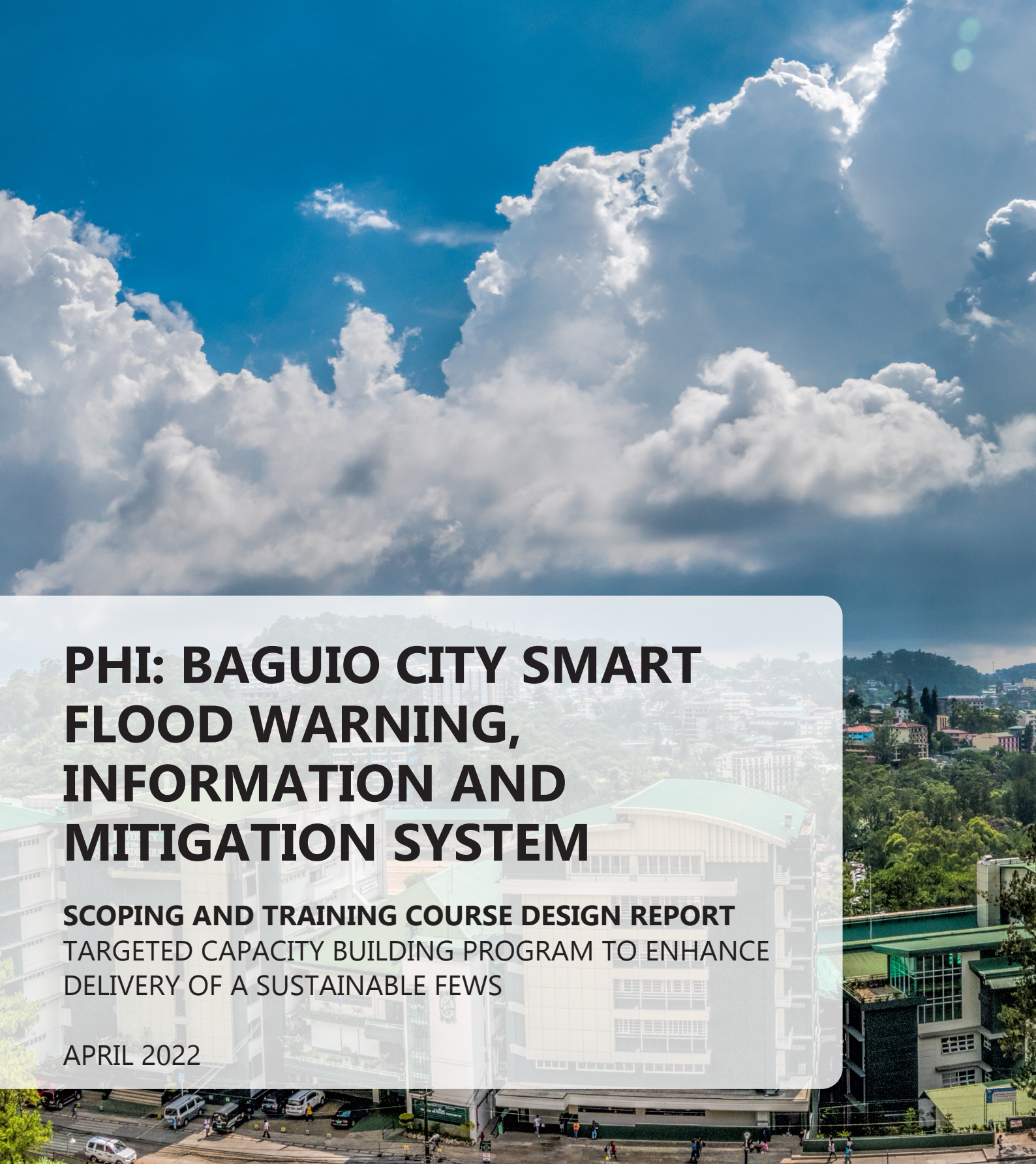

PHI: BAGUIO CITY SMART FLOOD WARNING, INFORMATION AND MITIGATION SYSTEM

SCOPING AND TRAINING COURSE DESIGN REPORT

TARGETED CAPACITY BUILDING PROGRAM TO ENHANCE DELIVERY OF A SUSTAINABLE FEWS

APRIL 2022

ASEAN AUSTRALIA SMART CITIES TRUST FUND
Asian Development Bank

Australian Government
Department of Foreign Affairs and Trade

ADB

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Source: Asian Development Bank

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Source: Adobe Stock

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ABBREVIATIONS

AASCTF	ASEAN Australia Smart Cities Trust Fund
ADB	Asian Development Bank
BSc	Bachelors of Science
DFAT	Department of Foreign Affairs and Trade (Australia)
DG	Decision Gate
FEWS	Flood Early Warning System
IT	Information Technology
LGU	Baguio City Local Government Unit
NAM	North American Mesoscale Forecast System
O&M	Operation and Maintenance
OTJ	On-The-Job
Q&A	Question and Answer
SMS	Short Message Service

1 BACKGROUND AND OBJECTIVE

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1.1 BACKGROUND

In August 2020, the ASEAN Australia Smart Cities Trust Fund (AASCTF) Task Team (led by Ramboll) commenced work on the implementation of the "Baguio City Smart Flood Warning, Information and Mitigation System" pilot project. The development of the Flood Early Warning System (FEWS) under the pilot project is taking place in collaboration with Baguio Local Government Unit (LGU) and other key stakeholders to improve community disaster preparedness, raise awareness, and ensure local ownership. The FEWS is furthermore set to become an integral element within the overall vision of Baguio City to become a truly resilient, dynamic, and smart city.

1.2 TARGETED CAPACITY BUILDING PROGRAM

In an effort to further solidify and enhance program effectiveness and sustainability (beyond the completion of the pilot project in December 2022), an additional component, comprising a year-long "Targeted Capacity Building Program to Enhance Delivery of a Sustainable FEWS" was added, effective from end-December 2021.

