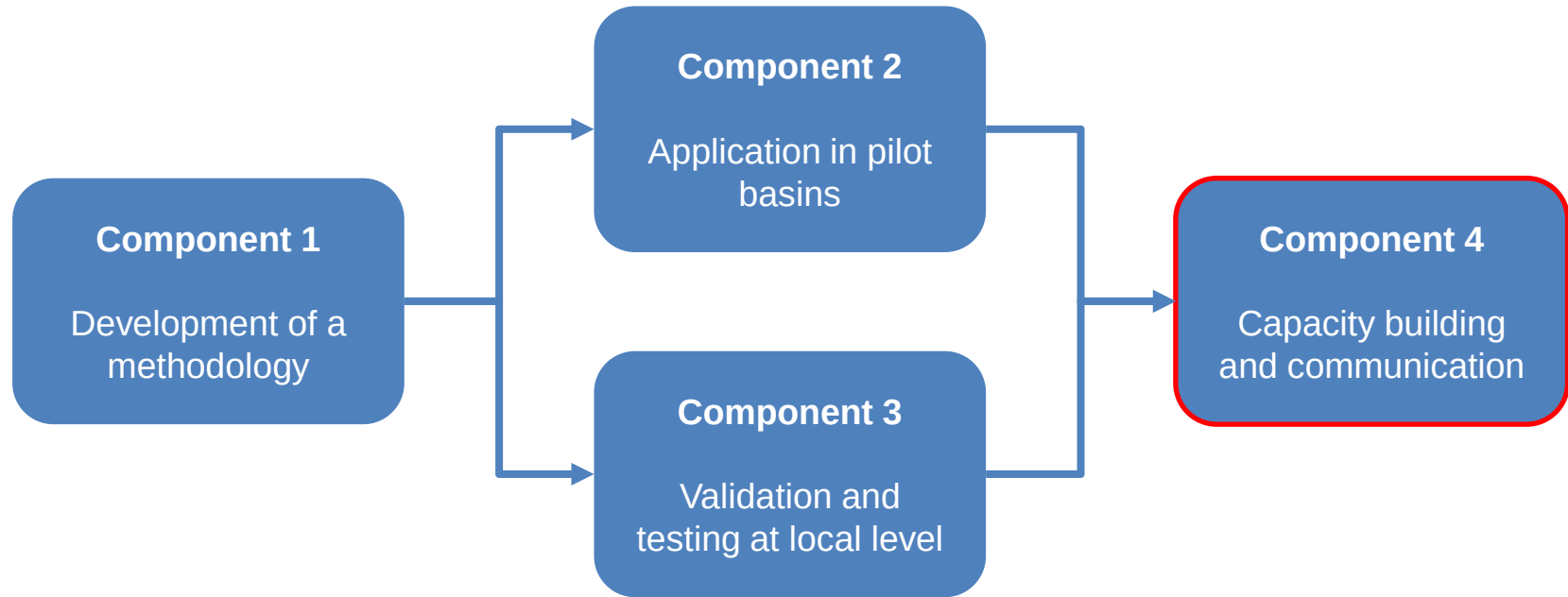


Agenda

- Outcomes and outputs
- Updates in 2018
- Lessons learned
- Next steps

- Discussion

Components



Outcome 4.1 - Experience and know how gained through the project is made available within the GEF system and beyond

Output 4.1.1 - Learning package including technical specifications and training materials for the application of the new methodology with DSS tools is tested (in 2-3 trainings with basin officials, utility and industry management and operational staff, and representatives from civil society with 15-30 people per training).

Outcome 4.2 - Global dialogue on water security and adaptation to climate variability and change enriched by the dissemination of project outcomes

Output 4.2.1 - Communication approach developed to disseminate F&D methodology within pilot basins, GEF basins, and to other relevant end users.

Output 4.2.2 - 2-3 Experience Notes and other documents and audio-visual materials produced for IW LEARN dissemination mechanisms and website.

Output 4.2.3 - Development of materials (4-5) developed and disseminated at major water events: WWF, Water Week, GEF IWC 7/8/9, and IWA Conferences.

