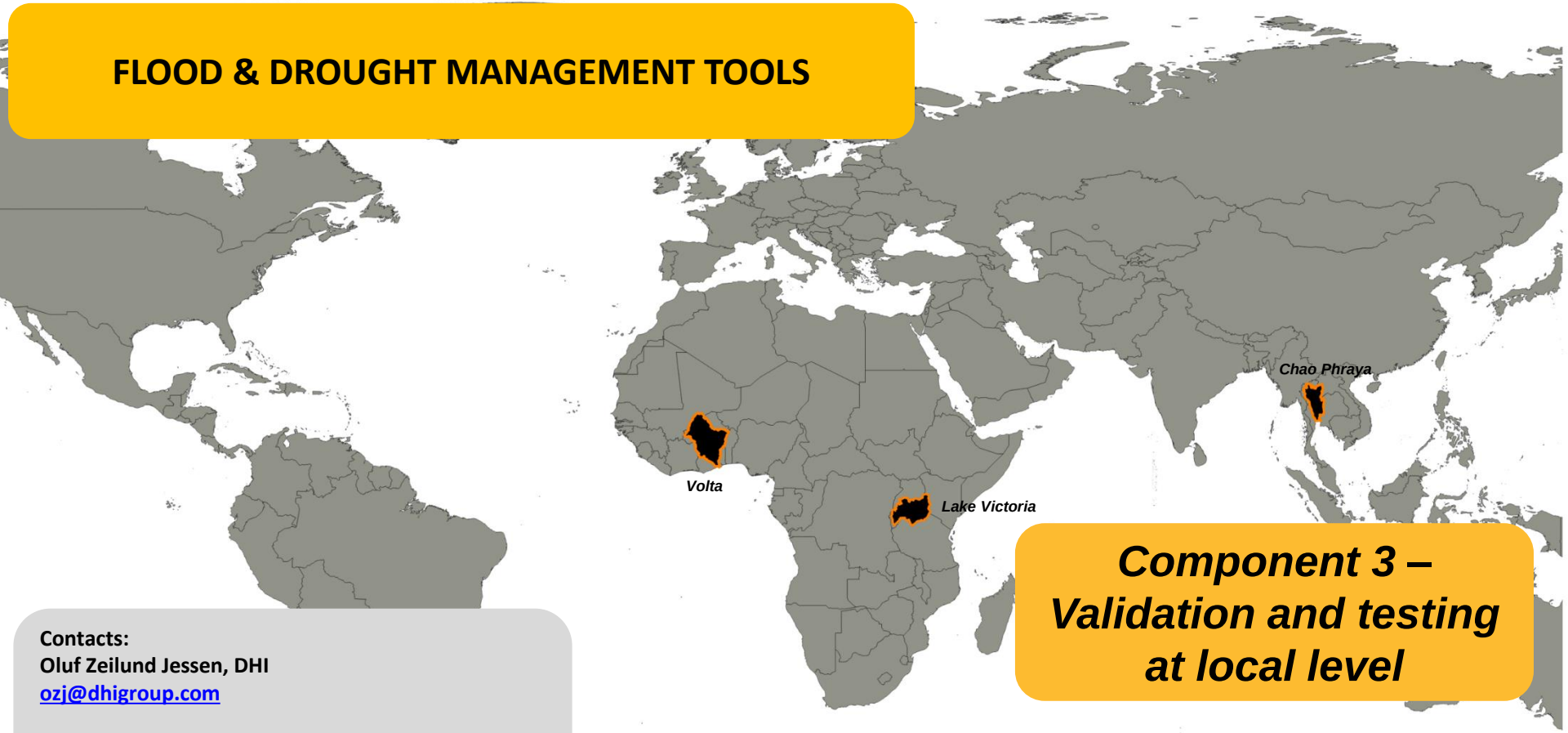
FLOOD & DROUGHT MANAGEMENT TOOLS



Component 3 – Validation and testing at local level

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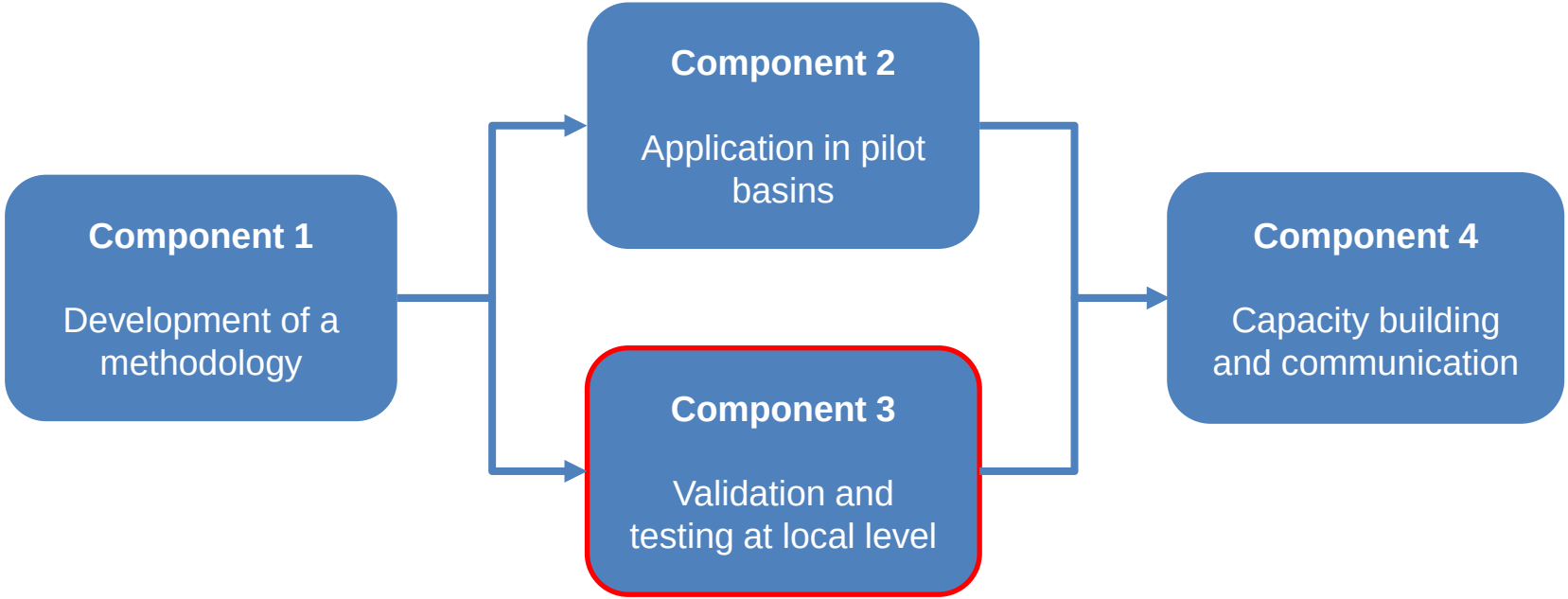
Agenda

- Outcomes and outputs
- Context
- Key processes supported
- Lessons learned
- Next steps
- Discussion

Components


Component 1
Development of a methodology
Component 2
Application in pilot basins
Component 3
Validation and testing at local level
Component 4
Capacity building and communication

Component 3 – Validation and testing at the local level

<u>Outcome 3.1</u> - Application of the methodology with DSS tools at lower administrative levels within the 3 pilot basins enables water suppliers and regulators, (agro) industries and urban area managers to consider options for increased resilience and preparedness to F&D within broader basin context with an emphasis on vulnerable groups affected by water related shocks.

Output 3.1 - *Recommendations for inclusion of flood and drought issues in WSP and other local planning methods in the 3 pilot basins with integration of urban and (agro-) industrial water users perspectives and realities.*

How can the project outputs be used by water utilities?
How to integrate climate information into water utility planning?

