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ANNUAL REPORT **2015**

International Centre for Integrated Mountain Development
Kathmandu, Nepal

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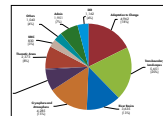
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Message from the Director General

The year 2015 was a memorable year for many reasons. The earthquakes on 25 April and 12 May that affected Nepal and neighbouring countries also disrupted operations at ICIMOD. However, the way ICIMOD and its partners responded will be something that I will not forget. I was proud that we were able to quickly rebound and deliver a full set of results for 2015. As I go through the pages of this annual report, I am pleased that, despite unexpected challenges, significant progress was made on multiple fronts.

The impact of ICIMOD's work in 2015 is visible in its ability to work with its member countries to respond to the urgent needs of mountain communities, from investigating a glacial lake outburst flood in Bhutan to quickly responding to the earthquake in Nepal. After the earthquake, ICIMOD drew on its strength as a convenor and its thematic expertise to mobilize an international team of experts to provide support to earthquake response, including mapping secondary geohazards and helping helicopter pilots chart rescue missions. At the same time, we held an international conference on ecotourism in Myanmar as well as a policy dialogue together with the Bangladesh Planning Commission focused on the Chittagong Hill Tracts.

Over the course of the year ICIMOD hosted a number of other memorable events that brought

global attention to important issues in the Hindu Kush Himalayas include international symposiums on glaciology and forestry, and the first meeting of the Climate and Clean Air Coalition to be held in Nepal.

ICIMOD's regional niche allows us to add special value to mountain development work – working across countries in the region to share knowledge and address shared issues. Our transboundary approach to landscape and river basin management has fostered close interactions and cooperation between countries. We have many activities where we work with communities on adaptation to change. And the positive impacts of these activities are multiplied when knowledge and solutions are shared and further improved, for example an innovative flood early warning system piloted in India but now taken up in Afghanistan and Nepal.

One of ICIMOD's core strengths as a knowledge organization is in generating new knowledge and acting as a knowledge broker. We are making concerted efforts with partners to fill critical data gaps, especially those that lead to solutions and support informed decision making. At the UNFCCC meeting in Paris, we launched the *Himalayan Water and Climate Atlas*, which visually depicts the status of glaciers under changing conditions, and the

possible impacts on rivers in several basins in our region. Other science outputs – ranging from new knowledge on glaciers to linkages between migration and community resilience are also featured.

To ensure that important findings and messages from our research are shared, and that knowledge from this region is put to use, we place special focus on communication and knowledge management. For example, the film *Dhuwa* used the element of comedy to draw public interest to the important issue of open burning and its contribution to growing air pollution across the region.

Partnership is critical for ICIMOD. We are lucky to work with over 200 partners in the region. From community organizations, to policy makers, to universities, each of our partners helps us advance towards our goal of improving the lives and livelihoods of mountain communities in a healthy mountain environment. In 2015, we have emphasized enhancing the level of engagement with our partners to maximize our success. I would like to take this opportunity to thank the many partners and friends of ICIMOD, without whom the work we do would not be possible.

POLICY ENGAGEMENT



ICIMOD Framework for Chittagong Hill Tracts Helps Point Way to Sustainable Development

About 10 per cent of Bangladesh is a rugged landscape very different from the rest of the country. The Chittagong Hill Tracts includes around 40 percent of the country's forest and is home to 12 tribal groups with unique cultures but high levels of poverty.

The development of this fragile ecosystem with its ethnically distinct, marginalized people will be assisted over the next five years by a plan crafted by ICIMOD in collaboration with the Government of Bangladesh. The Strategic Framework for Sustainable Development in the Chittagong Hill Tracts is now part of the Bangladesh Planning Commission's seventh five-year plan, which means that donors and agencies who engage in development work in the area will be following the framework.

ICIMOD focused closely on the nuances specific to the region's people, such as local types of land ownership and traditional institutions, to devise a framework that would help to protect the area's character and uniqueness while advancing opportunities for Bangladesh's mountain people.

Key Partners

- Ministry of Chittagong Hill Tracts Affairs, Bangladesh
- Planning Commission, Bangladesh



Ecotourism Policy Crafted for Myanmar's Protected Areas

Tourism in Myanmar is relatively new and expanding quickly, and developments now will set the course for the future. If the tourism economy develops in the wrong direction, it can damage the same cultural heritage and natural resources that draw visitors in the first place.