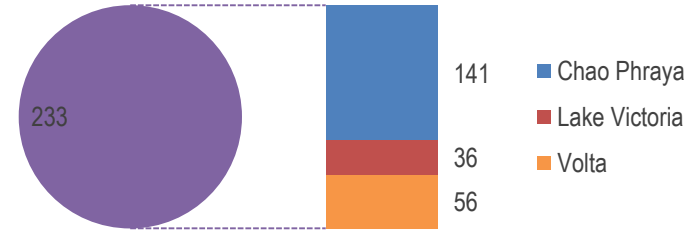
Updates

Capacity building and stakeholder engagement

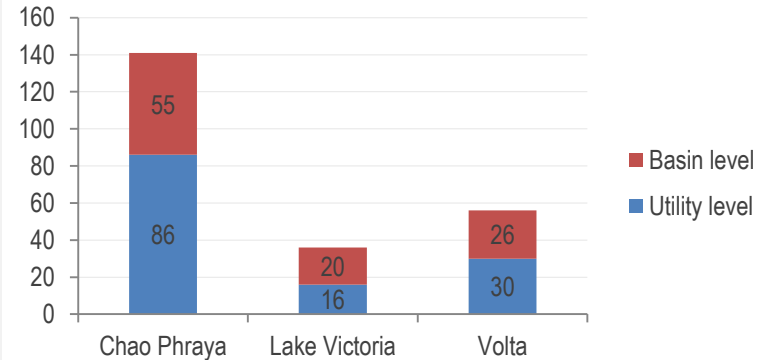
Technical training

- 233 people trained over 4 years
 - 141 Chao Phraya Basin
 - 36 Lake Victoria Basin
 - 56 Volta Basin
- Fairly even distribution across scales per basin

Total number trained per basin



Total number trained per basin



Technical training

- Chao Phraya Basin (24-26 November 2015)
- Lake Victoria Basin (26-29 January 2016)
- Volta Basin (8-11 February 2016)
- From data and information to planning Part 1: Yangon, Myanmar (5-6 September 2016)
- From data and information to planning Part 2: Bangkok, Thailand (6-9 December 2016)
- Technical training (HAII): Bangkok, Thailand (8-9 December 2016)
- Technical training (MWA and PWA): Bangkok, Thailand (13-15 December 2016)



Technical training

- Volta Basin: Accra, Ghana (27-31 March 2017)
- Lake Victoria: Kisumu, Kenya (12-14 June 2017)
- Chao Phraya Basin – Utility training (27-28 November 2017)
- Chao Phraya Basin – Basin training (29 November – 1 December, 2017)
- Volta – Utility training (ONEA) (11-13 April 2018)
- Volta – Utility training (Ghana Water Company Limited) (16-18 April 2018)
- Chao Phraya – MWA training (27 April 2018)
- Chao Phraya – MWA training (9-10 May 2018)



Technical training

- Lake Victoria – Utility training (22-24 May 2018)
- Chao Phraya – Basin training (11-14 June 2018)
- Chao Phraya – Utility training (18-20 June 2018)
- Lake Victoria – Basin training (26-28 June 2018)
- Volta Basin – Basin training (26-28 September 2018)



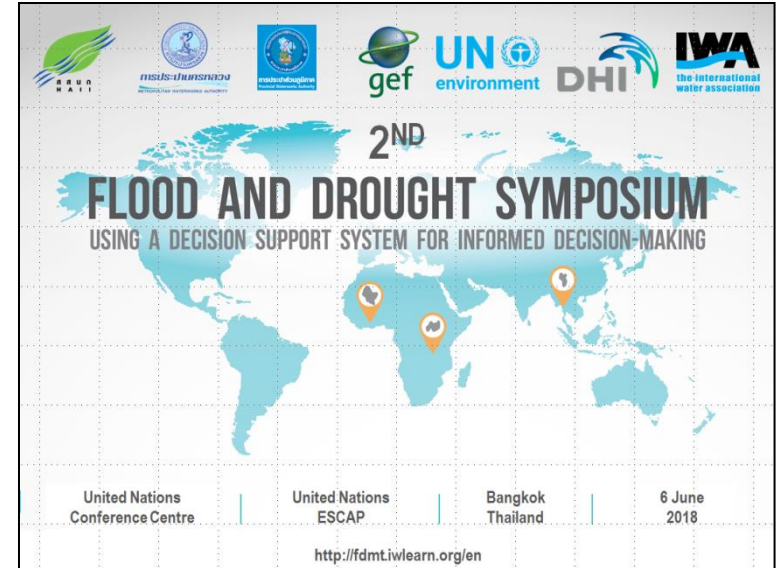
Awareness workshops

- Chao Phraya Basin - Flood and Drought Symposium (23 November 2015)
- Volta Basin - Understanding the value of a DSS (30 September 2015)
- Volta Basin - Awareness and knowledge exchange (12 February 2016)
- Lake Victoria Basin – LVBC promoted the project and its outputs at their Regional Policy Steering Committee meeting and Council of Ministers meeting



Awareness workshops

- **2nd Flood and Drought Symposium (6 June 2018) – Bangkok, Thailand**
 - Jointly hosted by HAIL, Metropolitan Waterworks Authority (MWA) and the Provincial Waterworks Authority (PWA),
 - Showcase and discuss the national vision on flood and drought management from different perspectives
 - Present on the strategies and approaches being used to effectively prepare and respond to current and future challenges
 - Raise awareness on the Flood and Drought Portal
 - Promote key stakeholders as the current and future champions of the Flood and Drought Portal



- **Planning for Floods and Droughts: Reflections and Future Opportunities (2 October 2018) – Nairobi, Kenya**
 - Highlight the ongoing transition towards using data tool solutions in water management with FDMT perspectives
 - Opportunity to share experiences and the future vision for managing water resources in transboundary basins
 - Raise awareness and ownership of the Flood and Drought Portal applications as a mechanism to address current and future water challenges
 - Official hand over the completed Flood and Drought Management Tools to GEF and key stakeholders



