ICIMOD

TRAINING ON

Resilient watersheds for integrated river basin management

Part 1: Tools and approaches for generating data and information for a resilient watershed

6–16 October 2020 | Microsoft Teams

Co-organized by: International Centre for Integrated Mountain Development (ICIMOD) and Department of Forests and Soil Conservation (DoFSC), Government of Nepal

Background

Efficient river basin management is vital for sustainable development in Nepal. The sectoral approach to the management of land and water ecosystems has led to the achievement of only narrow objectives of individual projects, at times with unintended consequences that have widened gender and social inequalities. Addressing environmental issues requires the inclusion of women and men and the marginalized, partnerships among different stakeholders, coordination between horizontal and vertical layers of government, public awareness, feedback to watershed managers, and enhanced institutional capacity.

Climatic changes in combination with socioeconomic drivers are creating pressures on watershed characteristics and functions. The impacts are felt not only within the watershed but also on communities who depend on watersheds for livelihoods and other services. There is a need for proper understanding and quantification of the resources and impacts on communities who depend on watersheds for livelihoods and other services.

The IRBM approach

Integrated river basin management (IRBM) addresses issues related to water and maximizes socioeconomic benefits while protecting mountain ecosystems. This approach also improves the coordination of different stakeholders from different sectors at different scales. To focus on the IRBM approach, the government has already established river basin management offices in all the major river basins of the country. These new institutional structures aim to foster coordination among relevant stakeholders and institutions and generate collective and integrated data for efficient watershed management.

The efficient use of data and information is vital for effective and efficient IRBM, which addresses upstream–downstream linkages, pushes climate change mitigation, and explores adaptation mechanisms.

About the training

This training on “Tools and approaches for generating data and information for a resilient watershed” is part of an ongoing collaboration between the DoFSC and the Koshi Basin Initiative at ICIMOD on strengthening IRBM. It will focus on generating data and information on different watershed components and enhancing the capacity on different analytical tools.

These tools and approaches will be useful for water resource management, watershed profiling, and preparation of a framework of watershed prioritization on the basis of importance and vulnerability/risk.

The training will cover the generation of watershed data and will touch upon a conceptual perspective of IRBM to understand watershed characteristics, land use, watershed delineation, quantification of watershed climate, watershed hydrology modelling, soil erosion estimation and landslide, governance approaches and institutional frameworks, and integrating gender equality and social inclusion (GESI) into watershed management plans.

After the training, the participants will be able to:

- Access and extract elevation and landcover data, delineate watersheds, and prepare watershed information maps
- Quantify climate (temperature, precipitation) information of watersheds
- Use the hydrological model to calculate water availability, evapotranspiration, and runoff components of watersheds
- Quantify the soil erosion of a particular area and gather information on historical landslides data
- Adapt the tools and technique learned for adaptive governance
- Integrate GESI data in watershed management to achieve equitable access over resources

Participants

This training is targeted for technical staff who are or will be generating data and information regularly as part of their regular duties. The primary target participants expected to be from the DoFSC, basin management centres, provincial government, Soil Conservation and Watershed Management Offices, Forests Research and Training Centres, and Watershed Resource Management Centres. They are expected to have a basic understanding of watershed processes and climatic datasets and a working understanding of GIS.

Agenda

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All timings are in Nepal Standard Time (UTC+05:45).

DAY 0 – TUESDAY, 6 OCTOBER 2020
Setting up for the virtual training

Time	Programme	Resource persons
10:00–12:00	Introduction and background 20 min	Santosh Nepal, ICIMOD Kanchan Shrestha, ICIMOD
	Setting up the Microsoft Teams platform – 20 min	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 – 20	Kabi Raj Khatiwada, ICIMOD
	Assigning a group for reflections for each day 20 min	Subina Shrestha, ICIMOD
	Pre-assessment 20	Kanchan Shrestha, ICIMOD

DAY 1 – WEDNESDAY, 7 OCTOBER 2020
Opening and key presentations

Time	Session	Details	Speakers
09:45–10:00	Sign-in and registration		Nishikant Gupta
10:00–10:10	Session 1A: Opening	Welcome remarks	Eklabya Sharma, ICIMOD Badri R Dhungana, DoFSC
10:10–10:20	Session 1B: Setting the context	Opening remarks: Understanding IRBM and its relevance in the present context of Nepal	Arun B Shrestha, ICIMOD
10:20–10:30		Overview of the training and institutional capacity-building approach	Santosh Nepal and Kanchan Shrestha, ICIMOD
10:30–10:40		Introduction, participants' expectations, and pre-assessment results	Kanchan Shrestha, ICIMOD
10:40–11:00		Keynote – Connecting watershed to river basins: Upstream–downstream linkages in the context of multiscale IRBM	Santosh Nepal and Arabinda Mishra, ICIMOD
11:00–11:20		Watershed management in Nepal: Challenges and opportunities	Badri R Dhungana, DoFSC
11:20–11:40		The concept of resilient watershed management	Sanjeev Bhuchar and Sunita Chaudhary, ICIMOD
11:40–14:45	Break		
14:45–15:00	Sign-in		Nishikant Gupta
15:00–15:20	Session 1C: Introductory/ overview presentations	Watershed components and processes	Sunita Chaudhary and Santosh Nepal, ICIMOD
15:20–15:40		Importance of gender and social inclusion in watershed management in Nepal	Aditya Bastola and Chanda G Gurung, ICIMOD
15:40–16:00		Data-driven governance of watersheds as socio-ecological systems	Arabinda Mishra and Avash Pandey, ICIMOD
16:00–16:15	Break		
16:15–16:35	Session 1C (continued)	Overview of the methodological approach for watershed profiling: Concepts and applications	Rajesh Thapa and Santosh Nepal, ICIMOD

