

FLASH FLOOD GUIDANCE SYSTEM HYDROMETEOROLOGIST TRAINING PROGRAM

Dr Rochelle Graham – Climate Scientist

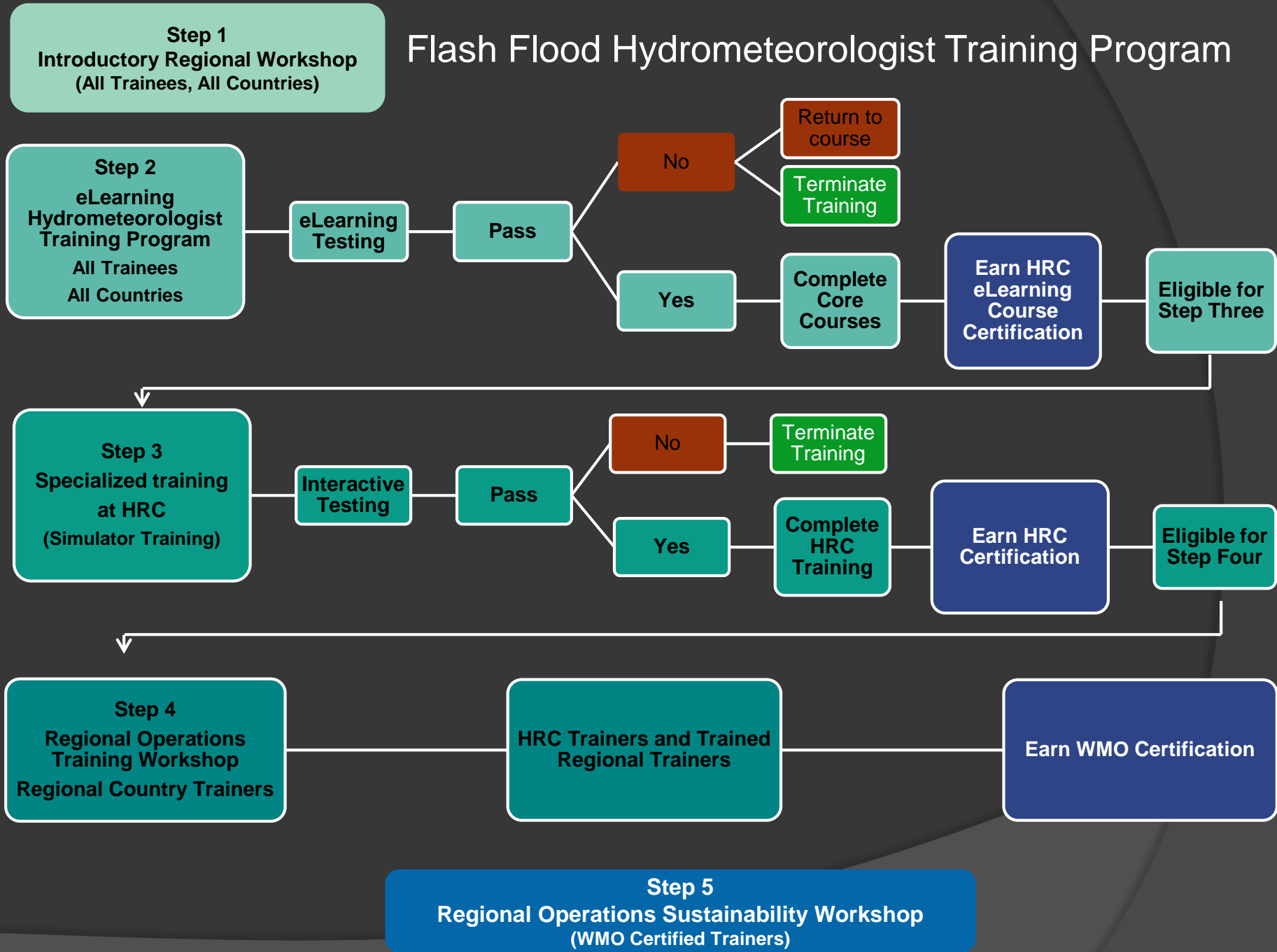
Haiti-Dominican Republic Flash Flood
Initial Planning Meeting

September 7th to 9th , 2016

Hydrologic Research Center
<http://www.hrcwater.org>



Flash Flood Hydrometeorologist Training Program



Flash Flood Hydrometeorologist Training Program

Step Zero Initial Planning Meeting

- ❑ Country commitment to Regional Flash Flood Guidance System
- ❑ Introduction to the Regional Flash Flood Guidance System
- ❑ Discussion of data requirements for development of flash flood guidance system
- ❑ Discussion of roles Hydrology and Meteorology Departments in development and implementation of FFG System.