Updates

Communication, dissemination and
stakeholder engagement

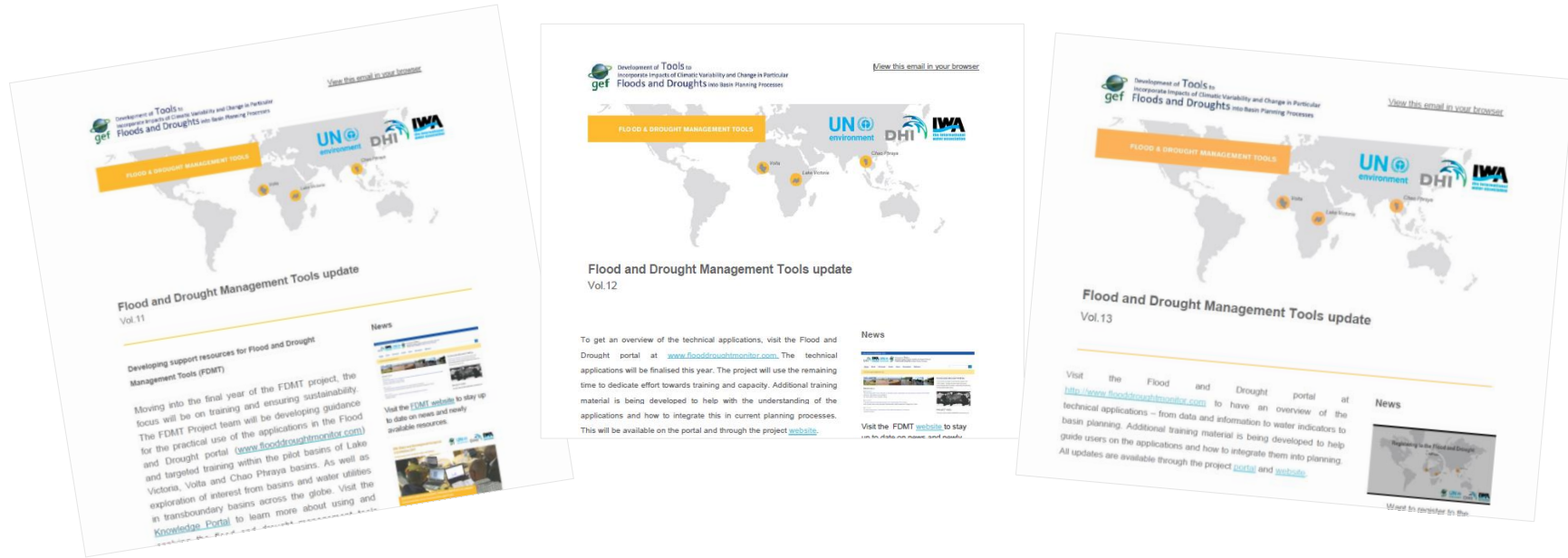
Modes of communication, dissemination and engagement

- Website: <http://fdmt.iwlearn.org/>
- Information sheets
- Newsletter every 2-3 months
- Blogs, articles and press releases
- Experience notes
- Videos
- Infographics
- Posters
- Webinars
- Learning material
- Events

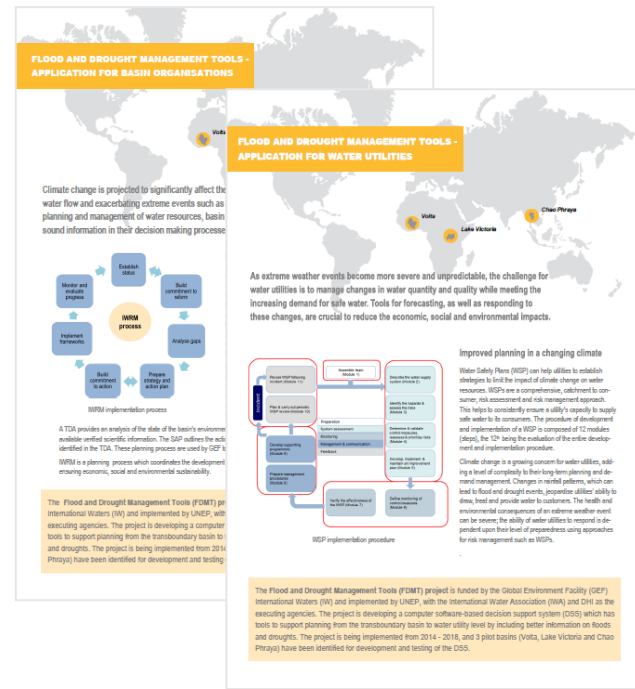


Newsletter

- 13 editions - <http://fdmt.iwlearn.org/docs/newsletters>
 - Provides an update on the project
 - Profiles stakeholder initiatives, programmes and projects