How water utilities can prepare and plan for climate change impacts

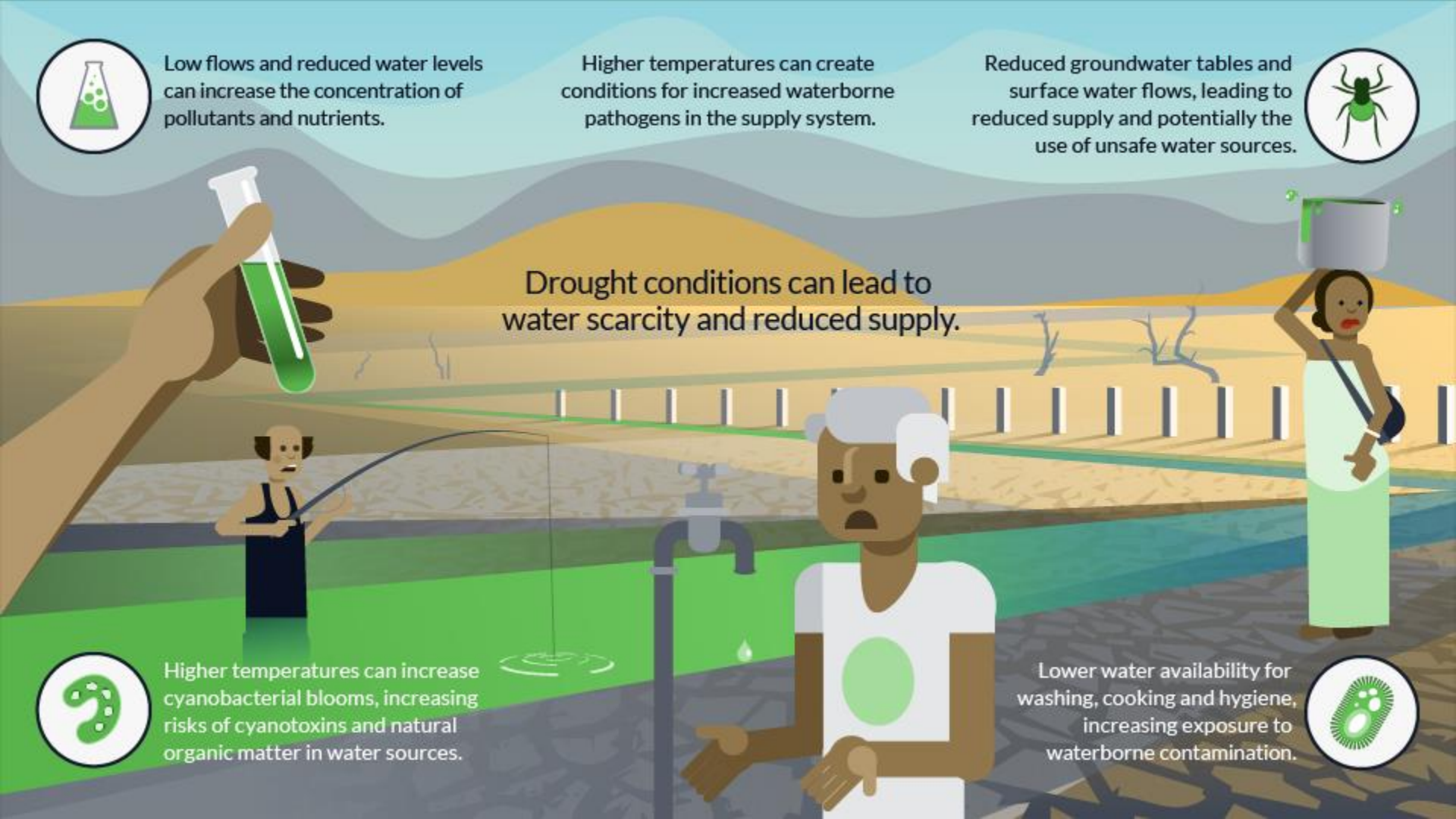
If you are responsible for a utility providing drinking-water supply, these are the risks that climate change poses to your operation, planning and the population you serve.

Climate change is altering weather patterns leading to extreme floods and droughts which will affect water resources and therefore drinking-water supply systems.

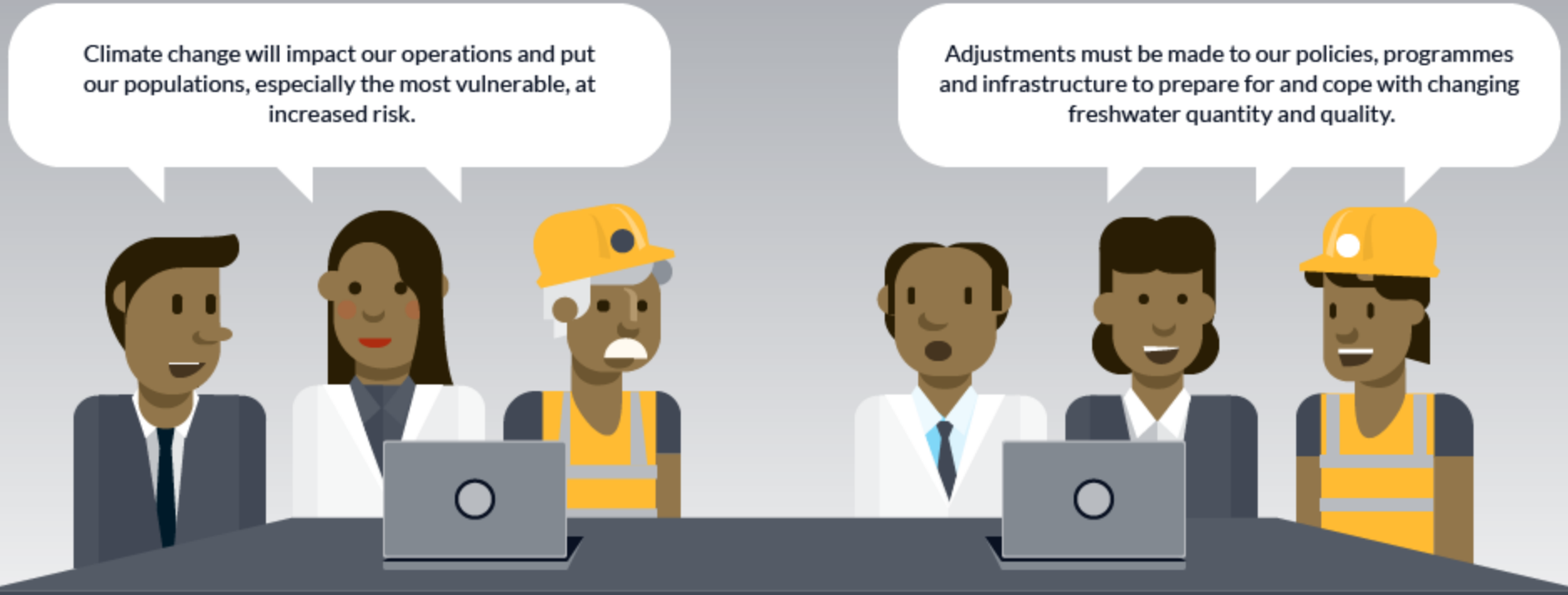
Climate change related impacts

1. Quality
2. Availability
3. Accessibility
4. Acceptability
5. Affordability

Damage to infrastructure
High levels of rainfall and runoff can increase loading of pathogens, chemicals, and suspended sediment in surface waters
Floods impact the quality of surface water and ground water in multiple ways:
Flood
Contaminated water entering groundwater through wells
Overflow and contamination from sewerage systems


Low flows and reduced water levels can increase the concentration of pollutants and nutrients.
Higher temperatures can create conditions for increased waterborne pathogens in the supply system.
Reduced groundwater tables and surface water flows, leading to reduced supply and potentially the use of unsafe water sources.
Drought conditions can lead to water scarcity and reduced supply.
Higher temperatures can increase cyanobacterial blooms, increasing risks of cyanotoxins and natural organic matter in water sources.
Lower water availability for washing, cooking and hygiene, increasing exposure to waterborne contamination.