The main objective of the targeted capacity building program is to ensure long-term sustainability for the established FEWS by securing the required local capacity for operating and utilising the FEWS as an active risk mitigation instrument beyond the timeframe of the pilot project.

The targeted training and capacity building program will consist of the following key elements:

1. **3-modules training program:** This will be carried out by DHI and supported by Ramboll. It will focus on giving the participants in the training program a general understanding of Flood Early Warning Systems and training in the different types of DHI software used in the FEWS system to be implemented in the "Baguio City Smart Flood Warning, Information and Mitigation System" pilot project. The training program will be carried out as online (self-paced, instructor-led, and expert advice) courses based on the ACADEMY by DHI eLearning platform.
2. **On-the-job (OTJ) training:** This will be carried out by Ramboll and will include all the specific training and support related to the Baguio models and the FEWS system developed by Ramboll in collaboration with the Baguio LGU.

A total of eleven (11) professionals have been selected to participate in the training and capacity building program following nomination from the LGU. Five (5) staff members from LGU have been selected for participation in the program, and they will constitute the "core group", who will have the main responsibility for operation and maintenance of the FEWS. A "peer group" consisting of six (6) persons outside of the LGU has also been selected for the program. The peer group participants come from local public institutions (universities, other public intuitions etc.), and their main role will be to support the core group. Interviews were conducted with the nominated participants to assess their present capacity within relevant fields and establish a baseline capacity to tailor the program content accordingly (cf. Chapter 2).

1.3 OBJECTIVE OF THIS NOTE

The main objective of this report is to provide an overview and an **introduction to the design and scope of the 3-module training program to be led by DHI**. Furthermore, the report provides a summary of the baseline capacity as established through interviews with all nominees.

2 ASSESSMENT OF THE PRESENT CAPACITY OF THE SELECTED PARTICIPANTS

Source: Adobe Stock

2.1 INTERVIEW OF NOMINEES

The nominees for the training were interviewed to get an understanding of their educational and professional backgrounds, as well as skills and experience related to the training modules in order to tailor and adapt the program to the trainees' present capacity. Interviews with all participants were prioritized as these provide an opportunity to get to know the nominees' knowledge and experience, their strengths and availability, as well as personality and communication skills and provides an opportunity for asking follow-up questions to establish a sound understanding of their present skillsets and possible role within the team.

Prior to the interviews all nominees' resumes were reviewed and assessed. The interviews with the nominees took place between Friday 18 February and Thursday 24 February 2022, and were based on a list of pre-defined questions related to educational background, working experience, present role in relation to flood and disaster management, knowledge about hydrology, hydraulics, FEWS, information technology (IT), etc. Furthermore, individual questions were asked to each participant based on their respective resumes.

The interviews were carried out by experts from both Ramboll and DHI. Some general observations were made during the interviews:

1. The core group nominees (LGU staff) are much more aware of the project and the upcoming training and capacity building program activities than the nominees from the peer group, which was also expected.
2. The nominees generally understood questions very well and provided clear and honest answers. They were generally not shy to speak during the interviews. However, we are yet to see how they will respond when they are in a larger group of people.
3. When asked about their availability for the training, they all mentioned that they had been granted permission to commit to the training. Some of the LGU staff further mentioned that their supervisors had expressed the importance of the training to them. The non-LGU staff also expressed interest in the training and a motivation to learn, but it was also obvious that the most senior staff members having managerial roles were busy and may not be able to participate fully.
4. Their English skills are generally good, so language should not become an issue during the training.

2.2 THE EDUCATIONAL BACKGROUND AND PRESENT SKILLS, KNOWLEDGE, AND EXPERIENCE OF THE NOMINEES

Based on the interviews and an assessment of the nominees the following was concluded:

1. **None in the LGU core group have an educational background in hydrology, hydraulics and modelling**, and their knowledge in these areas was found to be generally very limited. They all have a Bachelor of Science (BSc), but none of them has an educational background in water resources. Instead, two have a BSc in nursing, two have a BSc in IT/Computer Science and one has a BSc in Civil engineering. Thus, there is a need to start the training modules at a very basic level. The core group do, however, have substantial experience in local flooding issues, their causes, data availability, etc.
2. Due to the limited knowledge of the core group on the relevant topics, **the training modules need to be supplemented with substantial on-the-job (OTJ) training to equip the nominees with skills to sustainably operate the FEWS, especially for those who will be responsible for the different aspects of the system.** During the OTJ training it is advisable to include the peer group members when feasible to ensure their ability to support the core team longer-term.
3. **There is a good knowledge base and experience within procurement, installation, maintenance and troubleshooting of hardware in the core group as well as in the peer group**, so it is foreseen that this element of the FEWS can be handled well by the nominees.
4. **There is no knowledge of DHI software among the nominees.**
5. Some of the nominees have programming experience, but **none in the core group has experience in Python programming** and the knowledge and experience of Python programming is also limited in the peer group.
6. The Capacity Building Program, including the training modules and OTJ training, will be important for the sustainability of the FEWS project. However, the five (5) members of the core group (LGU staff) have presently very limited experience with most of the key topics, especially hydrology, hydraulics, and modelling. Therefore, it will be a challenge to bring them to a professional level in these topics during the training, enabling them to be fully responsible for the operation and maintenance (O&M) of the FEWS system once the project is completed. Therefore, **the need for a consolidation phase following the project should be assessed,** where the LGU could get some further targeted support and additional training.

3 COURSE DESIGN AND FORMAT OF THE TRAINING PROGRAM

Source: Adobe Stock

3.1 TRAINING MODULES

The program will be based on the ACADEMY by DHI virtual eLearning platform tailored to the specific needs and requirements of the trainees and containing a number of self-paced and instructor-led courses. The program will facilitate progressive learning ensuring that each trainee successfully passes one level before progressing to the next level. Each session contains an evaluation module for the trainee to pass before obtaining a certificate for the specific learning track.

