ICIMOD

TRAINING ON

Use of Circuitscape Linkage Mapper to assess and design effective biological corridors in Bhutan

17–20 August 2021 | Microsoft Teams

PHOTO: EMMANUEL RONDEAU, WWF-UK AND DOFPS, BHUTAN

Background

The protected area network in Bhutan comprises 10 protected areas connected by eight biological corridors, covering 51.44% of the country. The biological corridors are areas set aside to connect one or more protected areas and facilitate the movement of wild animals and dispersal of plants. A network of eight biological corridors covering an area of 3,011 sq. km was declared as a "Gift to the Earth" from the people of Bhutan in 1999. The biological corridors provide connectivity across an elevation gradient from the sub-tropical ecosystems of Royal Manas National Park, Phibsoo Wildlife Sanctuary (PWS), and Jomotsangkha Wildlife Sanctuary to the alpine ecosystems of Jigme Dorji National Park and Wangchuck Centennial National Park. The corridors also provide lateral connectivity from the Jigme Khesar Strict Nature Reserve (JKSNR) in the west to the Sakteng Wildlife Sanctuary and Bumdeling Wildlife Sanctuary in the east. The biological corridors along with the national parks, wildlife sanctuaries, and the strict nature reserve form the Bhutan Biodiversity Conservation Complex, which in turn forms a larger conservation landscape in the region.

The existing biological corridors in Bhutan were designed and delineated through a qualitative evaluation of landscape factors that drive the least-cost path to linkage mapping. However, the corridors need to be protected and managed effectively to overcome the impacts from changing land use practices and climate change. In addition, new corridors need to be designed for enhancing the conservation of biodiversity and linkages at the landscape level. Therefore, the periodic assessment of the existing network of biological corridors is critical for effective management, and designing new corridors will be essential in improving landscape connectivity.

About the training

There are many ways to design wildlife corridors – from sketching on habitat maps based on ground observations, to connecting preferred patches within the matrix of land use and land cover, to using elaborate geospatial modelling based on landscape characteristics that are conducive to wildlife movement and safeguarding critical ecological processes. Whatever tools, techniques, or approaches are adopted, the primary goal is to facilitate and complement in-depth interrogation into rationally linking fragmented habitats and creating a more permeable landscape. A modelling method is considered an appropriate first step to explore options, debate alternatives, and contemplate viable solutions under most plausible future scenarios.

This training will cover the basic preparatory phase of defining the scope and setting a proper context for corridor design, satisfying minimum input requirements. Participants will learn how to run a GIS model properly calibrated and validated to fit the desired linkage objectives, the geographic setting, and the bio-ecological elements and functions of interest in the landscape. The Circuitscape package of GIS tools will be used for corridor design and connectivity analysis to transfer basic skills in the application of geospatial modeling tools in exploring, assessing, and evaluating corridor designs for biological connectivity between islands of wildlife habitats and discrete protected areas in Bhutan. The case of the proposed JKSNR–PWS corridor will be used as an example for both lectures and hands-on exercises in the modeling process.

Objectives

The primary purpose of this training is to develop the technical capacity of relevant officials and stakeholders in Bhutan to diagnose and reassess the current corridor network and redesign system of habitat and ecosystem linkages. The training will also enable trainees to gain a better understanding of connectivity concepts and data, along with the basic knowledge and skills required to set up and run Circuitscape Linkage Mapper.

The specific objectives of the training are as follows:

- Impart knowledge and skill necessary to assess and manage biological corridors for an enhanced biodiversity and sustained flow of ecosystem services
- Expose participants to innovative science of conservation and connectivity embedded in powerful geospatial tools and techniques
- Introduce and use the Circuitscape Linkage Mapper connectivity analysis software package in an immersive hands-on practical session

Expected outcomes

Upon completion of the training, participants will be equipped with basic skills in connectivity modeling, mapping process, and translating results. The institutional capability of partner agencies will also be enhanced to plan and implement conservation activities in the biological corridor.

Expected participants

A total of 45 representatives from the protected areas and divisional forest offices under the DoFPS, MoAF, Royal Government of Bhutan, will be participating in the training.

Course pre-requisites

A basic knowledge of GIS is recommended to complete the hands-on exercises. Participants will need access to a computer and reliable internet connectivity during the course.

Online course format

The online training will be conducted over four days via Microsoft Teams. Each day will include at least four hours of online sessions with course trainers and participants, followed by activities that will be completed offline by each participant.

Pre- and post-training engagements

Pre-training assessment of participants will be done through short online surveys once the list of participants is confirmed. At the end of the training, participants will be given group exercises for developing new or realigning existing corridors, taking advantage of new and updated information, scientific advances, and innovations in tools and approaches. The groups will report back after a month with the results of their respective corridor connectivity assignment to deliberate further on their learning and experiences. The class will reconvene for a one-day session.