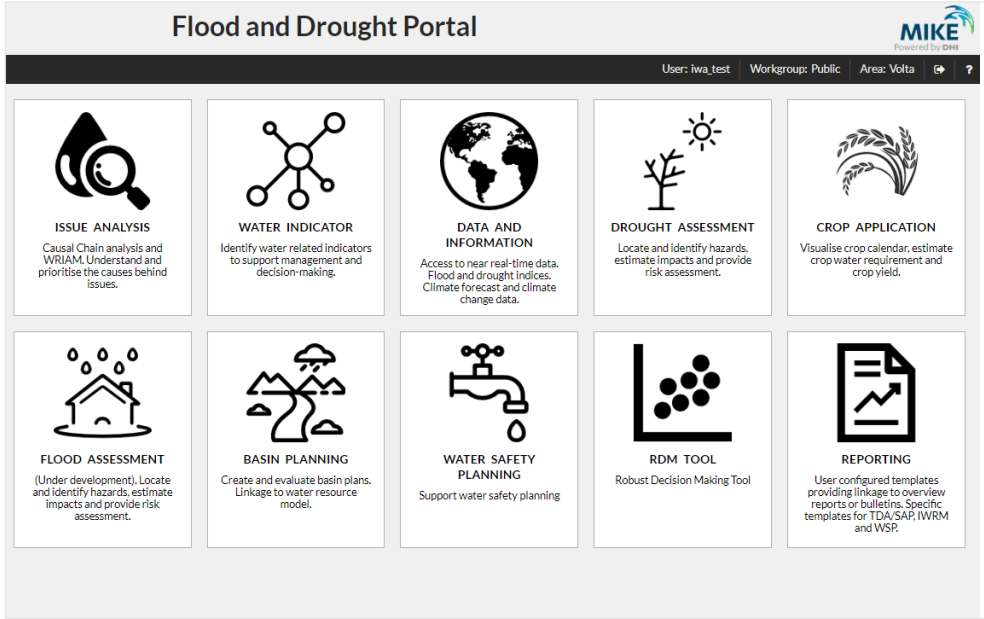
A changing climate affects the timing, predictability and intensity of precipitation.



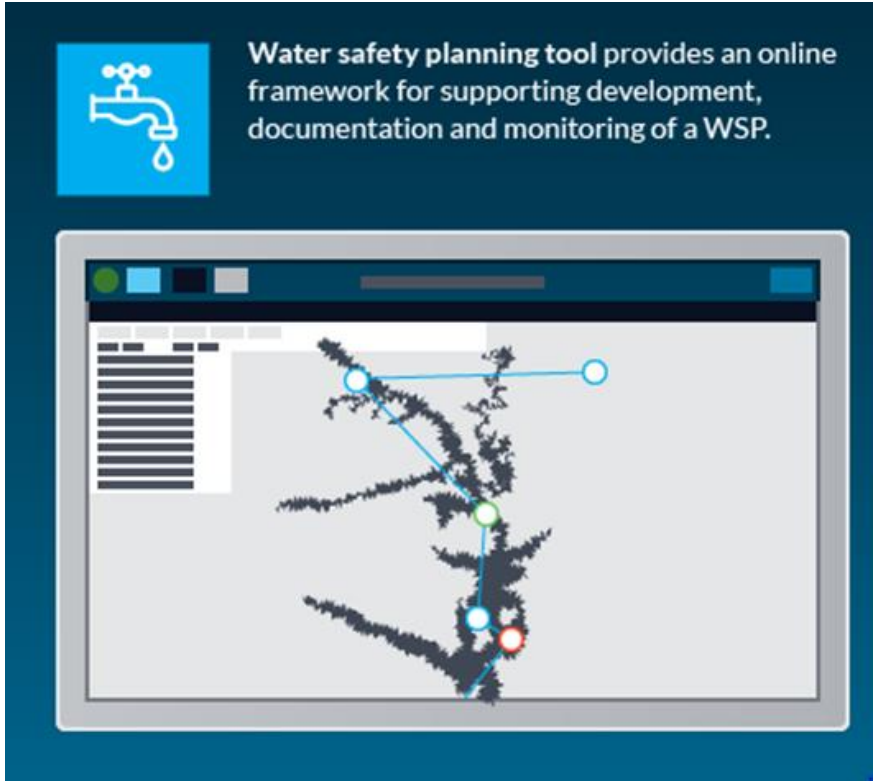
Land, water and urban area managers can better prepare for water related risks by integrating information on flood and drought events into planning and analysis processes to ensure drinking water is safe.

Relevant to water utilities

- Ensure a water utility's water service provision - WSP
- Support decision processes at water utility level to address impacts
- Provide technical applications supporting the inclusion of flood and drought issues into planning

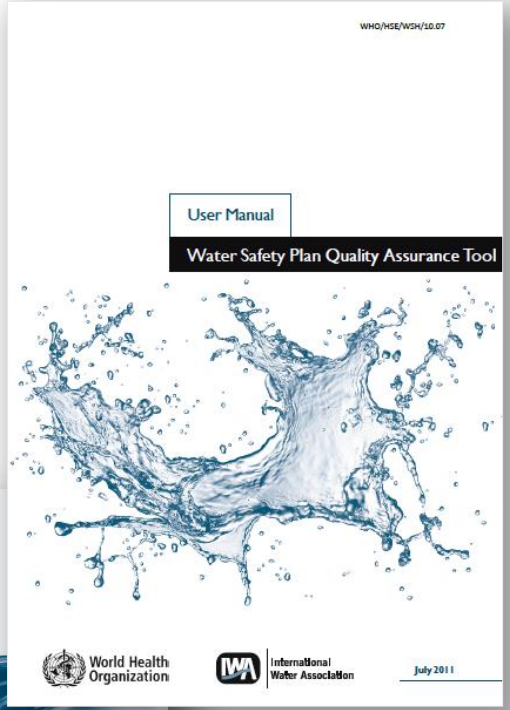


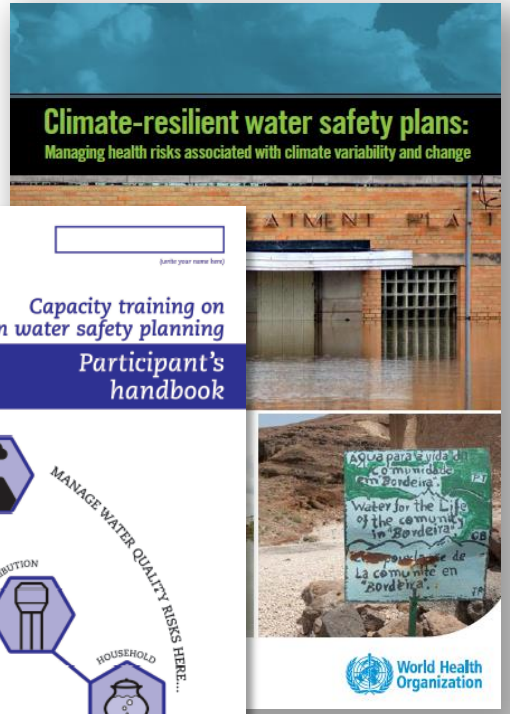
Key processes supported by the project – Water Safety Planning

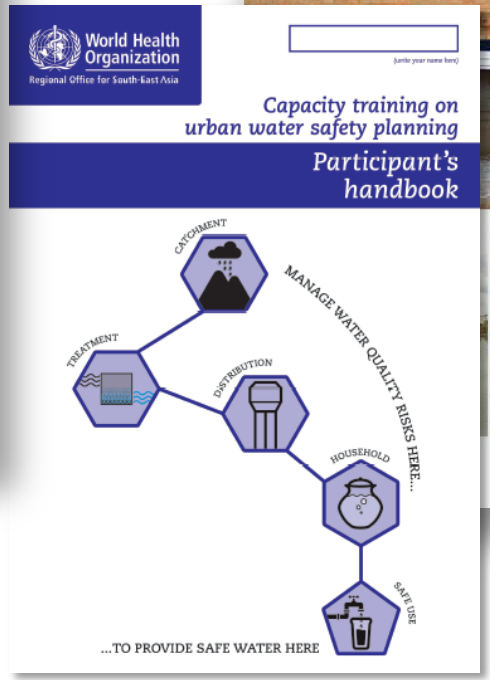


- WSP are recognised as the most effective means of ensuring the safety and acceptability of drinking water supply
- WSP offers a systematic framework to manage risks by considering the impact of climate variability and change.
- Entry point for water utilities is Water Safety Planning application – other applications provide useful inputs to WSP