Flash Flood Hydrometeorologist Training Program

Step 1
Introductory Regional Workshop
(All Trainees, All Countries)

Step 2
eLearning Hydrometeorologist Training Program
All Trainees
All Countries

eLearning Testing

Pass

No

Return to course

Terminate Training

Yes

Complete Core Courses

Earn HRC eLearning Course Certification

Eligible for Step Three

Step 3
Specialized training at HRC
(Simulator Training)

Interactive Testing

Pass

No

Terminate Training

Yes

Complete HRC Training

Earn HRC Certification

Eligible for Step Four

Step 4
Regional Operations Training Workshop
Regional Country Trainers

HRC Trainers and Trained Regional Trainers

Earn WMO Certification

Step 5
Regional Operations Sustainability Workshop
(WMO Certified Trainers)

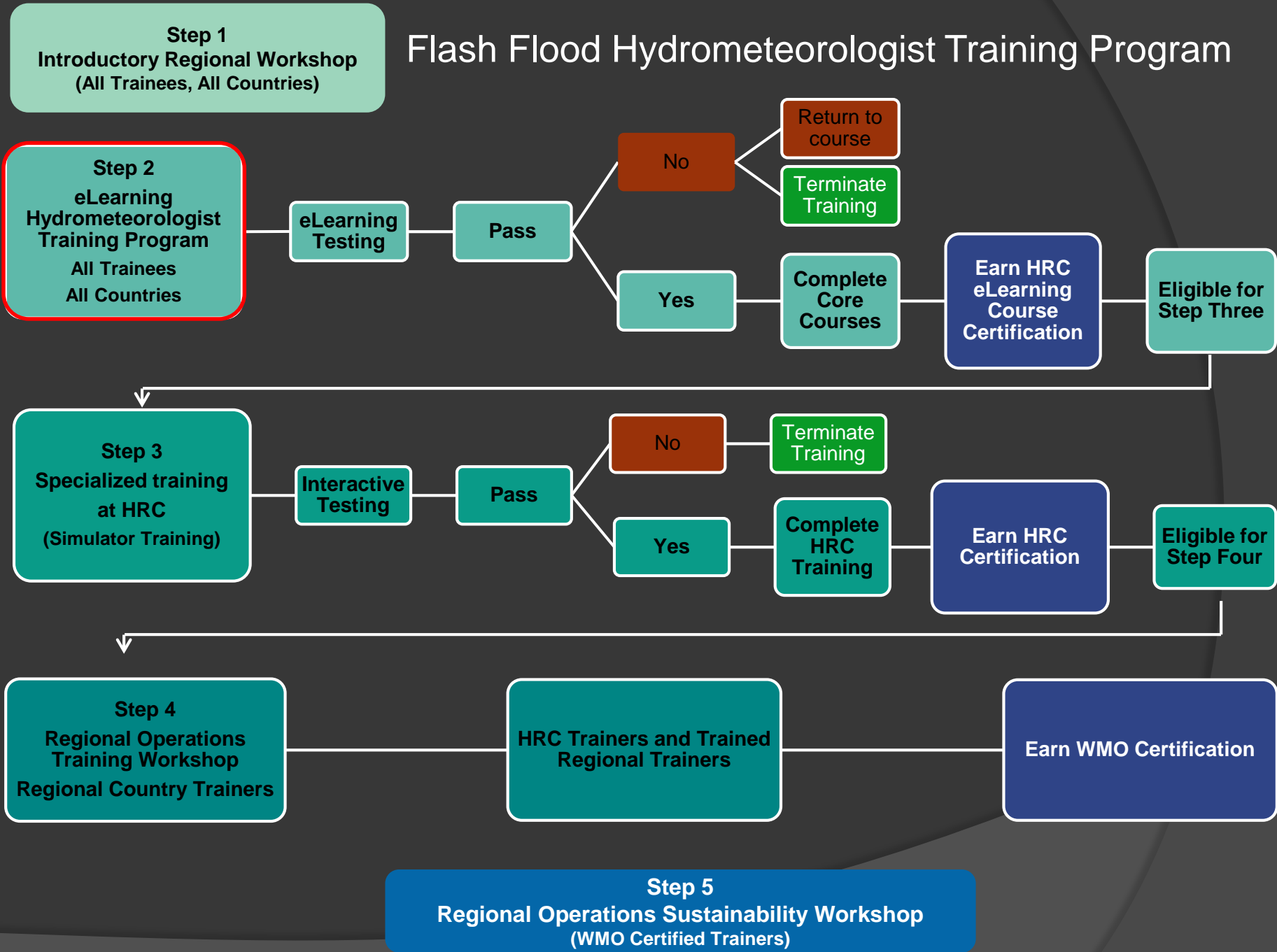
Flash Flood Hydrometeorologist Training Program

Step one Introductory Regional In-Country Workshops Done during implementation

- ❑ Re-introduction to the Regional Flash Flood Guidance System
- ❑ Introduction to models used and products produced in the FFG system.
- ❑ Discussion of data requirements still needed and verification of data



Flash Flood Hydrometeorologist Training Program



Flash Flood Hydrometeorologist Training Program

Step two eLearning Hydrometeorologist Training Program

eLearning program to support system operations, product interpretation, system validation, including the use, management, and interpretation of output from the system, and the development of protocols to alert response agencies and the public of an impending or existing threat;

Five courses:

- ❑ Elements of Meteorology
- ❑ Elements of Hydrology
- ❑ Geographical Information Systems (GIS)
- ❑ Remote Sensing
- ❑ Flash Flood Guidance System products

Flash Flood Hydrometeorologist Training (FFHT) Program

HYDROLOGIC RESEARCH CENTER

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Eight courses

Elements of Meteorology,
Elements of Hydrology,
Hydrometeorological Statistics,
Fluvial geomorphology,
GIS basics,
Flash Flood Guidance Model Products,
Remote sensing and
Early warning systems.