The course is designed around three (3) main modules and ten (10) sub-modules, which each represent a separate course with a number of sessions as described in more details in Chapter 4. The program will cover the topics as illustrated in Figure 3.1.

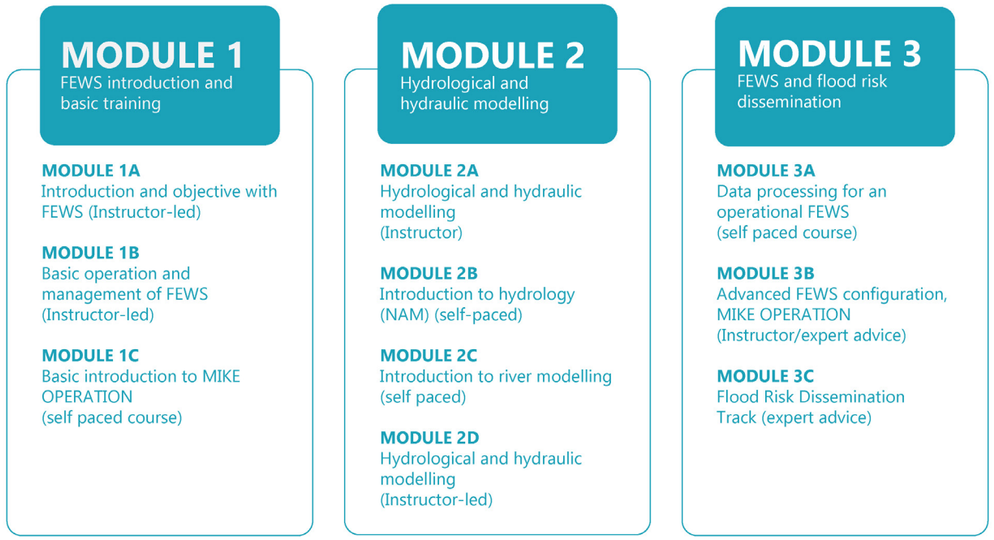

Figure 3.1: Illustration of the structure of the training program with 3 training modules and the underlying 10 sub-modules. Four of the sub-modules are self-paced, while the remaining sub-modules are instructor-led or based on expert advice, which is the case for the two last sub-modules.

3.2 THE ACADEMY BY DHI E-LEARNING PLATFORM

As already mentioned, the training is online and will be based on the ACADEMY by DHI eLearning platform. The eLearning platform is based on efront (https://www.efrontlearning.com/) and will be configured specifically for this assignment. Some key features are:

1. The eLearning platform is hosted in the cloud and accessible from all PC, mobile and tablet devices and is proposed to be hosted and maintained for the coming 3 years with no additional fee (the yearly fee after the 3 years is around 10 USD/person/year).
2. Each trainee will have his/her own log-in, and progress and successes of each trainee can be monitored separately.
3. At a later stage the eLearning platform has the possibility to be extended with additional training sessions.

A few highlights of the proposed eLearning platform:

1. When logging on to the platform the trainee will have an overview of the different modules as illustrated in Figure 3.2.
2. When entering a course, the trainee will have an overview of the different sessions and the activities within a single sub-module. The trainee will have to complete all the activities in order to pass a course. The activities could e.g., consist of: i) learning through a video; ii) reading a text; iii) completing a specific assignment; iv) taking a test; or v) responding to a survey. The user is also provided with a brief description of the course, including expected output, and how they will learn in the sub-module/ training session, as shown in Figure 3.3.

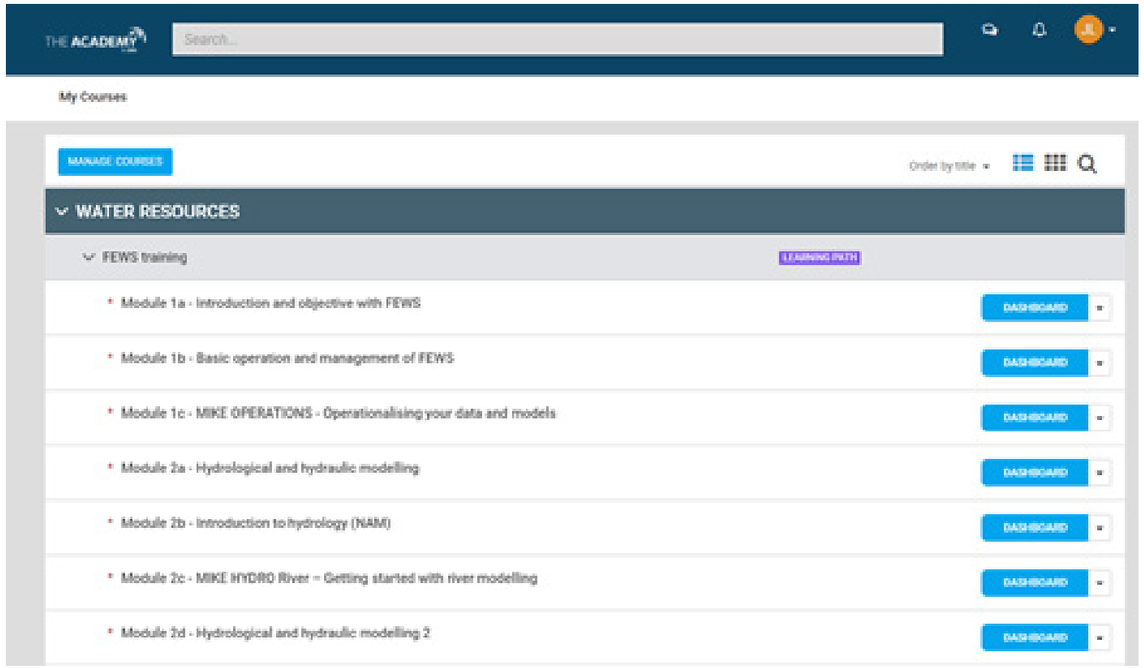

Figure 3.2: When logging in to their account the trainees will get an overview of the available sub-modules. Note: This screen dump is from a work-in-progress of the training course.