Input: Resources







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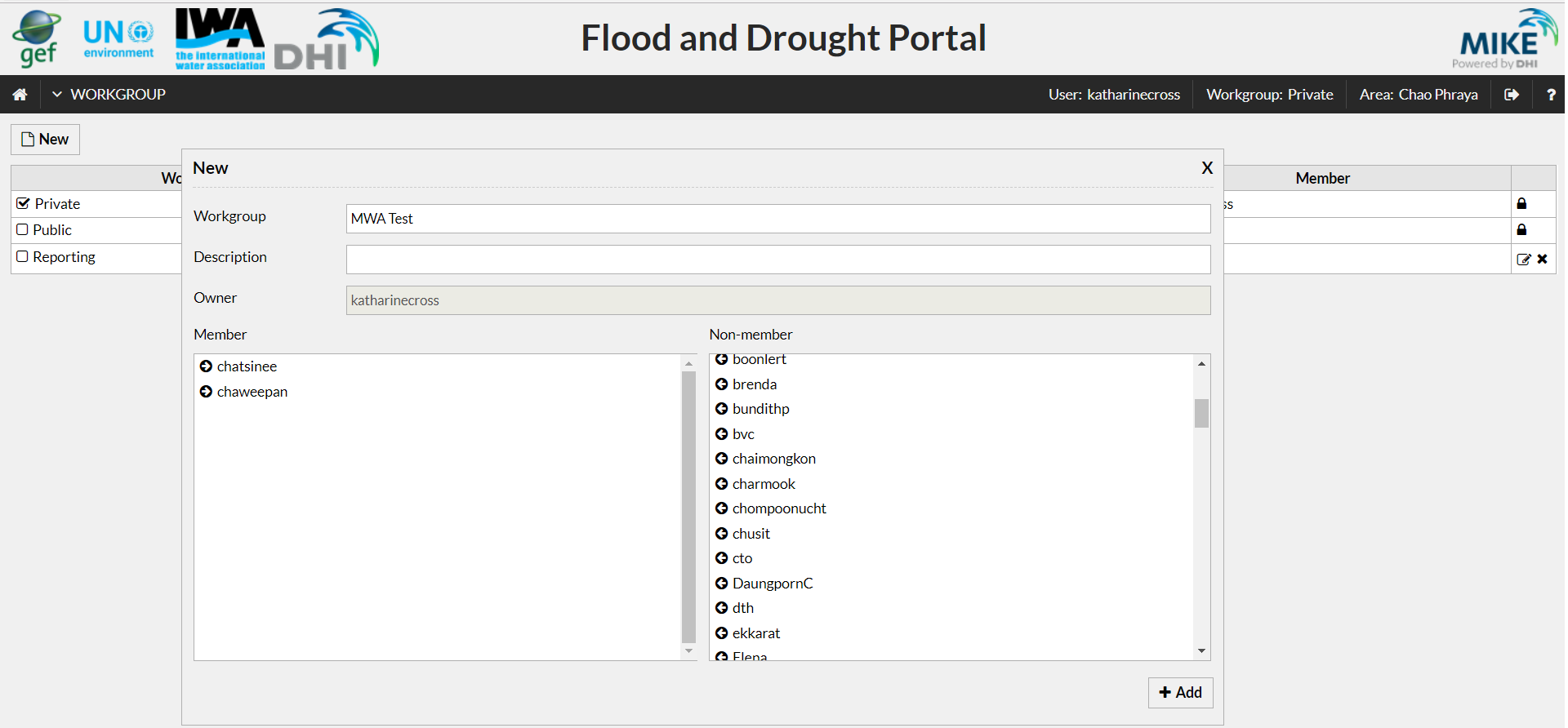


Flood and Drought Portal

WATER SAFETY PLANNING | User: katharinecross | Workgroup: MWAtest | Area: Chao Phraya

Open | New | Clone | Edit | Delete

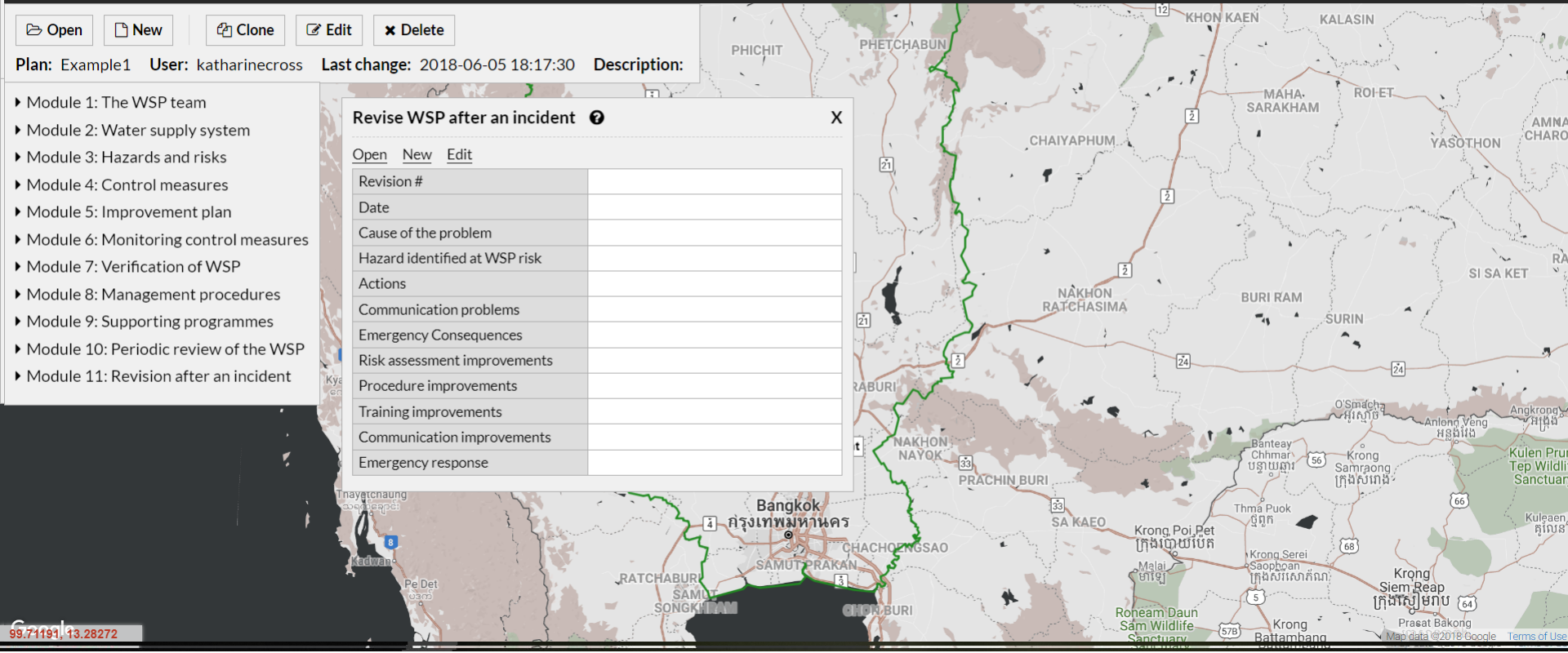
Plan: Example1 **User:** katharinecross **Last change:** 2018-06-05 18:17:30 **Description:**

- Module 1: The WSP team
- Module 2: Water supply system
- Module 3: Hazards and risks
- Module 4: Control measures
- Module 5: Improvement plan
- Module 6: Monitoring control measures
- Module 7: Verification of WSP
- Module 8: Management procedures
- Module 9: Supporting programmes
- Module 10: Periodic review of the WSP
- Module 11: Revision after an incident

Revise WSP after an incident

Open New Edit

Revision #	
Date	
Cause of the problem	
Hazard identified at WSP risk	
Actions	
Communication problems	
Emergency Consequences	
Risk assessment improvements	
Procedure improvements	
Training improvements	
Communication improvements	
Emergency response	



Module 1: The WSP Team

The team might include:

- Managers, engineers, water quality control staff, technical staff involved in day-to-day operation and often representatives from health and environmental sectors.

