

# Resilient watersheds for integrated river basin management

## Part I: Tools and approaches for generating data and information for a resilient watershed

### Agenda

#### Day 0 – Tuesday, 6 October 2020

##### SETTING UP FOR THE VIRTUAL TRAINING

Time	Programme	Resource persons
10:00–12:00	Introduction and background	Santosh Nepal, ICIMOD ; Kanchan Shrestha, ICIMOD
	Setting up the Microsoft Teams platform	Kanchan Shrestha and Rays Rajbhandari, ICIMOD
	Setting up the virtual training environments – Ensuring the installation of the required software (e.g. GIS, R, notepad++) 20 min	Kabi Raj Khatiwada, ICIMOD
	Formation of groups	Kabi Raj Khatiwada, ICIMOD
	Assigning a group for reflections for each day	Subina Shrestha, ICIMOD
	Pre-assessment	Kanchan Shrestha, ICIMOD

#### DAY 1 – WEDNESDAY, 7 OCTOBER 2020

##### OPENING AND KEY PRESENTATIONS

Time	Session	Details	Speakers
10:00–10:15	Sign-in and registration		Nishikant Gupta
10:15–10:25	Session 1A: Opening	Welcome remarks	Eklabya Sharma, ICIMOD Badri R Dhungana, DoFSC
10:25–10:35	Session 1B: Setting the context	Opening remarks: Understanding IRBM and its relevance in the present context of Nepal	Arun B Shrestha, ICIMOD
10:35–10:45		Overview of the training and institutional capacity-building approach	Santosh Nepal and Kanchan Shrestha, ICIMOD
10:45–10:55		Introduction, participants' expectations, and pre-assessment results	Kanchan Shrestha, ICIMOD
10:55–11:15		Keynote – Connecting watershed to river basins: Upstream–downstream linkages in the context of multiscale IRBM	Santosh Nepal and Arabinda Mishra, ICIMOD
11:15–11:35		Watershed management in Nepal: Challenges and opportunities	Badri R Dhungana, DoFSC
11:35–11:55		The concept of resilient watershed management	Sanjeev Bhuchar and Sunita Chaudhary, ICIMOD
11:55–14:30	Break		
14:30–14:45	Sign-in		Nishikant Gupta
14:45–15:05	Session 1C: Introductory/overview presentations	Watershed components and processes	Sunita Chaudhary and Santosh Nepal, ICIMOD
15:05–15:25		Importance of gender and social inclusion in watershed management in Nepal	Aditya Bastola and Chanda G Gurung, ICIMOD
15:25–15:45		Data-driven governance of watersheds as socio-ecological systems	Arabinda Mishra and Avash Pandey, ICIMOD
15:45–16:00	Break		
16:00–16:20	Session 1C (continued)	Overview of the methodological approach for watershed profiling: Concepts and applications	Rajesh Thapa and Santosh Nepal, ICIMOD
16:20–16:45		Scope of watershed profiling in the federal context of Nepal	Lokhnath Sapkota, Water Resource Management Center

## DAY 2 – THURSDAY, 8 OCTOBER 2020

### WATERSHED DELINEATION AND PREPARING MAPS

Time	Session	Details	Resource persons
10:00–10:15	Sign-in		Nishikant Gupta
10:15–10:30	Session 2A: Concepts on watershed characteristics	Overview presentation – DEM, watershed delineation, land cover/RS, preparing maps (Example watershed: Indrawati–Bhotekoshi–Pachuwarghat)	Pradeep Dangol, Saurav Pradhananga, Kabi Raj Khatiwada, Santosh Nepal, and Subina Shrestha, ICIMOD
10:30–12:15	Session 2B: Hands-on exercises	<ul style="list-style-type: none"><li>- DEM download</li><li>- Outlet points for the watershed</li><li>- Watershed delineation from webHRU</li></ul>	
12:15–14:30	Break		
14:30–14:45	Sign-in		Nishikant Gupta
14:45–16:45	Session 2B (continued)	QGIS platform and webHRU <ul style="list-style-type: none"><li>- Clipping DEM</li><li>- Clipping land cover maps</li><li>- Preparing watershed maps</li></ul>	

## DAY 3 – FRIDAY, 9 OCTOBER 2020

### QUANTIFYING CLIMATE INFORMATION

Time	Session	Details	Resource persons
10:00–10:15	Sign-in		Nishikant Gupta
10:15–10:30	Participants' quick reflections from the previous day		
10:30–10:45	Session 3A: Quantifying watershed components	Overview of Day 3's exercises	Kabi Raj Khatiwada, Saurav Pradhananga, Santosh Nepal, Pradeep Dangol, and Subina Shrestha, ICIMOD
10:45–11:45		Spatial and temporal analysis of climate data from the area of interest	
11:45–12:15		Using R script for analyses	
12:15–14:30	Break		
14:30–14:45	Sign-in		Nishikant Gupta
14:45–16:45	Session 3B: Climate change datasets	Presentation – Climate change, Representative Concentration Pathways, and scenarios  Accessing the future climate information of a watershed (district climate change information from NAP portal)	Saurav Pradhananga, Kabi Raj Khatiwada, Santosh Nepal, and Pradeep Dangol, ICIMOD