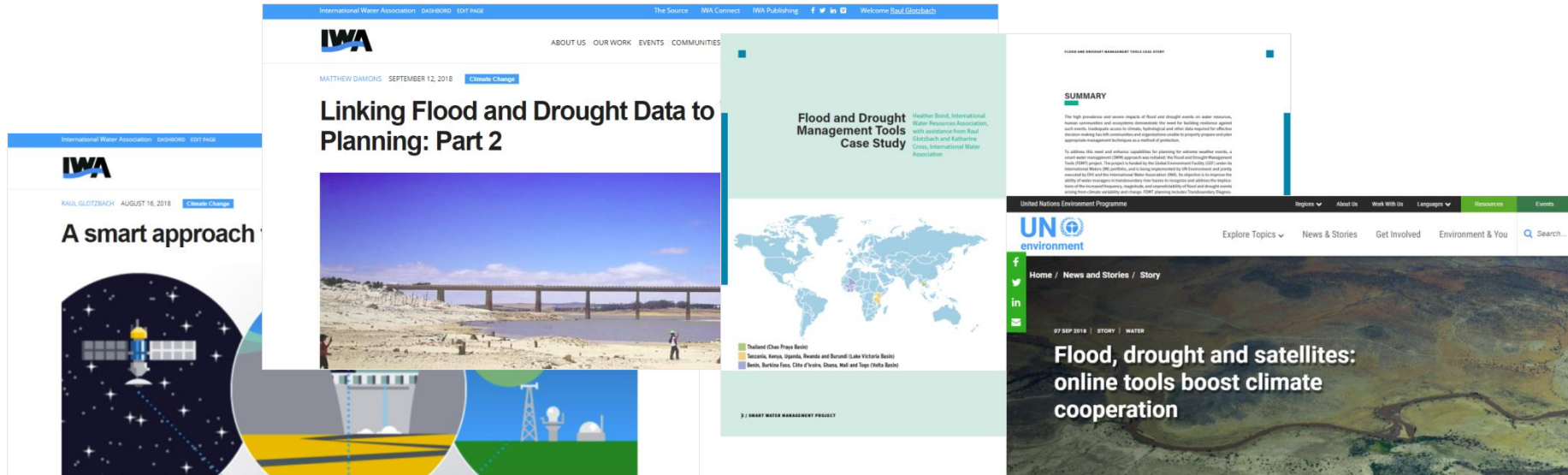


- [illegible]



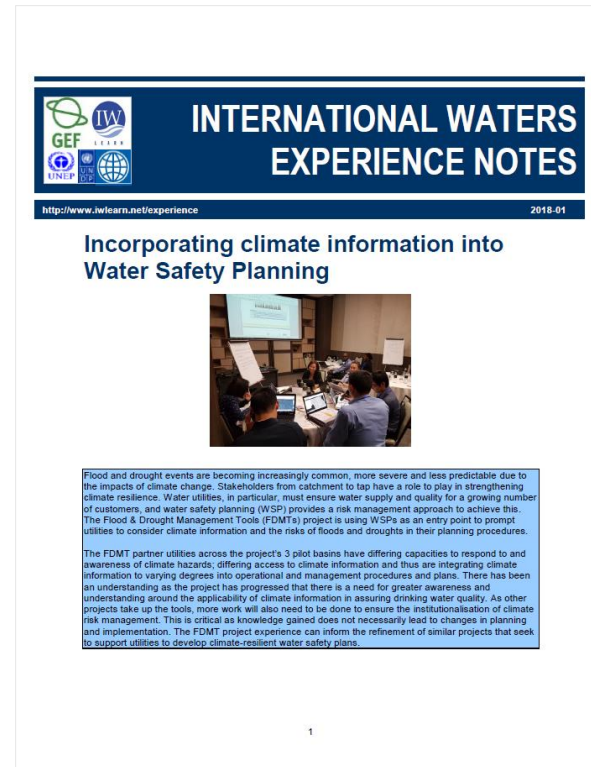
Blogs, articles and press releases

- Over 45 blogs, articles and press releases - <http://fdmt.iwlearn.org/news>
 - Topical, technical applications, events
 - Partner contributions (e.g. HAI, Emanti Management Group Ltd., International Water Resources Association, UN Environment)



Experience notes

- 2 experience notes - http://fdmt.iwlearn.org/resources/experience_note
 - Stakeholder engagement to develop applications for flood and drought planning
 - Incorporating climate information into Water Safety planning



Videos

- Social media video
- How to videos (video tutorials)
- Other videos (including webinar recordings)

FLOOD AND DROUGHT MANAGEMENT TOOLS

DHI IWA UN environment gef Development of Tools to Incorporate Impacts of Climatic Variability and Change in Particular Floods and Droughts into Basin Planning Processes

Home About Outcomes Events News Documents Resources

Library Information sheets Webinars Infographics Videos Experience note Communications

Videos

Technical applications	How to	Other
Drought Assessment - In English  to easily identify and monitor areas and sectors that are at risk.	Register to the Flood and Drought ... Registering to the Flood and Drought Portal 	Introduction to the Flood and Drou... Climate change is altering weathe 
Water Safety Planning - in English  to ensure a drinking-water	Use the Knowledge Portal Using the Knowledge Portal 	Introduction to the Flood and Drou... 