Q1 Who is on your WSP team?

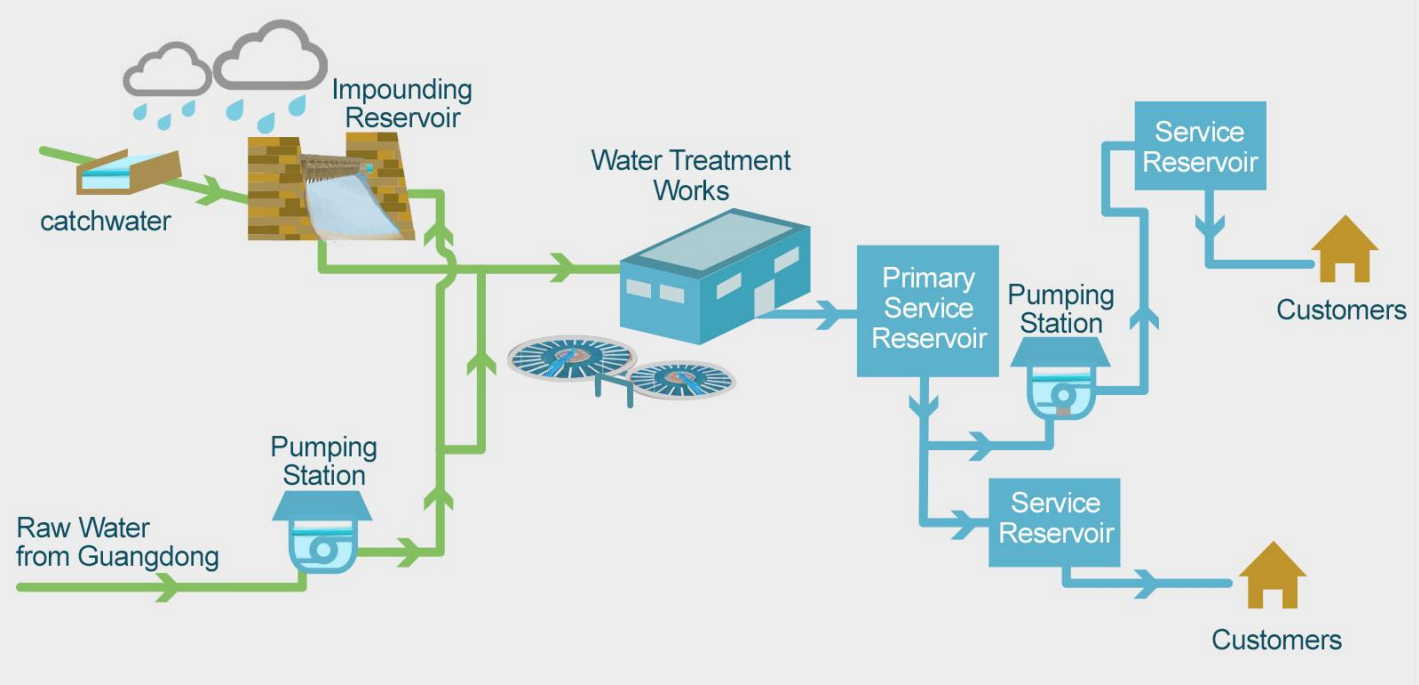
To consider and address the effects of climate change, WSP teams may require additional support in obtaining and interpreting climate-related information e.g.

- Climatologists
- Hydrologist

Q2. Who will you include (internal or external as a climate expert)?

Module 2: Describe the system

Q1. What are the key parts of your system?



Module 2: Describe the system

How to include climate change issues?

Need to know what parts of the water supply system will be impacted by climatic hazards

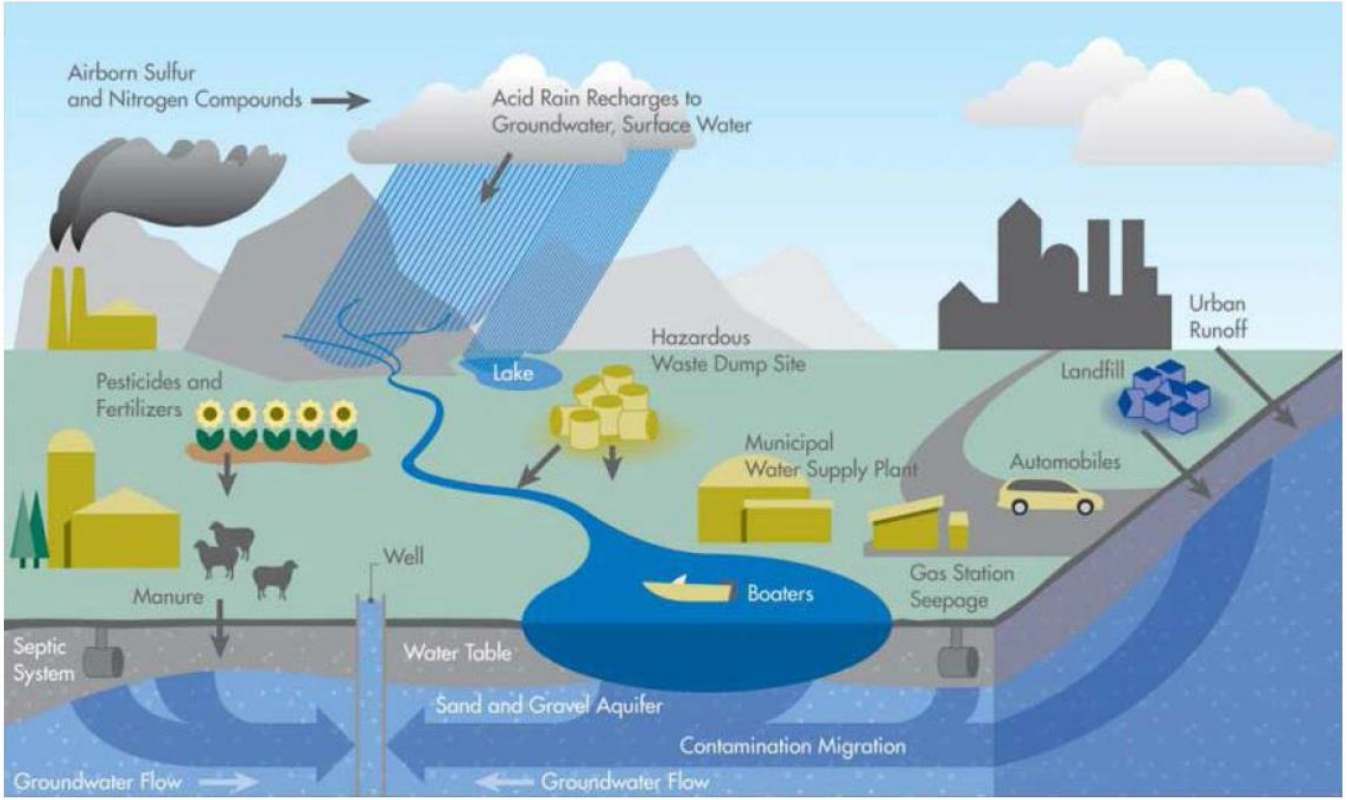
- Essential to support the hazard identification and risk assessment .
- Team must gather sufficient information to understand and address vulnerability to climate-related risks.
- Anticipating future changes to the water supply system e.g. changes to cope with seasonal variations due to climate change
- Important in long term planning for water resource management and water infrastructure

Q2. What parts of your system is likely to be affected by climate impacts (flooding, droughts)?