16:35–17:00		Scope of watershed profiling in the federal context of Nepal	DoFSC

DAY 2 – THURSDAY, 8 OCTOBER 2020
Watershed delineation and preparing maps

Time	Session	Details	Resource persons
09:45–10:00	Sign-in		Nishikant Gupta
10:00–10:15	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
10:15–12:00	Session 2B: Hands-on exercises	• DEM download • Outlet points for the watershed • Watershed delineation from webHRU	
12:00–14:45	Break		
14:45–15:00	Sign-in		Nishikant Gupta
15:00–17:00	Session 2B (continued)	QGIS platform and webHRU • Clipping DEM • Clipping land cover maps • Preparing watershed maps	

DAY 3 – FRIDAY, 9 OCTOBER 2020
Quantifying climate information

Time	Session	Details	Resource persons
09:45–10:00	Sign-in		Nishikant Gupta
10:00–10:15	Participants' quick reflections from the previous day		
10:15–10:30	Session 3A: Quantifying watershed components	Overview of Day 3's exercises	Kabi Raj Khatiwada, Saurav Pradhananga, Santosh Nepal, Pradeep Dangol, and Subina Shrestha, ICIMOD
10:30–11:30		Spatial and temporal analysis of climate data from the area of interest	
11:30–12:00		Using R script for analyses	
12:00–14:45	Break		
14:45–15:00	Sign-in		Nishikant Gupta
15:00–17:00	Session 3B: Climate change datasets	Presentation – Climate change, Representative Concentration Pathways, and scenarios	Saurav Pradhananga, Kabi Raj Khatiwada, Santosh Nepal, and Pradeep Dangol, ICIMOD
		Accessing the future climate information of a watershed (district climate change information from NAP portal)	

BREAK – SATURDAY, 10 OCTOBER 2020

DAY 4 – SUNDAY, 11 OCTOBER 2020
Watershed hydrological modelling

Time	Session	Details	Resource persons
09:45–10:00	Sign-in		Govinda Shrestha
10:00–10:10	Participants' quick reflections from the previous day		
10:10–10:40	Session 4A: Watershed hydrology	Overview presentation – Watershed hydrology and modelling: Concept and applications	Santosh Nepal, ICIMOD
10:40–10:50	Break		
10:50–11:20	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
11:20–11:40		Running the model in the sub-catchment and visualizing the output plots	
11:40–12:00		Calculation of the monthly precipitation and discharge	
12:00–14:45	Break		
14:45–15:00	Sign-in		Govinda Shrestha
15:00–15:50	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
15:50–16:00	Break		
16:00–17:00	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
09:45–10:00	Sign-in		Nishikant Gupta
10:00–10:10	Participants' quick reflections from the previous day		
10:10–10:40	Session 5A: Understanding soil erosion and landslides	GIS and remote sensing for determination of soil erosion	Kabir Uddin, ICIMOD
10:40–11:30		Landslide risk assessment in a watershed	Kripa Shrestha, ICIMOD
11:30–12:00		Demonstration of the Koshi Basin Information System (KBIS)	Bikram Shakya, ICIMOD
12:00–14:45	Break		
14:45–15:00	Sign-in		Nishikant Gupta
15:00–17:00	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
09:45–10:00	Sign-in		Nishikant Gupta
10:00–10:10	Participants' quick reflections from the previous day		
10:10–12:00	Session 6A: River basin governance	Introduction to river basin governance needs and challenges	Arabinda Mishra and Avash Pandey, ICIMOD
		Different approaches to river basin governance	
		Principles of adaptive governance and their alignment with the IRBM objective	
		Examples of adaptive governance from selected case studies	
12:00–14:45	Break		
14:45–15:00	Sign-in		Nishikant Gupta
15:00–17:00	Discussion and revision		

DAY 7 – WEDNESDAY, 14 OCTOBER 2020
Integrating GESI into the watershed management plan

Time	Session	Details	Resource persons
09:45–10:00	Sign-in		Nishikant Gupta
10:00–10:10	Participants' quick reflections from the previous day		
10:10–12:00	Session 7A: Integrating GESI analysis into the watershed management plan	Expectations and objectives of the module	Aditya Bastola and Chanda G Gurung, ICIMOD
		Importance of GESI analysis in watershed management plan	
		Interactive session – Gender analysis matrix: Example from the Dhankuta Sub-Water Management Plan	
12:00–14:45	Break		
14:45–15:00	Sign-in		Nishikant Gupta
15:00–17:00	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
09:45–10:00	Sign-in		Nishikant Gupta
10:00–11:00	Session 8A: Action plan and roadmap	• Presentation from the participants on the action plan (3 groups) – 10 min each • Brief discussion on institutional capacity building • Road map for watershed profiling	DoFSC ICIMOD
11:00–12:00	Session 8B: Closing	• Post-assessment results • Closing remarks from the participants • Certificate distribution • Remarks – ICIMOD • Closing remarks – DoFSC	