(Info)graphics



Flood issues

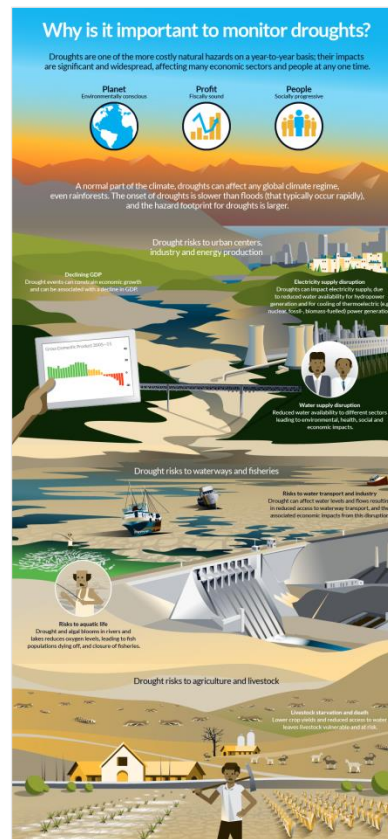
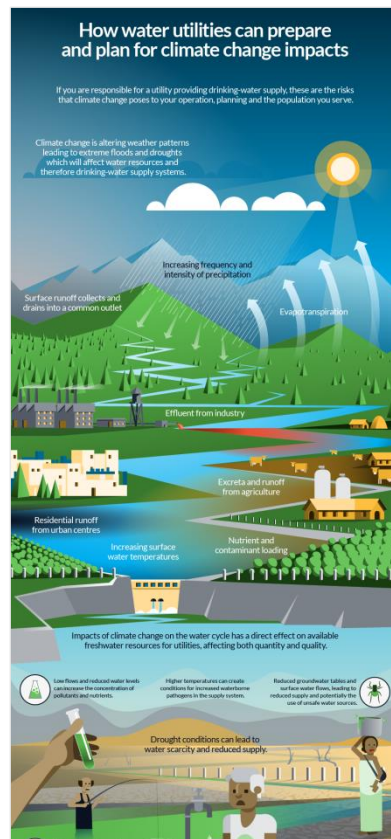


Sustainable basin



Drought issues

Infographics



Posters

Flood and Drought Management Tools

The project is developing a computer software-based Decision Support System (DSS) to support improved planning from the transboundary basin level by including better information on flood and drought even

Project approach

Land, water and urban area managers need to prepare for water-related risks by integrating information on the frequency, magnitude and unpredictability of flood and drought events into their planning. The project responds to this need, contributing to an improved capacity of water managers across utilities) to recognise and address the implications of changing climatic scenarios and land-use management.

Geographical focus



Integrating floods and droughts into planning

With the frequency and severity of flood and drought events increasing, there is a growing need for basin and utility managers to recognize and better plan for the impacts on human welfare, ecosystem and economic development. Processes such as integrated Water Resource Management and the Global Treatment Facility (GTF) Transboundary Diagnostic Assessment Strategic Action Programme, have been introduced to help basin managers assess and plan for the impacts of water-related risks at a sustainable water resources management. For utilities, planning can be through Water Safety Plans. Safety plans are a comprehensive, catchment to consumer, risk assessment and management approach to consistently ensure a utility's capacity to supply safe water to its consumers. WSPs can help establish strategies to limit the impact of climate change on water resources.

Planning supported by a Decision DSS

The DSS contains tools used to gather and analyze data and then to use in decision making. The first set of drought information will enable users to evaluate, recognize and economic development. Processes such as integrated Water Resource Management and the Global Treatment Facility (GTF) Transboundary Diagnostic Assessment Strategic Action Programme, have been introduced to help basin managers assess and plan for the impacts of water-related risks at a sustainable water resources management. For utilities, planning can be through Water Safety Plans. Safety plans are a comprehensive, catchment to consumer, risk assessment and management approach to consistently ensure a utility's capacity to supply safe water to its consumers. WSPs can help establish strategies to limit the impact of climate change on water resources.

Support for Water Safety Planning by the Planning Decision Support

Water Safety Planning

Water Safety Planning (WSP) is a comprehensive risk assessment and risk management approach that steps in water supply from catchment to consumer. The aim of a WSP is to "consistently ensure acceptability of a drinking water".

The implementation of the WSP is done through 11 separate modules. The Planning Decision Support supports most of the modules.

WSP modules supported by the DSS



Schematic representation

The first task of the WSP team is a detailed description of the water supply system which is required to support the subsequent risk assessment process.

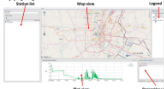
The Planning DSS support a schematic representation of the water supply.



Hazards and risks in the W

Risk Assessment of the different component water supply system is a central part of a Safety Plan.

The DSS concept is based on setting complete Hazard - Control Measure - M table for each of the components in the supply system.