Module 3: Hazards and risks

Q1. What are the top 3 hazards to the system?

Q2. Which of these hazards effect the key process steps you identified in Module 2?



Module 3: Hazards and risks – How to include climate issues?

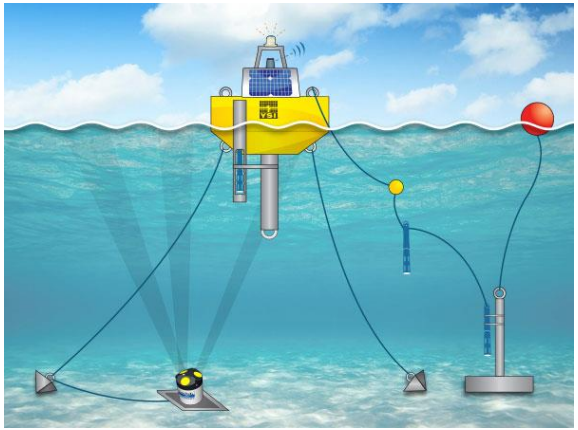
Climate variability and change can potentially add new hazards and risks being associated with hazards and hazardous events.

- Use data and information tool to identify possible climate hazards that would affect the utility
- *Note: Climate change itself will not change the basic nature of threats to water services but it will change their likelihood and severity*

Q3. How are the hazards identified impacted by increased rainfall or lack of rainfall and high temperatures?

Module 4: Control measures

Q1. What existing control measures do you have for each hazard?
Q2. Will the control measure be sufficient?



Module 4: Control measures – How to include climate information?

- The effectiveness of existing control measures may change with changing climatic conditions, impacting the risk assessment.
- Where existing controls are insufficient to adequately manage current or future risk, additional control measures will be needed

Q3. Based on the assessment, will the control measure be sufficient with increased flooding?

What about drought and water scarcity?

Module 5: Improvement plan – How to include climate information?

Q1. Which control measure are not working well and need to be improved?
Q2. What improvements can be put in place?

- **Identify additional control measures to manage climate-related risk**.
  - Control measures may be specific to drinking-water systems or improvements in water resources management to reduce risks related to natural disasters.
  - Some control measures will be the responsibility of other stakeholders rather than the water supply agency and so need to be developed in partnership
- **Consider the impacts of climate change on long-term plans**
  - Capital infrastructure upgrades and new supply sources,
  - Need to consider climate risks associated with rising demand and pollution

Q3. What new control measures can be put in place to deal with future climate hazards (e.g. water scarcity and flooding)?

Modules 8: Management Procedures

Q1 What management procedures do you have for normal and incident/emergency situations?

Consider climate- and weather-related emergencies when developing management procedures

- Emergency response planning and disaster risk reduction
- The WSP can contribute to DRR through better preparedness and contingency planning to facilitate water safety in an emergency as well as faster recovery

Q2. What management procedures do you have that consider weather emergencies (flooding and droughts)?

Modules 9: Develop Supporting Programmes

Q1 What supporting programmes do you have to develop people's skills in implementing WSP?

- Include climate risk management in supporting programmes
  - Capacity development
  - Stakeholder engagement & outreach
  - Programmes of research

Q2. What supporting programmes include climate risk?

Module 11: Review after an incident

Review following an incident

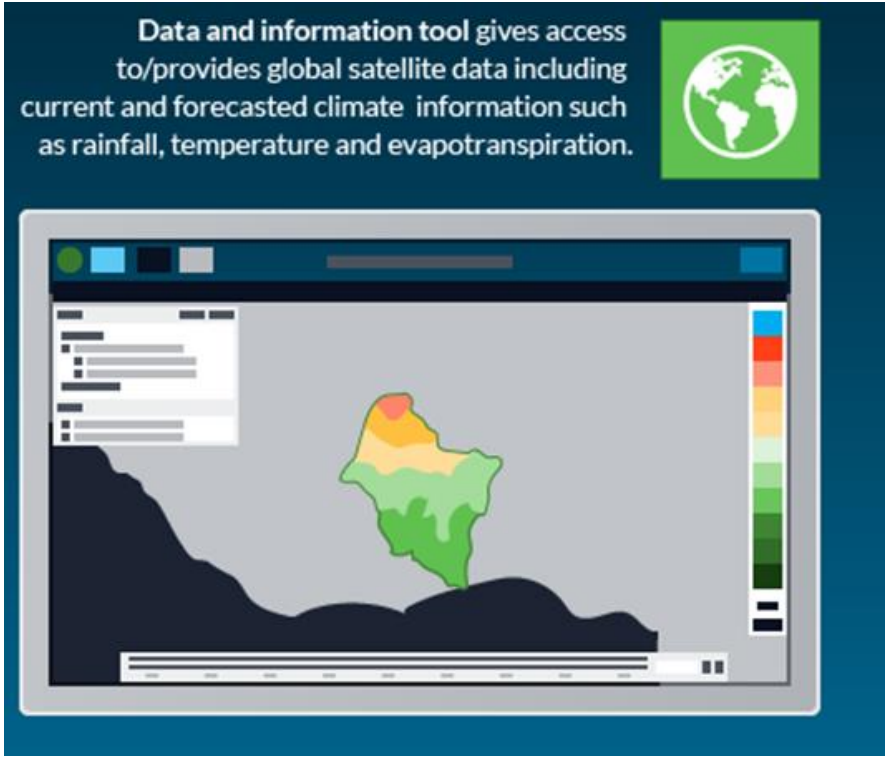
- Review the WSP following an incident, emergency or near miss
- Determine the cause of the incident, emergency or near miss and sufficiency of response
- Revise the WSP as necessary, including updates to supporting programmes

Q1. Have you reviewed the WSP after an incident? What kind of incident?

Q2. What weather hazards might result in an incident at your water utility?

Q3. What would be the impact on the water supply system (e.g. flooding damages infrastructure).

Data and information



- Climate data can answer questions posed in each module
- Can provide information to identify current and future climatic hazards (e.g. water scarcity, increased temperatures) that will affect the water supply system
- Development of a methodology to integrate climate information into hazard and risk analysis in WSP

Benefits: using flood & drought data

- Early detection especially in the case of droughts where the onset is not always clear
- Planning for disasters, early response time
- Protection of water infrastructure
- Improved risk management (prevention and mitigation of risks associated with floods and droughts)
- Early warning to specific areas that may be affected by a disaster

Challenge

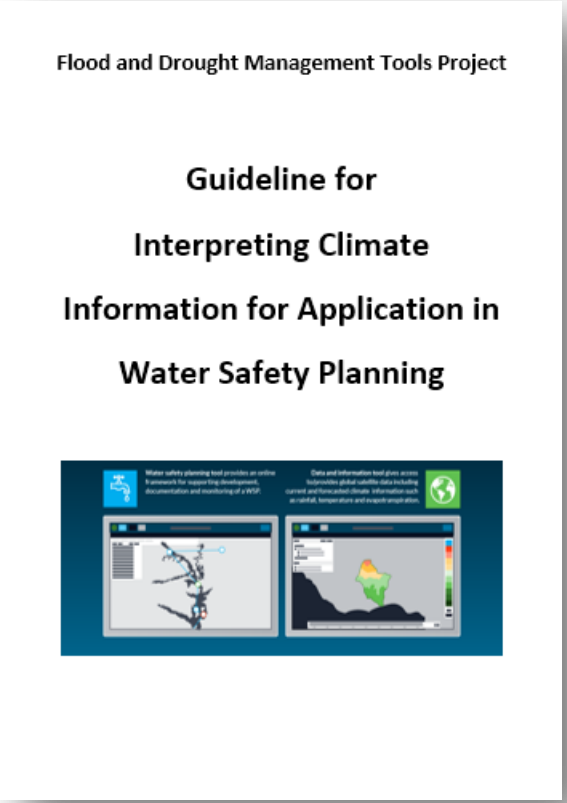
- Utilities/municipalities have trouble
  - Using and interpreting the data from the Flood & Drought Portal
  - Incorporating the findings into their water safety planning processes and operations