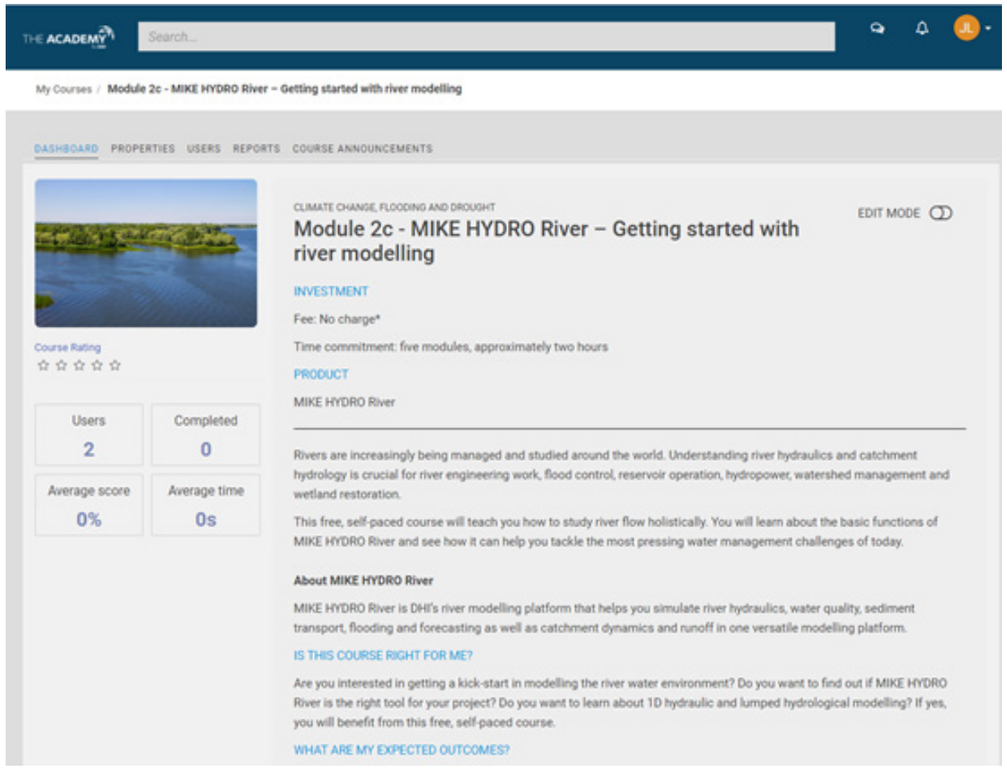

Figure 3.3: Example of an opening page when entering one of the sub-modules in the DHI ACADEMY eLearning platform.

3.3 DECISION GATES

The training program has two Decision Gates. A Decision Gate (DG) is a point in the process, where the criteria related to the specific decision gate need to be met in order to continue and/or modify the training program.

The first decision gate (DG1) is after the completion and assessment of the interviews (see the work plan in Appendix 1). Proceeding to Stage 2 (Module 1+2) requires that commitment to participate in the training is confirmed verbally as well as formally via a commitment letter provided. Thus, at this stage the final number of participants is to be confirmed and their commitment secured before proceeding to Stage 2.

The second decision gate (DG2) is at the end of Stage 2 when training modules 1 and 2 are completed. Proceeding to subsequent training requires that the criteria for DG2 are satisfied. Participation of all trainees is required. Subsequent assessment of individual and collective level of the training, changes to the subsequent training program, trainee line-up and delivery mechanism will be discussed and agreed upon. The evaluation reports to be prepared after modules 1 and 2 will feed into the second decision gate.

4 COURSE CONTENT

Source: Adobe Stock

The Capacity Building Program is based on the ACADEMY by DHI eLearning platform, which will be tailored to the specific needs and requirements of the trainees. The level of the training will reflect the educational background, skills, knowledge, and experience of the nominees as assessed through the resume review and the interviews as described in Chapter 2. As none of the nominees from the core group have an educational background within water resources and they all have no or limited experience in the area of hydrology, hydraulics and modelling, the training will start from a very basic level.

The program will facilitate progressive learning ensuring that each trainee successfully passes one level before progressing to the next level. Each sub-module contains an evaluation module for the trainee to pass before obtaining a certificate for the specific learning track. The evaluations include an assessment of how much the trainees have learned during the sub-module – through a number of quizzes – as well as their evaluation of the course itself. Based on the outcome of the evaluation, the next instructor-led course may be modified/adapted in terms of content and level of training to meet the learning ability and needs of the trainees. However, the already existing self-paced courses will not be modified.

As illustrated in Figure 3.1, the training will consist of 3 main modules: 1) FEWS introduction and basic training, 2) Hydrological and hydraulic modelling, and 3) FEWS and flood risk dissemination. The modules are subdivided into 10 sub-modules in total. Each sub-module, which represents a separate course, is divided into a number of sessions.

Four (4) of the sub-modules will be self-paced and based on existing self-paced courses, apart from module 2b (Introduction to hydrology (NAM)), which will be prepared in relation to this training program. The remaining sub-modules will be instructor-led except the last two sub-modules, which are planned to be "expert advice" sessions, tailored to the needs of the participants. Modules 1 and 2 will be carried out prior to the coming monsoon season, from late March to early June 2022, and Module 3 is planned to be carried out after the monsoon from mid-September to late October 2022. A work plan for the training is attached in Appendix 1.