VIEW COURSES

Filter Courses

MEKONG RIVER COMMISSION MODULE

Forum

+ Add

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Courses	Course Material	Examination	Actions
Mekong River Commission Flash Flood Guidance Products Module	Add View	Add	

ELEMENTS OF METEOROLOGY

Forum

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FLASH FLOOD GUIDANCE PRODUCTS

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FORUM TEST

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ELEMENTS OF HYDROLOGY

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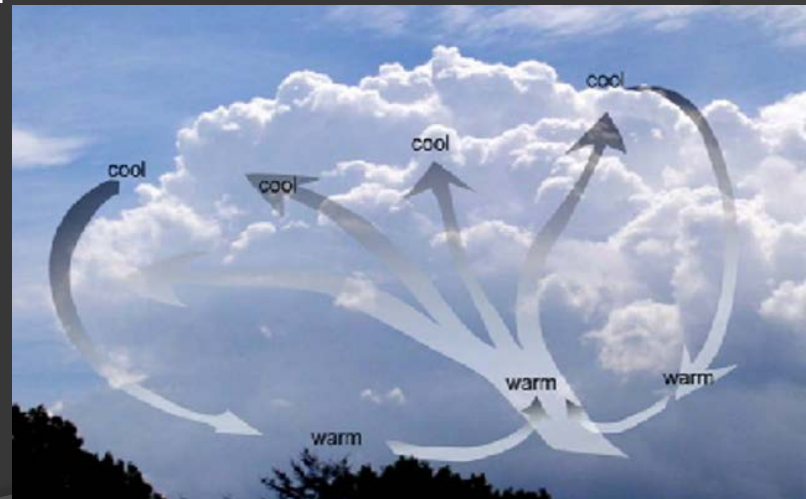
Flash Flood Hydrometeorologist Training Program

Step two eLearning Hydrometeorologist Training Program

Elements of Meteorology

Flash floods are events that are the result of heavy or excessive amounts of rainfall within a short period of time, usually less than 6 hours, causing water to rise and fall quite rapidly.

1. Factors necessary to produce heavy rainfall
2. Elements necessary for deep moist convection.
3. Characteristics of flash flood producing storms.
4. Examples of flash flood producing storms.
5. Meteorological processes that contribute to flash floods.



Flash Flood Hydrometeorologist Training Program

Step two eLearning Hydrometeorologist Training Program

Elements of Hydrology

Fundamental components of the hydrologic cycle, rainfall-runoff processes, evaporation, infiltration and groundwater flow, water budgets, introduction to surface and sub-surface hydrology, and flash flood modelling using simulation and spatial analysis tools.

1. Water cycle
2. Surface hydrology
3. Sub-surface hydrology
4. Flash floods – unique properties



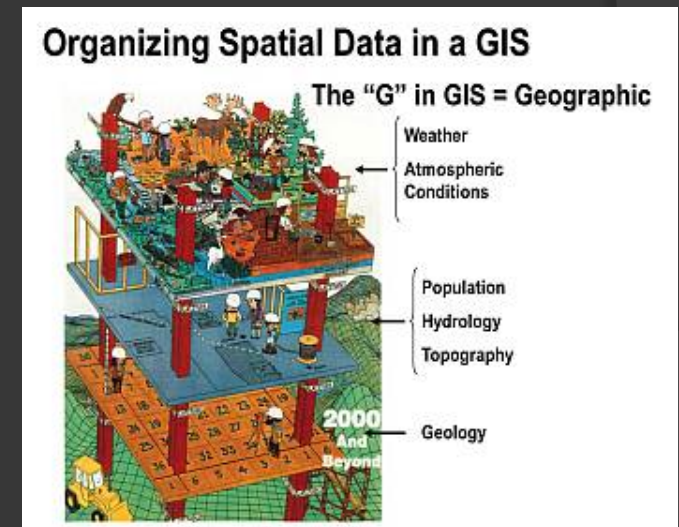
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Geographical Information Systems (GIS)

An introduction to GIS with a focus on the science applications of GIS systems, how data is generated, and how to use different software tools to map and analyze GIS data.