→ **Development of a guidance document to assist decision-making**

- Approach can be used for other data sources

Guideline for Interpreting Climate Information for Application in Water Safety Planning

- Guide the use and interpretation of data from the Flood & Drought Portal
- Incorporate the findings into water safety planning processes and operations
- Provide guidance to assist decision-making
- Provide an approach applicable for other data sources
- Blog series
- How-to videos


Flood and Drought Management Tools Project

Guideline for Interpreting Climate Information for Application in Water Safety Planning

Current and future risk rating

Likelihood						
	Almost Certain 5	5	10	15	20	25
	Likely 4	4	8	12	16	20
	Moderate 3	3	6	9	12	15
	Unlikely 2	2	4	6	8	10
	Rare 1	1	2	3	4	5
		Insignificant or no impact 1	Mild or minor 2	Moderate 3	Major 4	Catastrophic 5

Risk Score	<6	6-9	10-15	>15
Risk rating	Low	Medium	High	Very High

Hazard and risks | Control measures | Improvement plan

Preliminary risk assessment with no control

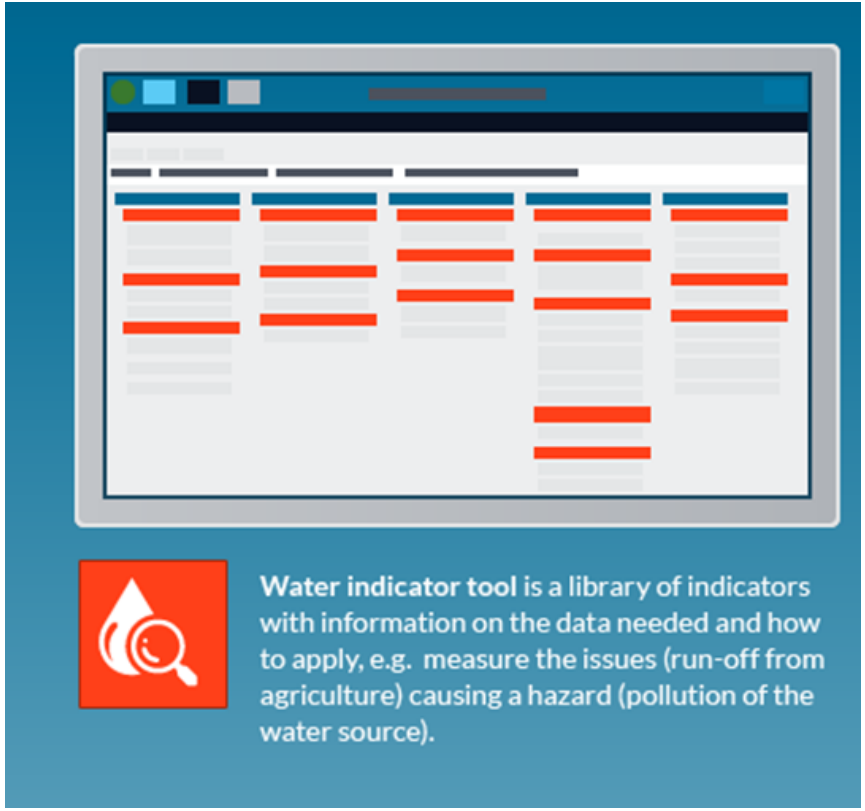
	Current	Future (Climate change)
Likelihood	Unlikely	Possible
Severity	Moderate	Major
Risk rating	Medium risk	High risk

- Also capture
  - Control measures
  - Improvement plan

Issue analysis

- Use application to catalyse discussion on environmental issues that impacts water supply
- Can build on issues identified by basin agencies
- Identify the causes behind a specific issue (hazard)
- Prioritize issues to apply control measures
- Can help pinpoint what utility can do to address a risk

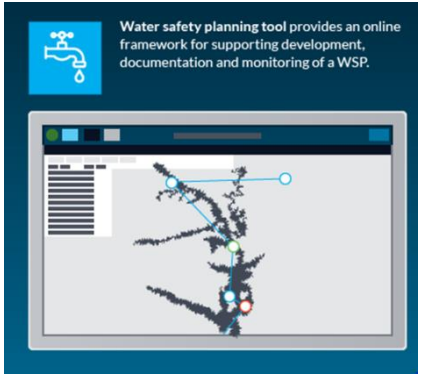
Water indicator

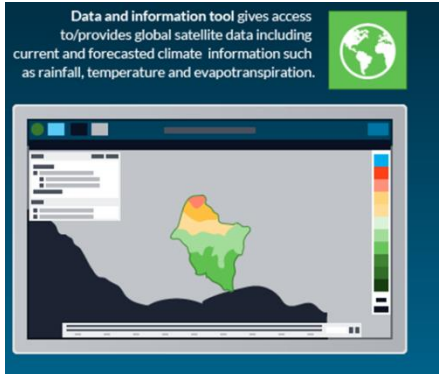


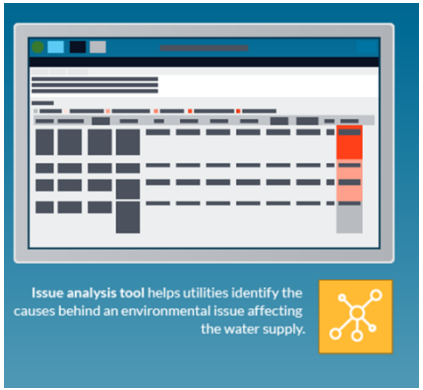
- Inclusion of catchment level/climate indicators that are useful to the utility to monitor and provide alerts e.g. water scarcity issues
- Utilities know what information to ask for from other agencies
- Use of indicator tool to select relevant indicators which can be used to measure performance of control measures
  - e.g. number of people with access to drinking water

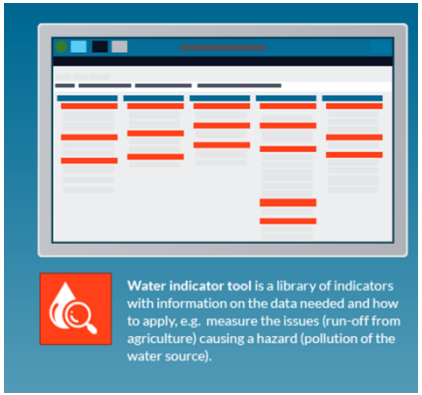
Key activities in 2018

- Portal development
  - Functionality of (water utility) relevant applications completed
  - Final bug fixes
- Training and guidance of how utilities can use key applications
  - Water Indicator
  - Issue analysis
  - Data and information tool
  - Water safety planning
- Guideline for Interpreting Climate Information for Application in Water Safety Planning



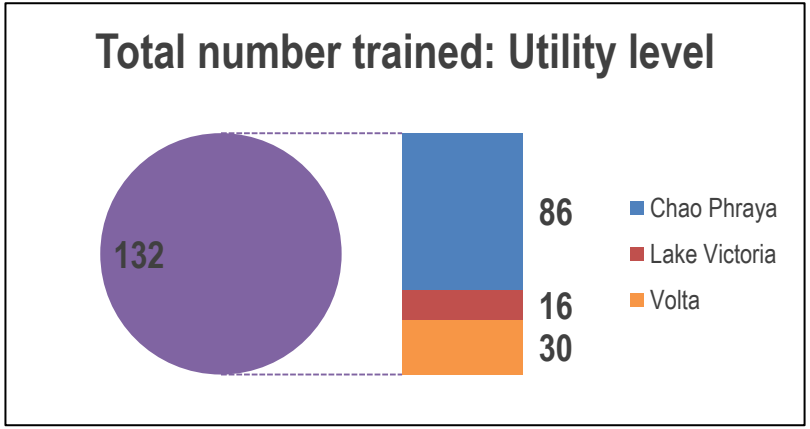






Key activities in 2018

- Capacity building
  - Technical trainings and workshops held
  - Over 130 utility staff trained across pilot basins over 4 years
  - Knowledge portal and development of learning and guidance material
    - Step-by step guides (user manual)
    - Video tutorials
    - Guidance documents
- Integration of project outputs into climate resilient water safety planning approaches (with WHO)