The training program consists of three types of sub-modules:

1. **Self-paced:** These are pre-prepared courses, which the trainees will go through themselves. The trainees will normally be given a period of two weeks to go through and complete the courses. During each course there will be two 1-hour Q&A sessions where the participants can ask questions to experts.
2. **Instructor-led:** These sub-modules will consist of a number of instructor-led sessions, where the instructor will e.g., give lectures, discuss pre-reading material with the participants, guide the trainees through exercises, and have a dialogue with the trainees and answer questions which they may have. These will also help foster peer-to-peer learning and ensure mentoring.
3. **Expert advice:** In these sub-modules the participants will get an opportunity discuss in more details with the experts on some of the specific questions and need the group may have e.g., in relation to operation and maintenance of MIKE OPERATIONS.

The contents of each of the 3 modules and 10 sub-modules are briefly described in the following sections.

4.1 MODULE 1 - FEWS INTRODUCTION AND BASIC TRAINING

This module is focused on establishing the overview and knowledge of an operational FEWS system. The trainees will obtain a basic understanding of the operation and management of an operational FEWS. It consists of the following learning modules:

- **Module 1a - Introduction and objective with FEWS (Instructor-led)**: Introduction to FEWS and the key objectives of an operational FEWS as well as presentation of operational use cases. (2 sessions of 2 hours)
- **Module 1b - Basic operation and management of FEWS (Instructor-led)**: Provides expertise for operation and management of an operational FEWS. (4 sessions of 2 hours)
- **Module 1c - Basic introduction to MIKE OPERATION (self-paced)**: General introduction and understanding of MIKE OPERATIONS and the most important steps in the configuration and setup of an operational flood forecasting system.

4.1.1 MODULE 1A - INTRODUCTION AND OBJECTIVE OF FEWS (INSTRUCTOR-LED)

This will be the first training course and the objective will be to provide an overall and general knowledge of an FEWS and the key objectives for such a system. There will be a key focus on presentation of successfully implemented FEWS' from different parts of the world and learning points from these systems will be presented and used in the module. This sub-module will also include a dialogue with the trainees about actual flooding problems around Baguio.

The module will consist of 2 sessions each of a duration of 2 hours, and the topic of the sessions will be as follows:

- **Session 1 -** Introduction to flood management and FEWS.
- **Session 2 -** Presentation of operational FEWS use cases.

4.1.2 MODULE 1B - BASIC OPERATION AND MANAGEMENT OF FEWS (INSTRUCTOR-LED)

This module will go more into the details of an operational FEWS and provide experience and knowledge of the different components e.g., data, models, forecasts, and results. The module will also go into the challenges of developing models for operational use. At the end of this module the trainees will have a good understanding of the different components of an FEWS.

The module will consist of 4 sessions, each of a duration of 2 hours, and the topic of the sessions will be as follows:

- **Session 1 -** General introduction to FEWS.
- **Session 2 -** Key components of an FEWS (data, models, forecast and results).
- **Session 3 -** Introduction to MIKE OPERATIONS and its role in an FEWS system.
- **Session 4 -** Operation and management of FEWS.

4.1.3 MODULE 1C - BASIC INTRODUCTION TO MIKE OPERATION (SELF-PACED)

The purpose of this module, self-paced, online course is to give the trainees a general introduction to and understanding of MIKE OPERATIONS and the most important steps in the configuration and setup of an operational flood forecast system.

MIKE OPERATIONS is a software product designed for model-based forecast services and for online operational control of river systems, water collection systems and water distribution systems. MIKE OPERATIONS allows users to build simple real-time systems while offering flexible tools that help users deal quickly and safely with complexities within real-time modelling.

Using MIKE OPERATIONS and MIKE HYDRO River, the course brings trainees through seven modules starting with the acquisition of real-time data and ending with an automated flood forecast system. The course contains the following self-paced sessions:

- **Session 1 -** Introduction
- **Session 2 -** Download and installation of software
- **Session 3 -** MIKE OPERATIONS at a glance
- **Session 4 -** Getting started with MIKE OPERATIONS
- **Session 5 -** Configuration and data management tools
- **Session 6 -** Operationalizing data import of online data
- **Session 7 -** Visualization of data and warning levels

Source: Adobe Stock

4.2 MODULE 2 - HYDROLOGICAL AND HYDRAULIC MODELLING

This module will focus on establishing the capacity needed for maintaining the underlying hydrological and hydraulic models in the established FEWS after the end of the project and contains modules on the following topics:

- **Module 2a - Hydrological and hydraulic modelling (Instructor-led)**: Introduction to hydrological and hydraulic modelling, including the basic concepts for understanding the underlying physics in the water cycle as well as water flow in rivers. (2 sessions of 2 hours)
- **Module 2b - Introduction to hydrological modelling (NAM) (self-paced)**: Set-up and application of the NAM model as the hydrological engine in an operational FEWS.
- **Module 2c - Introduction to river modelling (self-paced)**: Set-up and application of the MIKE HYDRO River model.
- **Module 2d - Hydrological and hydraulic modelling (Instructor-led)**: Compile the learnings of hydrological and hydraulic modelling and ensure that the trainees have gained a basic understanding and expertise in using hydrological models (NAM) and hydraulic models (MIKE HYDRO River) as these are the model types used in the established FEWS. (2 sessions of 2 hours)

4.2.1 MODULE 2A - HYDROLOGICAL AND HYDRAULIC MODELLING (INSTRUCTOR-LED)

This module will introduce hydrological and hydraulic modelling and will go through the basic concepts for understanding the underlying physics in the water cycle as well as the water flow in rivers.

The module will consist of 2 sessions, each of a duration of 2 hours, and the topic of the sessions will be as follows:

- **Session 1 - Hydrological modelling:** Basic understanding and overview
- **Session 2 - Hydraulic modelling:** Basic understanding and overview

4.2.2 MODULE 2B - INTRODUCTION TO HYDROLOGY (NAM) (SELF-PACED)

Hydrological modelling is required to represent the rainfall-runoff processes in catchments and to transform weather forecasts into hydrological forecasts.

DHI's MIKE software portfolio includes various soil-moisture accounting hydrological models, which are generally used in water resources assessments and real-time flood and flow forecasting systems. An example is the NAM model code, which is among the most applied hydrological model codes, providing fast and appropriate hydrological modelling capability. It is frequently used in real-time systems and has proven successful in conditions around the globe in connection with water resources assessments and basin planning.