1. Description of GIS – introduction of concepts and application using Arcview/QGIS
2. Applied use of GIS – as related to flash flood
3. Manipulation of data for new or modifications of flash flood forecasting using GIS
4. Types of analysis available using GIS
5. Practical exercise



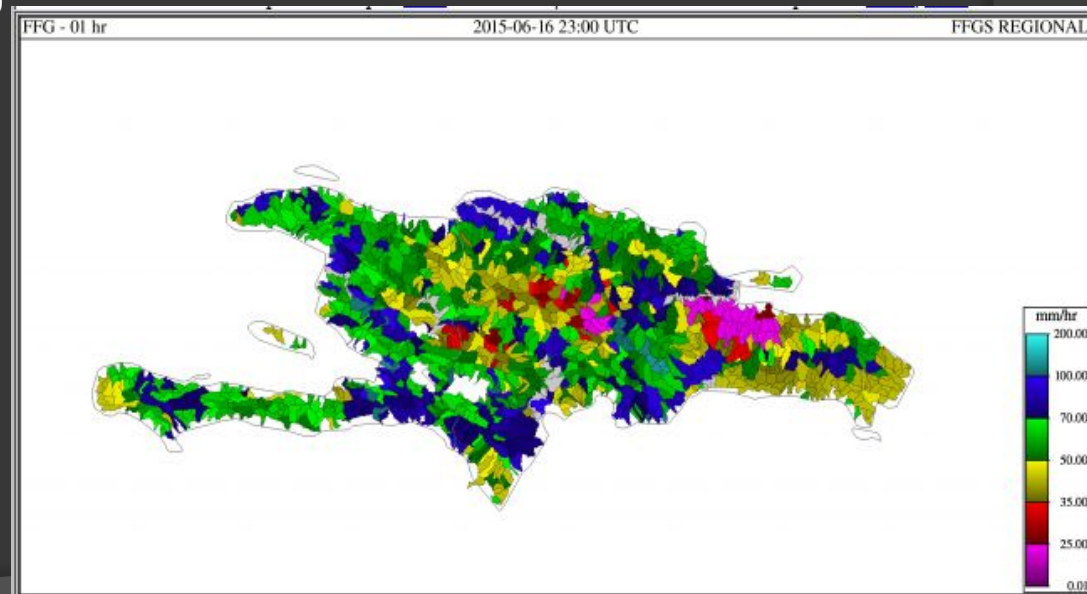
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Step two eLearning Hydrometeorologist Training Program

Flash Flood Guidance System products

An overview of the application of flash flood guidance model products.

1. Description of flash flood guidance system - introduction of concepts and application
2. Types of analysis available using flash flood guidance model
3. Practical exercise using flash flood guidance model



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FORUM TEST

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ELEMENTS OF HYDROLOGY

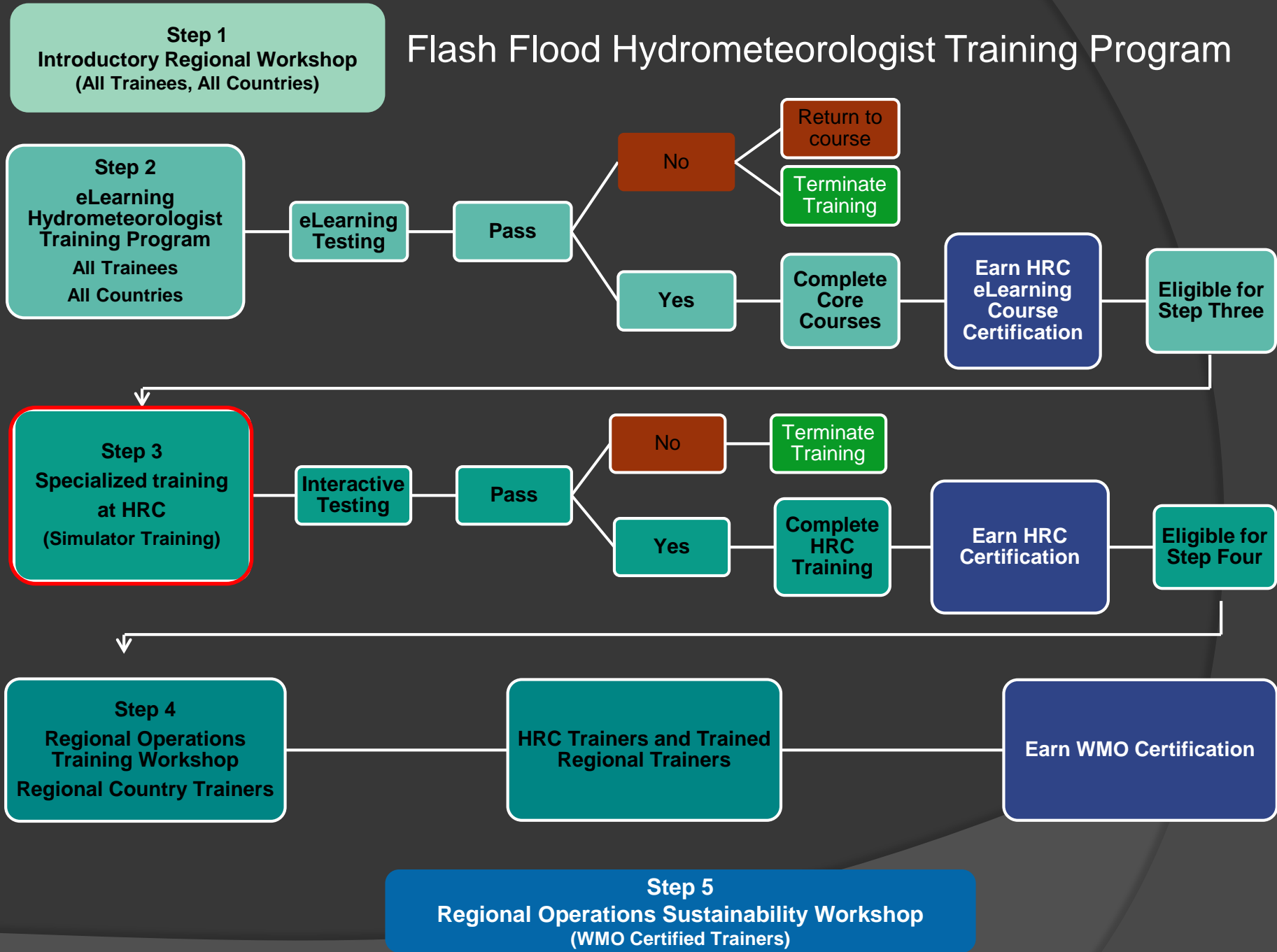
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Flash Flood Hydrometeorologist Training Program