About the Flood and Drought Management Tools Project

The Flood and Drought Management Tools project is funded by the Global Environment Facility (GEF) International implemented by UNEP, with the International Water Association (IWA) and DHI as the executing agencies. The project computer software-based decision support system (DSS) which has tools to support planning from the transboundary utility level by including better information on floods and droughts. The project is being implemented from 2014 - 2 basins (Volta, Lake Victoria and Chao Phraya) have been identified for development and testing of the

Project website: <http://flood.dss.iwam.org>

Contacts:
DHI
Omar Zaidan
o.zaidan@dhigroup.com

Information:
Katharine Cross
katharine@iwam.org

Project website: <http://flood.dss.iwam.org>

Contacts:
DHI
Omar Zaidan
o.zaidan@dhigroup.com

Information:
Katharine Cross
katharine@iwam.org

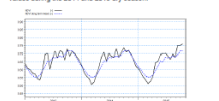
Tools developed for supporting drought management within Tha

Drought in Thailand

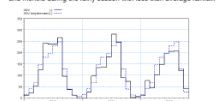
The dry season starting in November 2014 was characterised by water shortage and a low storage in the T maps to the right show the values for the Normalised Difference Vegetation Index (NDVI) for March 2015. This index is derived from satellite imagery (MODIS) as a 16-day composite product. The maps show March, indicating relatively small biomass, while the NDVI values in October are much higher.

Drought identification

The monthly mean NDVI values shows lower than average NDVI values during the 2014 and 2015 dry season.



Monthly average NDVI values for the Chao Phraya basin (black line: measured NDVI and blue line: long term mean of NDVI). The TRMM rainfall shows a lower than average dry season rainfall, and months during the early season with less than average rainfall.



Monthly average rainfall for the Chao Phraya basin (black line: observed rainfall (TRMM) and blue line: long term mean of TRMM rainfall).



The objective of drought identification is to evaluate the impact on sectors as the agricultural sector. This requires mapping of the land use within the drought affected areas.

The NDVI deviation index indicates the variation from the long term mean. It shows how the vegetation compares to the long term mean values for the same period (maps in the middle). During the dry season several areas show significant lower NDVI values than normal. The difference is so large that areas are classified as drought impacted (maps in the bottom).

In October 2015 the situation is close to normal, which indicates no crop water deficit, and a close to normal irrigation application.

About the Flood and Drought Management Tools Project

The Flood and Drought Management Tools project is funded by the Global Environment Facility (GEF) International implemented by UNEP, with the International Water Association (IWA) and DHI as the executing agencies. The project computer software-based decision support system (DSS) which has tools to support planning from the transboundary utility level by including better information on floods and droughts. The project is being implemented from 2014 - 2 basins (Volta, Lake Victoria and Chao Phraya) have been identified for development and testing of the

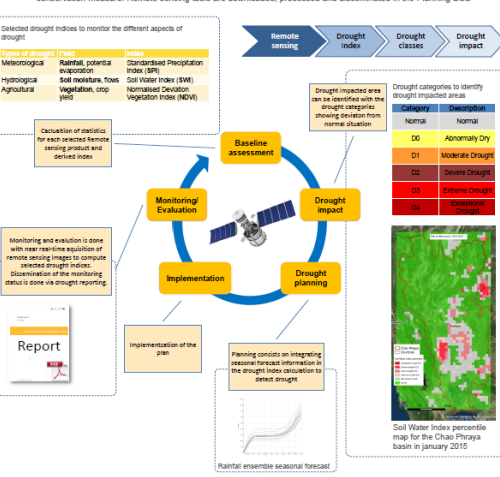
Project website: <http://flood.dss.iwam.org>

Contacts:
DHI
Omar Zaidan
o.zaidan@dhigroup.com

Information:
Katharine Cross
katharine@iwam.org

Operational drought monitoring system based on near real-time remote sensing data to support decision makers in identifying emerging droughts areas

The drought monitoring system is able to accommodate for the three types of drought: meteorological, hydrological and agricultural. Most water supply planners find it useful to consult one or more indices before making a decision such as water conservation measure. Remote sensing tools are downloaded, processed and disseminated in the Planning DSS



Planning consists on integrating assessed forecast information in the drought index calculation to detect drought.

Soil Water Index percentile map for the Chao Phraya basin in January 2015

Project website: <http://flood.dss.iwam.org>

Contacts:
DHI
Omar Zaidan
o.zaidan@dhigroup.com

Information:
Katharine Cross
katharine@iwam.org

Posters

Flood and Drought Management Tools

Objective

Land, water and urban area managers need to prepare for water-related risks by integrating scientifically sound information on the frequency, magnitude and unpredictability of flood and drought events into their planning processes.

The project is developing a package of web-based technical applications (tools), accessible through the Flood and Drought Portal. The tools can be applied individually or together to include information about floods, droughts and future scenarios into different types of planning from the transboundary basin to water utility level.

Flood and Drought Portal (www.flooddroughtmonitor.com)

Problem

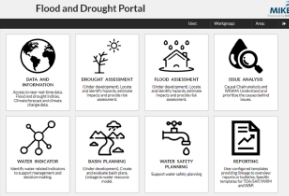
With the frequency and severity of flood and drought events increasing, there is a growing need for basin and utility managers to recognise and better plan for the impacts on human welfare, ecosystems and economic development.