Such a code must be robust and applicable under various climatic conditions and basin characteristics, and sometimes under sparse data availability. For example, the NAM code is a semi-distributed conceptual model code to simulate hydrographs as a function of the conditions in each of four mutually interrelated storages: 1) Vegetation; 2) Ground Surface; 3) Soil profile zone; and 4) Groundwater aquifers normally representing the basin conditions.

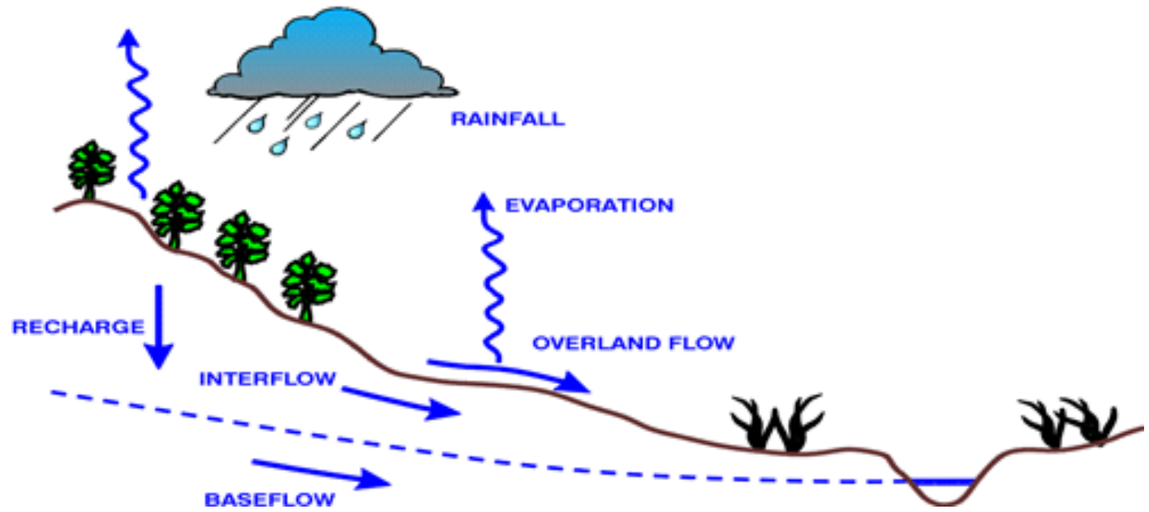

Figure 4.1 Processes in the hydrological cycle.

This self-paced online course will teach the trainees how to use the NAM model as the hydrological engine in an operational FEWS. The course will consist of a number of self-paced sessions which are currently under development and will be presented as they are developed.

4.2.3 MODULE 2C - INTRODUCTION TO RIVER MODELLING (SELF-PACED)

Rivers are increasingly being managed and studied around the world. Understanding river hydraulics and catchment hydrology is crucial for river engineering work, flood control, reservoir operation, hydropower, watershed management and wetland restoration.

This self-paced course will teach trainees how to study river flow holistically. The trainees will learn about the basic functions of MIKE HYDRO River and see how it can aid to tackle the most pressing water management challenges of today. MIKE HYDRO River is DHI's river modelling platform that allows users to simulate river hydraulics, water quality, sediment transport, flooding and forecasting as well as catchment dynamics and runoff in one versatile modelling platform.

Upon completion of the course, trainees will be able to set up and run their very first model in MIKE HYDRO River and will be on their way to becoming a river modeller. The course contains the following self-paced sessions:

- **Session 1 - First steps:** Creating a new project, understanding the user interface, and working with background layers.
- **Session 2 - Hydrodynamic:** Creating river branches, importing cross sections, setting up weirs and defining boundary conditions and sources.
- **Session 3 - Hydrology:** Creating catchments, configuring rainfall-runoff models, and coupling to the hydraulic model.
- **Session 4 - Model execution:** Configuring outputs, going through the model validation, defining computational control parameters, and running the model.
- **Session 5 - Results:** Investigating the results and understanding the log files.

4.2.4 MODULE 2D - HYDROLOGICAL AND HYDRAULIC MODELLING (INSTRUCTOR-LED)

This module will compile the learning on hydrological and hydraulic modelling and ensure that the participants have gained a basic understanding and expertise in using hydrological models (NAM) and hydraulic models (MIKE HYDRO River) as these are the model types used in the established FEWS.

The module will consist of 2 sessions, each of a duration of 2 hours, and the topic of the sessions will be as follows:

- **Session 1 -** Key requirements for hydrological and hydraulic modelling.
- **Session 2 -** Expert advice for maintenance and operation of hydrological and hydraulic models in an operational FEWS.

The two sessions will end with a small test which needs to be successfully passed in order for the participants to pass the module.

4.3 MODULE 3 - FEWS AND FLOOD RISK DISSEMINATION

This module will focus on establishing the capacity needed for maintaining and supporting the established FEWS after the end of the project and contains modules on the following topics:

- **Module 3a -** Data processing for an operational FEWS (self-paced): Focus will be on how to process data for the FEWS system in case the participants need to update or edit some of the data in the established system.
- **Module 3b -** Advanced FEWS configuration, MIKE OPERATIONS (expert advice): Focus will be on specific learning skills or gaps required for operating the MIKE OPERATIONS system which is the backbone of the established FEWS. (3 sessions of 2 hours)
- **Module 3c -** Flood Risk Dissemination Track (expert advice): Focus will be on how to interpret the results from the FEWS and convert the results into flood warnings and actions. (3 sessions of 2 hours)

4.3.1 MODULE 3A – DATA PROCESSING FOR AN OPERATIONAL FEWS (SELF-PACED)

The MIKE suite of models are powerful tools for understanding and solving many water challenges. To make them work, data is needed. Available and project level data, however, may be compiled in many different formats.