Flash Flood Hydrometeorologist Training Program

Step three Specialized training at Hydrologic Research Center

Advanced Operations and Interactive Simulator Training at the Hydrologic Research Center focused on in-depth understand of System and operational application.



Interactive Simulator

Objective: To permit forecaster to run 'What if' experiments with respect to inputs and parameters.



- Utilizes historical events drawn from existing operational systems
- Assumes synoptic analysis had been performed (synoptic descriptions of events provided).
- Allows forecaster to make changes in input and/or parameters and gain understanding of the impacts of changes on FFG simulation and products, and *the impact on their decisions to issue flash flood warnings.*

GFFGS-SIM INTERFACE

- (a) Event Selection
 - event number
 - conditions
 - activate

(1) EVENT PARAMETER SELECTION

Product navigation date is now set to the event Begin Date.

GFFGS-SIM - Global Flash Flood Guidance System Simulator

Return to Product Console

Select Simulation Event Parameters:

Event Number: 1

Soil Type	Initial Conditions	Antecedent Precip	Event Precip	Forecast Precip
<input checked="" type="radio"/> Nominal	<input type="radio"/> +30%	<input type="radio"/> +30%	<input type="radio"/> +30%	<input type="radio"/> +30%
<input type="radio"/> Sandy	<input checked="" type="radio"/> Nominal	<input checked="" type="radio"/> Nominal	<input checked="" type="radio"/> Nominal	<input checked="" type="radio"/> Nominal
<input type="radio"/> Clay	<input type="radio"/> -30%	<input type="radio"/> -30%	<input type="radio"/> -30%	<input type="radio"/> -30%

Activate New Parameter Selections

(b) Preview & Animation

Event Product Preview

Open Preview Animation (Pop-Up Window)