Development of the tools to support planning for flood and drought events has been in consultation (meetings, workshops and training) with stakeholders across three pilot basins (Chao Phraya, Lake Victoria and Volta).

Approach

The applications in the portal allow users 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.

The tools can be applied in a single workflow which enables stakeholders to compile information from models, indicators and existing planning approaches to develop future planning scenarios that are robust, resilient and pragmatic.



Images by Chris Wells (chris@chris-wells.com)



Images by Chris Wells (chris@chris-wells.com)

About the Flood and Drought Management Tools Project

The Flood and Drought Management Tools project 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 being implemented from 2014 - 2018, and 3 pilot basins (Volta, Lake Victoria and Chao Phraya) have contributed to the development of the methodology and applications provided in the Flood and Drought Portal.

Contacts:

DHI
Oleif Zeland Jensen
o.z@dhigroup.com

International Water Association
Katherine Cross
katherine.cross@iwainq.org



Project website: <http://fdmt.iwainq.org/>

Support for Water Utility Planning

Objective

Water utilities can be better prepared and plan for climate change impacts.

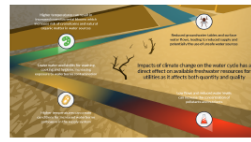
Water utilities providing drinking-water supply face several climate related risks that impacts operations, planning and their consumers.

Problem

Climate change is altering weather patterns leading to extreme floods and droughts which affect water resources and therefore drinking-water supply systems. Impacts of climate change on the water cycle directly affects the availability of freshwater resources for water utilities as it influences both quantity and quality.

Approach

Addressing the climate hazards and impacts demands effective planning. Water Safety Planning, a comprehensive risk assessment and management approach across each step in the water supply chain from catchment to tap, provides an opportunity and entry point for water utilities to become more climate resilient.




Impact of flood and drought events on freshwater resources
Images by Chris Wells (chris@chris-wells.com)

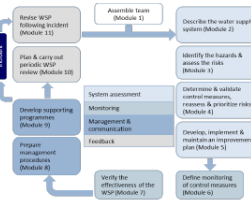
The Flood and Drought Portal (www.flooddroughtmonitor.com) provides tools which can help water utilities access and analyse climate information, select indicators and prioritise issues which can all be used to inform their Water Safety Plans.

Water safety planning tool - provides an online framework for supporting development, documentation and monitoring of a WSP.

Data and Information tool - global historical and satellite data including current and forecasted climate information such as rainfall, temperature and evapotranspiration.

Issue analysis tool - helps identify the causes behind an environmental issue affecting the water supply.

Indicator tool - a library of indicators with information on the data needed and how to apply; e.g. measure the issues (run-off from agriculture) causing a hazard (pollution of the water source).



Water Safety Planning modules supported by the portal

About the Flood and Drought Management Tools Project

The Flood and Drought Management Tools project 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 being implemented from 2014 - 2018, and 3 pilot basins (Volta, Lake Victoria and Chao Phraya) have contributed to the development of the methodology and applications provided in the Flood and Drought Portal.

Project website: <http://fdmt.iwainq.org/>

Contacts:

DHI
Oleif Zeland Jensen
o.z@dhigroup.com

International Water Association
Katherine Cross
katherine.cross@iwainq.org

Flood and Drought Management Tools Project

Posters

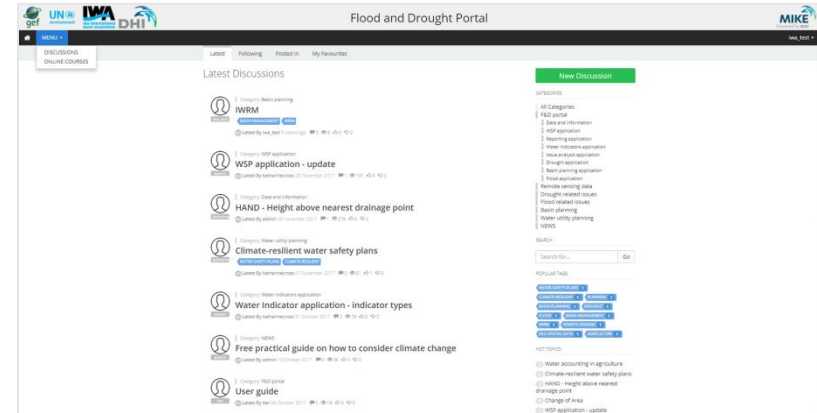


- Past webinar - <http://fdmt.iwlearn.org/resources/webinars>
 - Use of satellite data for drought and flood management (Technical presentation) - 24 November 2016
 - Drought Management today - cases from Asia - 12 January 2017
 - Drought early warning and assessment, experiences from Africa - 28 February 2017
 - Water Safety Plans – a risk management approach from catchment to consumer - 15 March 2017
 - The challenges and experiences in developing multi-objective basin plans - 17 May 2017