In this course, the trainees will review the data types used by MIKE models and learn how to format the data to be ready to use for modelling. The module will cover types of data, unit systems and file formats. In addition, the module will discuss tools built into the MIKE software for importing and transforming data to be model-ready.

Upon completion of the course, trainees will be able to format time series data in a form that MIKE recognises and select appropriate time series attributes such as time type, value type, item type, and item-unit.

Trainees will further be able to import time series data into MIKE native formats and understand the basics of spatial data, projection, and coordinate systems. Finally, trainees will be able to convert spatial data into a form understandable by MIKE and import converted spatial data into MIKE grid (dfs2) files.

The course contains the following self-paced sessions:

- **Session 1 -** Data Types: Time Series
- **Session 2 -** Data Types: Spatial Data

4.3.2 MODULE 3B – ADVANCED FEWS CONFIGURATION, MIKE OPERATIONS (INSTRUCTOR-LED/EXPERT ADVICE)

MIKE OPERATIONS is a software product designed for model-based forecast services and for online operational control of river systems, water collection systems and water distribution systems. MIKE OPERATIONS allows users to build simple real-time systems while offering flexible tools that allows users to deal quickly and safely with complexities within real-time modelling.

MIKE OPERATIONS is a unique combination of a standardised out-of-the-box software product and an extremely flexible and open software framework. This means that users can get their system up and running safely and quickly while reserving the option to enhance their MIKE OPERATIONS configuration as needs evolve.

This module will be designed based on the learning experience from Module 1 and 2 and will focus on strengthening the capacity of the trainees in using MIKE OPERATIONS. The course will contain Q&A sessions targeting specific needs for using the MIKE OPERATIONS software and will enable expert advice from the experts to the participants.

4.3.3 MODULE 3C - FLOOD RISK DISSEMINATION TRACK (EXPERT ADVICE)

The established FEWS will be able to predict water levels and subsequent areas likely to be impacted by flood events. This module will provide guidance and advice from experts having worked on numerous successfully established FEWS in Asia, Europe and Africa providing advice on how to interpret the model results and convert it into flood warnings and actions.

The module will be developed in close alignment with the activities in the Data Dissemination and Outreach Plan under development for Baguio as part of the “Baguio City Smart Flood Warning, Information and Mitigation System” pilot project. The module will consist of a number of online sessions where the specific content will depend on the actual needs and requirements of the participants. Examples of areas most likely to be covered in the module include how to:

- Understand the flood warnings from the FEWS;
- Submit warnings using SMS or online messaging applications;
- Configure web dashboards to be shared with stakeholders or the public;
- Extract results and convert them into reports or bulletins; and
- Make the linkage between flood warnings from the FEWS and flood actions.

APPENDIX 1

DETAILED WORK PLAN FOR TARGETED CAPACITY BUILDING PROGRAM

TA-9554 REG: SOUTHEAST ASIA URBAN SERVICES FACILITY
PHI: Baguio LGU Targeted Capacity Building Programme to Enhance Delivery of a Sustainable FEWS
ATTACHMENT 1: WORK PLAN

STAGE 1 - TRAINING PREPARATION AND TRAINING MODULE DESIGN
STAGE 2 - TRAINING PROGRAMME IMPLEMENTATION
STAGE 3 - EXTENDED SUPPORT

middle range

TIME COMMITTMENT OF LGU TRAINEES
1-2 HRS/WK (misc. - evaluations, comms, etc.)
4-6 HRS/WK (self-study)
20-30-20 HRS/WK (instructor-led courses)
20-30 HRS/WK (OTJ training - pre-/during Monsoon)
4-6 HRS/WK (OTJ training - post-Monsoon)

middle range

TIME COMMITTMENT OF NON-LGU TRAINEES
1-2 HRS/WK (misc. - evaluations, comms, etc.)
2-4 HRS/WK (self-study courses)
16-20 HRS/WK (instructor-led courses)
8-16 HRS/WK (OTJ training - pre-/during Monsoon)
2-4 HRS/WK (OTJ training - post-Monsoon)