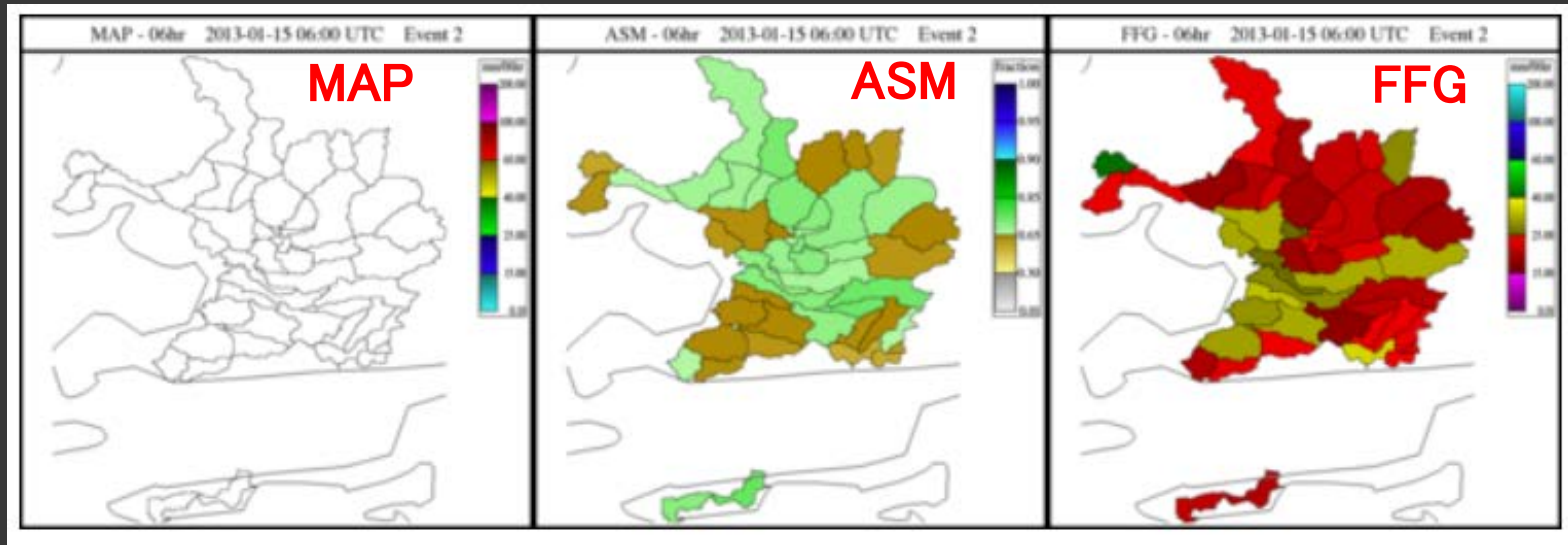
(c) Event dates

Currently Selected Simulation Event Parameters:

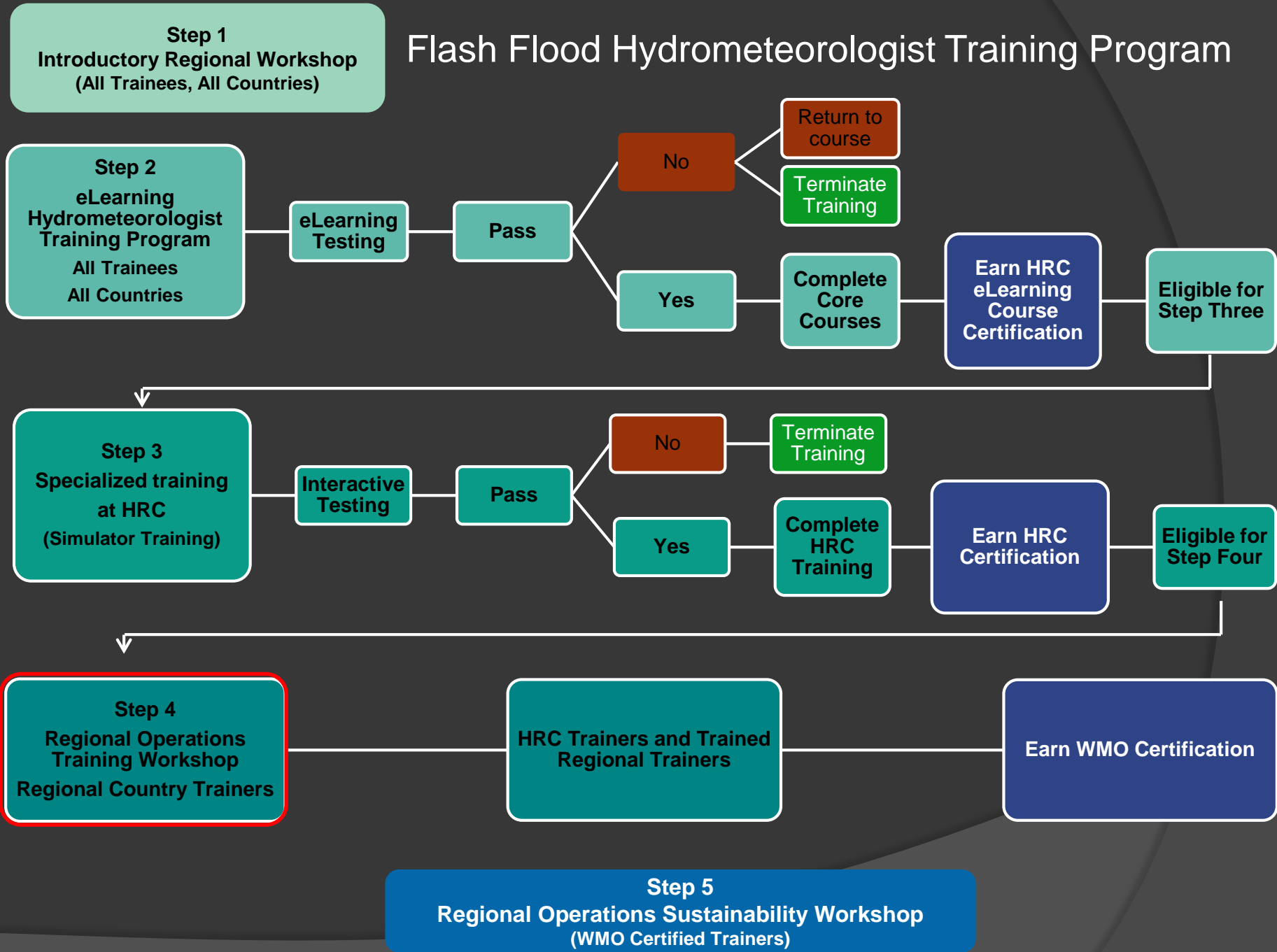
Event #	Soil Type	Initial Condition	Antecedent Precip	Event Precip	Forecast Precip	Begin Date	End Date	Event Code
1	Nominal	Nominal	Nominal	Nominal	Nominal	2013-01-08 00:00 UTC	2013-01-13 18:00 UTC	E001-stnom-icr00-pan00-pen00-pfir00

Simulator Example

Simulator provides animations of time series of select FFG products over course of selected events.