Lessons learned

- Level of flexibility of technical applications (e.g. WSP application)
  - Maintaining a global approach while addressing local contexts
  - Ensuring a flexible system to adapt to different contexts

- Capacity building and engagement
  - Varying degree of capacity and interest among stakeholders
  - Need for tailored approaches to capacity building and engagement – establish multiple approaches
    - Trainings and follow-ups with individual utilities
    - Webinars
    - Learning material (including videos and infographics)

Next steps

		2018										
	Activities	J	F	M	A	M	J	J	A	S	O	N
Component: 3	**Validation and testing at local level**											
Activity 1	Establish working environment for application of methodology with DSS tools in pilot basins											
Activity 2	Apply F&D Components in a DSS to contribute towards utility level planning (e.g. water safety planning) in selected basins											
Activity 3	Recommend policy and strategy for flood and drought in consultation with stakeholders											

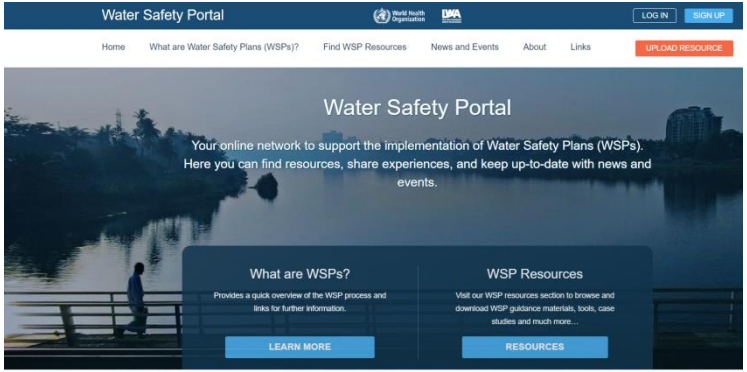
- Finalise learning material
- Continued collaboration with external partners (e.g. WHO) through existing and new projects (OFID project)
- Integration of tools into WSP training, auditing, etc.
- Finalise strategic recommendations report for WSP
- *Follow-up– be able to adjust risk hazard matrix, reporting link, stand-alone tool with more flexibility?*

Spin-off projects: OFID project

- Implementing climate resilient water safety planning to improve water supply and public health
  - Objectives:
    1. Build capacity to enable effective and sustainable WSP implementation
    2. Integrate climate resilience into WSP for better preparedness and response to extreme climatic events
    3. Increase awareness of WSP benefits in securing public health, water security and resilience to extreme events
  - Countries: Burkina Faso, Ghana, Senegal, Kenya, and Ethiopia
  - Partners: Water utilities, *WHO*

WHO partnership (2019-2021)

- Promote and support the development of resources on climate resilient water safety planning
  - Referencing the WSP support application (and Flood and Drought Portal generally)
- Provide technical expertise, and input into WHO resources on climate resilient water and sanitation and support countries capacities to address climate change risks
  - Integrating the use of the Flood and Drought Portal in training packages and contributing with experience from the Flood and Drought Management Tools project to develop and implement climate resilient WSP
- Integrate projects outputs into the Water Safety Portal



Other possibilities?

- **Work with regulators** – as WSP increasing becoming a requirement for water utilities (e.g. EU Drinking Water Directive)
- IWA is home to the **International Water Regulators Forum** (IWRF)
  - One of a kind global network for regulatory authorities and officials with regulatory & supervisory functions related to water and sanitation services (including water quality)

www.flooddroughtmonitor.com

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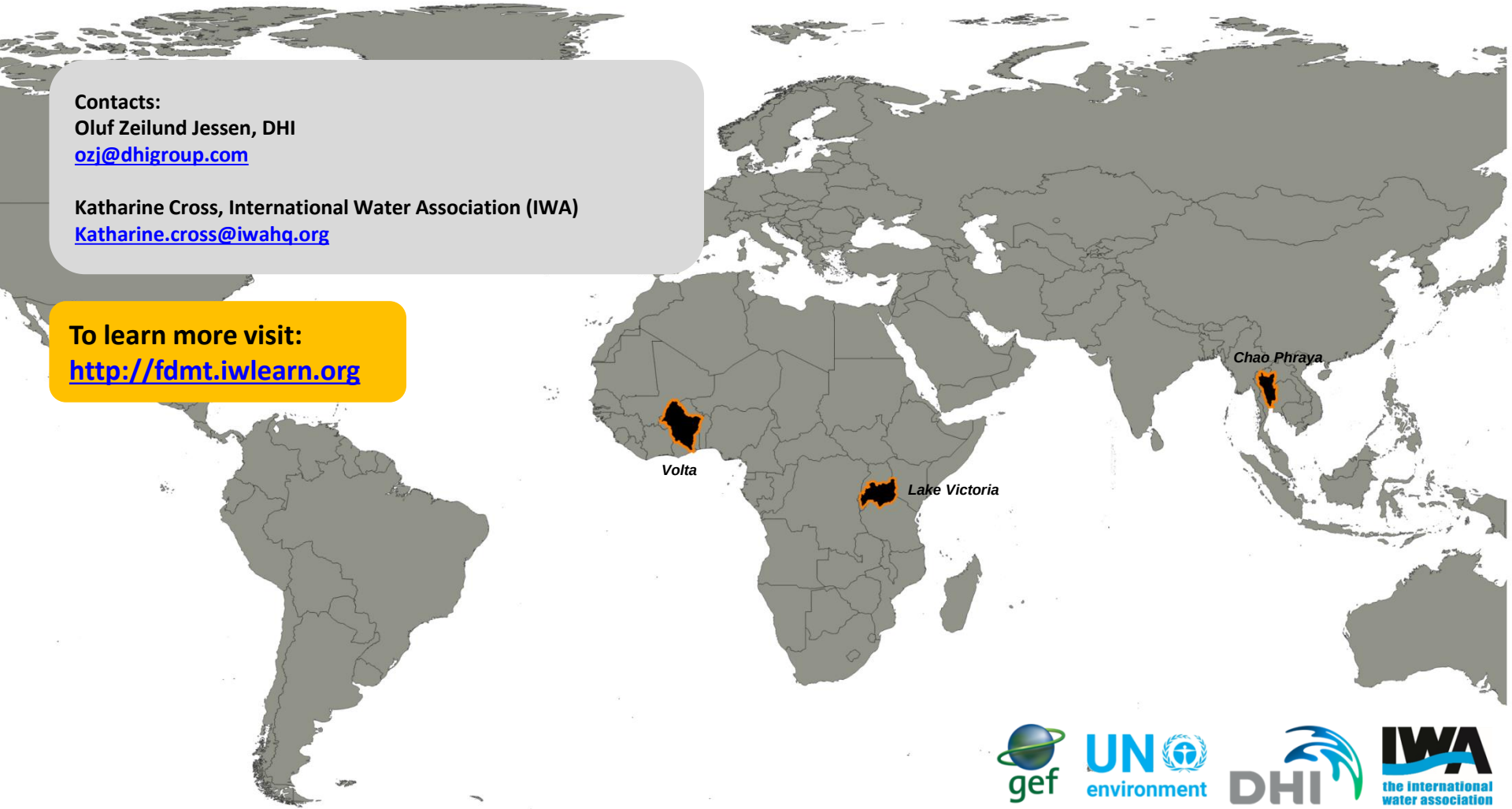
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