		week start date	Month 1					Month 2					Month 3				Month 4					Month 5				Month 6				Month 7				Month 8				Month 9				Month 10				Month 11				Month 12			
			03/Jan	10/Jan	17/Jan	24/Jan	31/Jan	07/Feb	14/Feb	21/Feb	28/Feb	07/Mar	14/Mar	21/Mar	28/Mar	04/Apr	11/Apr	18/Apr	25/Apr	02/May	09/May	16/May	23/May	30/May	06/Jun	13/Jun	20/Jun	27/Jun	04/Jul	11/Jul	18/Jul	25/Jul	01/Aug	08/Aug	15/Aug	22/Aug	29/Aug	05/Sep	12/Sep	19/Sep	26/Sep	03/Oct	10/Oct	17/Oct	24/Oct	31/Oct	07/Nov	14/Nov	21/Nov	28/Nov	05/Dec	12/Dec	19/Dec	26/Dec	02/Jan
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
1	**STAGE 1 - TRAINING PREPARATION AND TRAINING MODULE DESIGN**																																																					
1.1	**Mobilisation**																																																				
1.2	**Initial Stakeholder Consultations**																																																			
1.2.1	Discussions with stakeholders to assess requirements for training																																																			
1.2.2	Confirm selection of 3-5 no. non-LGU participants in the training programme																																																			
W1	**Workshop 1 (W1)** - Kick-off meeting/scoping workshop																																																			
1.3	**Pre-Training Survey**																																																			
1.3.1	Interviews with paticipants to assess level/requirements																																																			
1.3.2	Course design and preparation																																																			
1.3.3	Setting-out evaluation criteria for training																																																			
1.3.4	Pre-training (skills baseline) survey [Note: survey of existing knowledge, expectation and interest prior to commencement.]																																																			
D1b	**Scoping and Training Course Design Report (D1b)** [Note: 5-10 pages in length.]																																																			
DG1	**Decision Gate 1: Participant/Entity Committment secured** [Note: Proceeding to Stage 2 requires that the criteria for DG1 is satisfied. Participation of all key stakeholders and trainees in a workshop setting is required, whereby committment is confirmed verbally as well as formally via signed Minutes of Meeting and/or signed committment letters submitted subsequent to the workshop. Final participant number/nomination is to be confirmed at this stage. GO/NO GO to proceed from ADB (in writing) is required at this stage.]																																																			
2	**STAGE 2 - TRAINING PROGRAMME IMPLEMENTATION**																																																			
	MODULE 1 - FEWS introduction and basic training																																																		
2.1	**Module 1a - Introduction and objective with FEWS (Instructor-led)**																																																			
2.1.1	Preparation of "Introduction and objective with FEWS"																																																		
2.1.2	Implementation																																																		
2.1.3	Quizzes and evaluation																																																		
2.2	**Module 1b - Basic operation and management of FEWS (Instructor-led)**																																																			
2.2.1	Preparation of "Basic operation and management of FEWS"																																																		
2.2.2	Implementation																																																		
2.3.3	Quizzes and evaluation																																																		
2.3	**Module 1c - Basic introduction to MIKE OPERATION (self-paced course)**																																																			
2.2.1	Preparation of "Basic introduction to MIKE OPERATION"																																																		
2.2.2	Implementation																																																		
2.3.3	Quizzes and evaluation																																																		
W2	**Module 1 Feedback Workshop (W2)**																																																			
D3B	**Module 1 (Basic FEWS) Course Evaluation Report (D3b)** [Note: 5-10 pages in length.]																																																			
	MODULE 2 - Hydrological and hydraulic modelling																																																		
2.4	**Module 2a - Hydrological and hydraulic modelling (Instructor-led)**																																																			
2.4.1	Preparation of "Hydrological and hydraulic modelling "																																																		
2.4.2	Implementation																																																		
2.4.3	Quizzes and evaluation																																																		
2.5	**Module 2b - Introduction to hydrology (NAM) (self-paced)**																																																		
2.5.1	Preparation of "Introduction to hydrology (NAM)"																																																		
2.5.2	Implementation																																																		
2.5.3	Quizzes and evaluation																																																		
2.6	**Module 2c - Introduction to river modelling (self-paced)**																																																		
2.6.1	Preparation of "Introduction to river modelling"																																																		
2.6.2	Implementation																																																		
2.6.3	Quizzes and evaluation																																																		
2.7	**Module 2d - Hydrological and hydraulic modelling (Instructor-led)**																																																		
2.7.1	Preparation of "Hydrological and hydraulic modelling"																																																		
2.7.2	Implementation																																																		
2.7.3	Quizzes and evaluation																																																		
W3	**Module 2 Feedback Workshop (W3)**																																																		
D3C	**Module 2 (Hydrological and hydraulic modelling) Course Evaluation Report (D3c)** [Note: 5-10 pages in length.]																																																		
DG2	**Decision Gate 2: Midway Training Programme Effectiveness Assessment** [Note: Proceeding to subsequent activities/trainings requires that the criteria for DG2 is satisfied. Participation of all key stakeholders and trainees in a workshop setting is required. Following assessment of individual and collective level assessment of trainings, changes to the subsequent programme, trainee line-up and delivery mechanism will be discussed, deliberated and agreed. Minutes of Meeting will be prepared and signed by all key parties subsequent to the workshop. GO/NO GO to proceed from ADB (in writing) is required at this stage.]																																																		
	MODULE 3 - FEWS and flood risk dissemination																																																		
2.8	**Module 3a - Data processing for an operational FEWS (self-paced)**																																																			
2.8.1	Preparation of data processing self-paced course																																																		
2.8.2	Implementation																																																		
2.8.3	Quizzes and evaluation																																																		
2.9	**Module 3b - FEWS and advanced introduction to MIKE OPERATION (expert advice)**																																																		
2.9.1	Advanced MIKE OPERATION instructor-led course																																																	
2.9.2	Implementation																																																	
2.9.3	Quizzes and evaluation																																																	
2.10	**Module 3c - Flood Risk Dissemination**																																																	
2.10.1	Preparation - Flood risk dissemination from FEWS (expert advice)																																																	
2.10.2	Implementation																																																	
2.10.3	Quizzes and evaluation																																																	
W4	**Module 3 Feedback Workshop (W4)**																																																	
D3D	**Module 3 (FEWS and flood risk dissemination) Course Evaluation Report (D3d)**																																																	
2.11	**End-of-Training Evaluation**																																																	
2.11.1	Post-training evaluation survey																																																	
D6B	**End-of-Training Evaluation Report (D6b)**																																																	
3	**STAGE 3 - EXTENDED SUPPORT**																																																	
3.1	**Longer-term Support & Evaluation**																																																	
3.1.1	Adhoc expert advice to LGU/trainees over MS Teams or by email																																																		
3.1.2	Assessment of end-of-project capacities and determination of longer-term external support																																																	
3.1.3	Draft Memo: Recommendations on long-term external support needs to address identified end-of-project remaining capacity gaps																																																	

Stage
Main Activity
Sub-Activity

Workshop/Meeting
Draft Deliverable
Final Deliverable (delivered within 2 weeks of receipt of consolidated comments)
GO/NO GO Decision Gate

ABOUT THE ASEAN AUSTRALIA SMART CITIES TRUST FUND

The ASEAN Australia Smart Cities Trust Fund (AASCTF) assists ASEAN cities in enhancing their planning systems, service delivery, and financial management by developing and testing appropriate digital urban solutions and systems. By working with cities, AASCTF facilitates their transformation to become more livable, resilient, and inclusive, while in the process identifying scalable best and next practices to be replicated across cities in Asia and the Pacific.

ASEAN AUSTRALIA SMART CITIES TRUST FUND
Asian Development Bank

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ADB