Flash Flood Hydrometeorologist Training Program



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Step four Regional Operations Training Workshop

HRC trainers in combination with Trained Regional - Trainers provide an in-country workshop at regional centers.

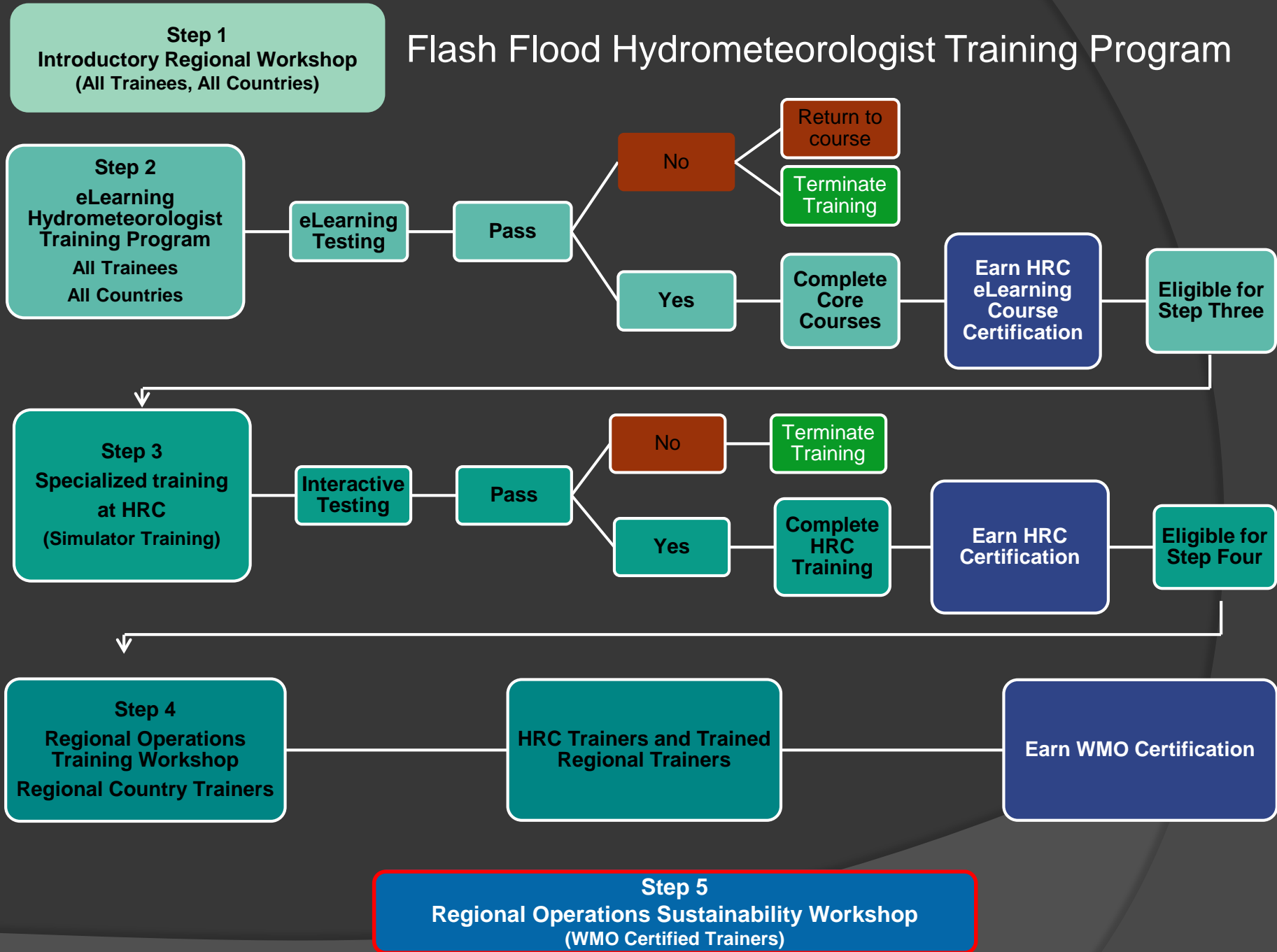
Three-day workshop covers:

(a) a brief discussion of the technical background and system development and,

(b) the operational use of the FFG System products through “hand-on” case studies; participants review and evaluate the FFG system products for selected events.