Agenda

17–20 August 2021 | Microsoft Teams

Day 1 | 17 August 2021

Time	Programme
OPENING SESSION	
Moderated by: **Namgay Bidha**, Senior Forestry Officer, NCD, DoFPS Co-facilitator: **Tashi Dorji**, Programme Coordinator, Kangchenjunga Landscape Conservation and Development Initiative (KLCDI), ICIMOD	
09:00–09:30	Check-in on MS Teams
09:30–09:35	Welcome remarks and training objectives - **Sonam Wangdi**, Chief, NCD, DoFPS
09:35–09:45	Opening remarks - **Dasho Lobzang Dorji**, Director, DoFPS
09:45–09:55	Opening remarks - **Pema Gyamtsho**, Director General, ICIMOD
09:55–10:00	Group photo
TECHNICAL SESSION	
10:00–11:00	Introduction to corridors, connectivity, and linkage mapping - **Karma Tshering**, Senior Remote Sensing and Geoinformation Specialist, ICIMOD
11:00–11:20	Break
11:20–12:30	Biology and ecosystem context for conservation and connectivity in KL - **Sunita Chaudhary**, Ecosystem Services Specialist, ICIMOD
12:30–13:30	Lunch break
13:30–14:30	Habitat suitability of important landscape-scale umbrella species - **Prashanti Sharma**, GIS and Remote Sensing Associate, ICIMOD
14:30–15:30	Introduction to empirical connectivity models, their processes, and challenges of connectivity modelling - **Karma Tshering**, ICIMOD
15:30–16:00	Reflections and feedback

Day 2 | 18 August 2021

Time	Programme
09:00–09:30	Check-in on MS Teams
09:30–11:00	Setting up and running the model: Application of circuit theory to connectivity science and conservation - **Karma Tshering**, ICIMOD
11:00–11:20	Break
11:20–12:30	Linkage pathways: Identifying and mapping least cost corridors between core PAs - **Karma Tshering**, ICIMOD
12:30–13:30	Lunch break
13:30–15:30	Barrier Mapper: Method for detecting barriers and restoration opportunities - **Karma Tshering**, ICIMOD
15:30–16:00	Reflection and feedback

Day 3 | 19 August 2021

Time	Programme
09:00–09:30	Check-in on MS Teams
09:30–11:00	Use of Pinch-point Mapper in corridors - **Karma Tshering**, ICIMOD
11:00–11:20	Break
11:20–12:30	Use of centrality mapping tools to prioritize important corridors - **Karma Tshering**, ICIMOD
12:30–13:30	Lunch break
13:30–14:00	(Continued – hands-on exercise) Use of centrality mapping tools to prioritize important corridors - **Karma Tshering**, ICIMOD
14:00–15:30	Use of climate linkage mapping tool - **Karma Tshering**, ICIMOD
15:30–16:00	Reflections and feedback

Day 4 | 20 August 2021

Time	Programme
09:00–09:30	Check-in on MS Teams
09:30–11:00	Use of linkage priority mapping tool and hands-on exercise - **Karma Tshering**, ICIMOD
11:00–11:20	Break
11:20–12:30	Post processing: Interpretating model results and communicating through maps - **Karma Tshering**, ICIMOD
12:30–13:30	Lunch break
13:30–14:00	Reflections on the training (participants will share their learning experiences and their understanding of connectivity science and practices) - **Tashi Dorji**, ICIMOD
14:00–14:30	Rapid scan of alternative tools and methodologies - **Karma Tshering**, ICIMOD
14:30–15:00	Break
CLOSING SESSION Moderated by: **Tandin**, KLCDI Bhutan Focal, NCD Co-facilitator: **Tashi Dorji**, ICIMOD	
15:00–15:15	Post-training assessment and feedback from participants
15:15–15:25	Overall training reflection and way forward - **Norbu Yangdon**, Senior Forestry Officer, NCD, DoFPS
15:25–15:35	Overall training reflection - **Karma Tshering**, ICIMOD
15:35–15:45	Closing remarks - **Nakul Chettri**, Regional Programme Manager, Transboundary Landscapes, ICIMOD
15:45–15:55	Closing remarks - **Sonam Wangdi**, Chief, NCD, DoFPS
15:55–16:00	Vote of thanks -**Tandin**, NCD -**Tashi Dorji**, ICIMOD

Organized by

Nature Conservation Division (NCD), Department of Forests and Park Services (DoFPS), Ministry of Agriculture and Forests (MoAF), Bhutan; and the International Centre for Integrated Mountain Development (ICIMOD)

For further information

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