## BREAK – SATURDAY, 10 OCTOBER 2020

## DAY 4 – SUNDAY, 11 OCTOBER 2020

### WATERSHED HYDROLOGICAL MODELLING

Time	Session	Details	Resource persons
10:00–10:15	Sign-in		Govinda Shrestha
10:15–10:25	Participants' quick reflections from the previous day		
10:25–10:55	Session 4A: Watershed hydrology	Overview presentation – Watershed hydrology and modelling: Concept and applications	Santosh Nepal, ICIMOD
10:55–11:05	Break		
11:05–11:35	Session 4A (continued)	Running the J2K hydrological model on the Koshi basin: Understanding input and output data (Calibrated and validated hydrological model will be provided)	Kabi Raj Khatiwada, Santosh Nepal, Saurav Pradhananga, and Pradeep Dangol, ICIMOD
11:35–11:55		Running the model in the sub-catchment and visualizing the output plots	
11:55–12:15		Calculation of the monthly precipitation and discharge	
12:15–14:30	Break		
14:30–14:45	Sign-in		Govinda Shrestha
14:45–15:35	Session 4B: Hydrological modelling	Hydrological modelling: Use of the watershed model for practical understanding of infiltration's role in the overland and base flow	Kabi Raj Khatiwada, Santosh Nepal, Saurav Pradhananga, Pradeep Dangol, and Subina Shrestha, ICIMOD
15:35–15:45	Break		
15:45–16:45	Session 4B (continued)	Calculation of the evaporation for each land use type of the watershed	

## DAY 5 – MONDAY, 12 OCTOBER 2020

### SOIL EROSION AND LANDSLIDES

Time	Session	Details	Resource persons
10:00–10:15	Sign-in		Nishikant Gupta
10:15–10:25	Participants' quick reflections from the previous day		
10:25–10:55	Session 5A: Understanding soil erosion and landslides	GIS and remote sensing for determination of soil erosion	Kabir Uddin, ICIMOD
10:55–11:45		Landslide risk assessment in a watershed	Kripa Shrestha, ICIMOD
11:45–12:15		Demonstration of the Koshi Basin Information System (KBIS)	Bikram Shakya, ICIMOD
12:15–14:30	Break		
14:30–14:45	Sign-in		Nishikant Gupta
14:45–16:45	Session 5B: Soil erosion calculation	Utilization of existing soil erosion data for the watershed analysis (Participants will use datasets from their watershed to calculate soil erosion)	Kabir Uddin and Kripa Shrestha, ICIMOD

## DAY 6 – TUESDAY, 13 OCTOBER 2020

### GOVERNANCE, POLICY, AND INSTITUTIONAL FRAMEWORK

Time	Session	Details	Resource persons
10:00–10:15	Sign-in		Nishikant Gupta
10:15–10:25	Participants' quick reflections from the previous day		
10:25–12:15	Session 6A: River basin governance	<div>Introduction to river basin governance needs and challenges</div> <div>Different approaches to river basin governance</div> <div>Principles of adaptive governance and their alignment with the IRBM objective</div> <div>Examples of adaptive governance from selected case studies</div>	Arabinda Mishra and Avash Pandey, ICIMOD
12:15–14:30	Break		
14:30–14:45	Sign-in		Nishikant Gupta
14:45–16:45	Discussion and revision		

## DAY 7 – WEDNESDAY, 14 OCTOBER 2020

### INTEGRATING GESI INTO THE WATERSHED MANAGEMENT PLAN

Time	Session	Details	Resource persons
10:00–10:15	Sign-in		Nishikant Gupta
10:15–10:25	Participants' quick reflections from the previous day		
10:25–12:15	Session 7A: Integrating GESI analysis into the watershed management plan	<div>Expectations and objectives of the module</div> <div>Importance of GESI analysis in watershed management plan</div> <div>Interactive session – Gender analysis matrix: Example from the Dhankuta Sub-Water Management Plan</div>	Aditya Bastola and Chanda G Gurung, ICIMOD
12:15–14:30	Break		
14:30–14:45	Sign-in		Nishikant Gupta
14:45–16:45	Session 7B: Action planning	Discussion, revision, action planning initiation, and post assessment	Kanchan Shrestha and Sanjeev Bhuchar, ICIMOD Prakash Thapa, DoFSC

## BREAK – THURSDAY, 15 October 2020

## DAY 8 – FRIDAY, 16 OCTOBER 2020

### COLLECTIVE REFLECTIONS AND SHARED OBJECTIVES

Time	Session	Details	Speakers/resource persons
10:00–10:15	Sign-in		Nishikant Gupta
10:15–11:45	Session 8A: Action plan and roadmap	<ul style="list-style-type: none"><li>• Presentation from the participants on the action plan (3 groups) – 15 min each (45 min)</li></ul> <p>Panel discussion: Roadmap for Watershed Profiling (30 min)</p> <p>Panelist: Badri R. Dhungana, DoFSC and Santosh Nepal, ICIMOD</p> <p>Moderator: Arun B. Shrestha, ICIMOD and Prakash Thapa</p> <p>Questions to the panelist:</p> <ul style="list-style-type: none"><li>• What is the scope for generating Watershed profiles by the DoFSC? And how?</li><li>• What type of support maybe needed for the staff?</li><li>• What type of support maybe needed from ICIMOD?</li></ul>	DoFSC  ICIMOD
11:15–12:15	Session 8B: Closing	<ul style="list-style-type: none"><li>• Post-assessment results – Kanchan Shrestha, ICIMOD – 10 min</li><li>• Closing remarks to the participants – 10 min</li><li>• Certificate distribution – 5 min</li><li>• Remarks – Arun B. Shrestha, RPM, ICIMOD – 5 min</li><li>• Vote of Thanks: Prakash Thapa, DoFSC and Kanchan Shrestha, ICIMOD – 5 min</li><li>• Closing remarks – Badri Dhungana, DDG, DoFSC – 5 min</li></ul>	