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Step five Regional Operations Sustainability Workshop

Step 5 workshops are led by WMO certified trainers, and act as refresher training in operational use, data requirements (an overview), system verification and user validation.

Three-day workshop covers:

- (a) a brief discussion of the technical background and system development and,
- (b) the operational use of the FFG System products through “hand-on” case studies, where workshop participants reviewed and evaluated the FFG system products for selected events.

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ISSUE 3 | VOLUME 4 | 2014

Hydrologic Research Center
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Flash Flood Guidance Gazette

Flash Flood Guidance (FFG) Gazette, a bi-annual newsletter bringing users of FFG products all the latest news – operational information, technical advances, case studies and a new e-learning environment for the flash flood community.

Special Issue: Disaster Risk Reduction

The International Day for Disaster Reduction (13th October, 2014) is a day to celebrate how people and communities are reducing their risk to disasters and raising awareness about the importance of Disaster Risk Reduction (DRR). For flash floods and floods community experience can provide the local knowledge and gender perspectives necessary for successful flash flood risk management strategies. Through DRR education it can also provide an understanding of the types, causes, and impacts of flash floods; flash flood hazards, and vulnerability to communities.

A community's DRR education can be the key to development and critical to broad-based economic growth, mitigation of the effects of fragility and conflict, and promoting country security. This is particularly true for areas heavily impacted by natural disasters such as droughts, floods, flash floods and earthquakes. As the sudden and emerging threats from natural disasters challenge individuals, families, communities and countries, educating affected populations becomes not only vital, but a requirement in the rebuilding process.

DRR education is not only a foundation of human development, in emergency situations; it provides physical and psychosocial protection, which can be both life-saving and life-sustaining. It is through education we can develop positive attitudes and responses, which are vital to confront crises, provide a channel for conveying survival messages, and promote personal development and preparedness for responsible citizenry.

Pakistan, Thailand, Haiti and the Philippines have been particularly hard hit in the past few years and the development of DRR programs that support literacy,

numeracy and life skills training point to aid in rebuilding communities. DRR education programs for systematic approach to identify mitigating the hazards associated hazards. If we focus on floods, the important characteristics of associated with these natural disasters (times) and with the potential impact (as little as two feet of flowing water) allows the learner to pose fundamental questions pertaining to this situation. This practical approach to understand their role and are given participate is one way to create awareness with individuals, families and by the knowledge the learner these and other natural disasters reduce the risk, empower the communities approaches to mitigation and adaptation strategies.

The following articles provide programs that involve individuals and communities.

Students in the Philippines present their School Hazard Map to teachers and suggest some mitigating or preventative measures based on what they have learned.



Philippines: Disaster Risk Reduction through Red Cross Youth Movement (DRRMRCYM)



Youth are taught on how to conduct Hazard, Vulnerability, and Capacity Assessments for their schools, and communities.

Education is not only for the students: every year secondary teachers do their Enhancement Training on Basic Life Support and Survival Swimming.



Tricia Mae Plesner, Red Cross Youth (RCY) president speak on behalf of the youth from the Philippines. She shares her experiences being a Disaster Risk Reduction (DRR) advocate in local schools and emphasizes the role of children in disaster risk reduction.



Informed Children: For Better Disaster Preparedness

The new millennium has brought a combination of natural and human-caused disasters to Pakistan; that have resulted in massive loss of lives and property with women and children being the largest groups impacted. While support is provided by the government, NGOs and the public, it is the resiliency of those affected, which often assists in the return to a normal life. In flood and flash flood impacted areas multiple steps have been taken towards better preparedness for such sudden hazards. However, the primary focus has either been of improvement of infrastructure or empowerment of adults, primarily men. But it is preparation of the community including woman and children that I have found to best support improved disaster risk reduction (DRR) strategies. For the last two years, I, staff and volunteers of Social Research and Development Organization (SRDO), an NGO, have been regularly visiting the coastal areas of Thatta and Badin in the province of Sindh (vulnerable due to proximity with River Indus and the Arabian Sea). We

such as: the importance of making sure their homes are safe, identification of a safe place to stay in an emergency, a storage place for dry rations, and establishing quick and reliable alarm systems. This information permits them to not only inform themselves but also their families and communities. In the past couple of years we (SRDO) have seen many positive results, with families and communities starting to take precautionary measures with the first warning of a flash flood or flood. While this year the floods in Sindh province remain moderate, disaster preparedness needs to be continued for the safety of all vulnerable populations. For us at SRDO it has been the children that have acted as the catalyst and their talents need to be utilized to transform their communities and country into a better, safer place to live.

Contributor: Annu Marwaza (annumarwaza@hotmail.com) is a senior researcher, analyst and writer on social development issues, especially pertaining to women, youth and children.

to 16 years) to dness and tant role in DRR, d organized ing information sh and Development NGO, has been of Sindh province. ill-designed n for these needy



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