- Upcoming webinar
 - [Interpreting climate information for water utilities](#) - 25 October 2018
 - [Climate Resilient Water Safety Planning](#) - 28 November 2018
 - From vision to action: how water utilities are building climate resilience - December 2018 (*tbc*)



- Ensure capacity building at the end of the project
- Accessible through the Knowledge Portal and project website
- Includes:
 - Step-by-step guides on functionality of technical applications
 - How to videos on the main functionality of the technical applications
 - Guidance documents (most applicable for water utilities) on how to interpret and integrate information in planning, such as WSP



- Resilient cities Asia-Pacific 2015, Bangkok, Thailand (11-13 February 2015)
- International Conference on Drought, Valencia, Spain (10-14 March 2015)
- 7th World Water Forum, Daegu and Gyeongbuk, Republic of Korea (12-17 April 2015)
- IWA Development Congress & Exhibition, Dead Sea, Jordan (18-22 October 2015)
- European River Symposium 2016, Vienna, Austria, (2-4 March 2016)
- IWA Global Water Safety Conference, Palawan, Philippines (25-28 April 2016)
- 8th GEF Biennial International Waters Conference (IWC), Negombo, Sri Lanka (9-13 March 2016)

- 1st Asian Science and Technology Conference for Disaster Risk Reduction, Bangkok, Thailand (23-24 August 2016)
- IWA World Water Congress & Exhibition, Brisbane, Australia (9-14 October 2016)
- Mekong Delta workshop, Hanoi, Vietnam (4-6 October 2016)
- 7th IWA ASPIRE Conference, Kuala Lumpur, Malaysia (11-14 September 2017)
- IWA Development Congress, Buenos Aires, Argentina (13-16 November, 2017)
- International Workshop on Water Scarcity: Taking action in transboundary basins and reducing health impacts, Geneva, Switzerland (11-12 December 2017)

- World Water Forum, Brasilia, Brazil (18-23 March 2018)
- IW LEARN Twinning event, Geneva, Switzerland (31 May 2018)
 - FDMT Technical Training
- IW Learn Regional workshop, Bangkok, Thailand (30 April - 2 May, 2018)
- World Water Week, Stockholm, Sweden (30 August 2018)
 - Session: Smart Water Systems for Improved Human Environmental and Economic Health
- Korea International Water Week, Daegu, Republic of Korea (14 September 2018)
 - Session: Smart Water Management case study lessons from around the world

- **World Water Congress & Exhibition, Tokyo, Japan (6-21 September 2018)**
 - Workshop: Climate Resilient Water Safety & Security Planning
 - Training: Climate smart utilities - tools for building resilience
 - Demonstration: Building climate resilience through improved planning: A demonstration of the Flood and Drought Portal



IWA World Water Congress & Exhibition
16-21 SEPTEMBER 2018 • TOKYO • JAPAN

BUILDING CLIMATE RESILIENCE THROUGH IMPROVED PLANNING
A demonstration of the Flood and Drought Portal
19 September 2018 | Meeting Room 3 | 13h30-15h00
Language: English

fdmt.iwlearn.org www.flooddroughtmonitor.com

Lessons learned

- Need to tailor communication and dissemination material for different user types
- Need for multiple engagement strategies
- Need for better engagement with GEF SEC to integrate project outputs in the overall agenda

Next steps

		2018											
	Activities	J	F	M	A	M	J	J	A	S	O	N	
Component: 4	Capacity building and dissemination												
Activity 1 (Output 4.1.1)	Prepare technical specifications, manuals, guidance and training materials for users in the 3 pilot basins focusing on capacity building in the pilot basin												
Activity 2 (Output 4.1.1)	Awareness workshops on DSS with decision makers												
Activity 3 (Output 4.1.1)	Prepare training module on application of flood and drought methodological approach from basin to end user for inclusion in existing training courses												
Activity 4 (Output 4.2.1)	Document the design and implementation process of flood and drought methodology in pilot basins to be communicated to a wide range of stakeholders												
Activity 5 (Output 4.2.2)	Audiovisuals, documents and other materials for global dissemination with an emphasis on IW LEARN												
Activity 6 (Output 4.2.3)	Prepare brochures, leaflets, CDs and materials suitable for water events												
Activity 7 (Output 4.2.3)	Organization of and participation in international conferences and workshops for the dissemination of methodological approaches and technical solutions across networks												

- Develop and finalise communications products including:
 - Blogs and articles
 - Infographics and posters
 - Information sheets
 - Videos
 - Newsletter
- Finalise and collate content for learning material
- Translate key documentation in French and Thai
- Continue to promote the Flood and Drought portal and seek opportunities to integrate the outputs in ongoing and new initiatives and projects (e.g. OFID project)

- How do we get stakeholders to use the products and tools?
- How should we use the products and tools to , for example, influence policy or enable communication between stakeholders?
- What additional content is needed and for which stakeholders or audiences?

www.flooddroughtmonitor.com

For more information, contact

DHI, Oluf Zeilund Jessen
ozj@dhigroup.com

IWA, Katharine Cross
katharine.cross@iwahq.org

Or learn more at

fdmt.iwlearn.org