To encourage growth that is green, people-friendly and sustainable, ICIMOD collaborated with the Government of Myanmar to craft an Ecotourism Policy and Management Strategy for Protected Areas, which lays out a strategy for promoting tourism and economic growth while safeguarding vulnerable areas. The policy has been approved by the government.

ICIMOD worked closely with the government agencies involved in tourism, natural resources, and environmental conservation to balance the seemingly disparate concerns of each sector. The proposed next steps include the launching of a pilot and working with the management framework in legal terms, so that each category of protected area will have relevant legislation.

The Myanmar model is also reflected in work in Bangladesh, where a similar policy is being developed for the Chittagong Hill Tracts.

“Ecotourism will not only benefit the protected areas through conservation, but also local communities through employment, capacity development, and as an alternative source of livelihood.”

U Htay Aung, Minister of Hotels and Tourism, Myanmar

Key Partners

- Ministry of Environmental Conservation and Forestry (now Ministry of Natural Resources and Environmental Conservation), Myanmar
- Ministry of Hotels and Tourism, Myanmar



Pakistan Conference Brings Climate Change Science to Policy Makers

The Upper Indus River basin supports over 215 million people, so knowing how it's impacted by climate change is pivotal to effective policy making in Pakistan. That means finding ways to bridge the gap between areas of knowledge – research, practice, and policy – so that knowledge can be shared and translated into useful action.

More than 100 researchers, practitioners, journalists, and high-level policy makers explored how to make that happen

during a three-day conference, 'Action for Adaptation: Bringing Climate Change Science to Policy Makers'.

Participants exchanged knowledge, strengthened networks, and engaged in discussions that led to recommendations on issues such as flood zoning, environmental protection, context-specific adaptation strategies, and the importance of strong representation by women, particularly in this era of male outmigration when women play key roles in farming and resource management.

Even as the July conference took place, floods swept through five provinces in the Upper Indus River basin, affecting around 800,000 people and underscoring the need for Pakistan's institutions and decision makers to share expertise to address the impacts of climate change.

"People say, 'Before I protect the environment I need food.' If you do not protect the environment, you will not have water. If you do not protect the environment, you will not have food."

Farzana Yaqoob, Minister of Women Development and Social Welfare, Jammu and Kashmir, Pakistan

Key Partners

- Ministry of Climate Change, Pakistan
- Ministry of National Food Security and Research, Pakistan
- Pakistan Agricultural Research Council (PARC)
- Sustainable Development Policy Institute (SDPI)
- World Wildlife Fund (WWF) Pakistan



Framework for Quake Recovery through Livelihood Resilience Adopted by Nepal Government

How can the immediate needs of rebuilding and recovery be achieved in ways that also strengthen communities for the future? ICIMOD became a strong voice for the incorporation of socioeconomic development into recovery planning after the Gorkha earthquake, and the effort bore fruit with the creation of a strategic framework, developed in collaboration with the Nepal National Planning Commission, that pinpoints

ways to integrate recovery into long-term development planning.

The framework draws on global and regional experience to identify effective, evidence-based approaches to improve livelihoods in ways that underpin long-term resilience. It focuses on elements that include incorporating vocational training and local skill development with recovery work, incentivizing the building of eco-

friendly structures, and ensuring that jobs reach women and marginalized people who are deeply vulnerable in disasters.

The Strategic Framework for Resilient Livelihoods in Earthquake-Affected Areas is a sign of the depth of policy engagement between ICIMOD and the Government of Nepal. It also prompted other development agencies to seek ICIMOD's assistance in extending the concepts and insights to their own work. Implementation of the framework can improve resiliency – not only when disaster strikes, but in the face of the many challenges that are part of the lives of mountain people.



Key Partner

- National Planning Commission, Nepal

Policy Makers and Experts Meet on Transforming Mountain Forestry

Forests cover around a quarter of the Hindu Kush Himalayas – holding fragile slopes in place, contributing to watershed health, and providing crucial ecosystem services in the mountains and areas downstream. Mountain forestry involves specialized concerns that separate it to some extent from general forestry.

As India is now in the process of reviewing its forest policy and other countries will also be updating their forest policies, ICIMOD brought together global and regional experts and government representatives to highlight issues specific to mountain forestry in ways that can inform policy discussions and ultimately improve forest management practices.

More than 300 delegates from 16 countries, international organizations, and regional governments delved into key issues during the five-day Transforming Mountain Forestry Symposium in Dehradun, India, from topics such as forest fires, invasive species, human-wildlife interaction, payment for ecosystem services, forest classification, and management and policy options.

The symposium included a lawmakers' session that brought together ministers and Members of Parliament from India's mountain states and Bangladesh to discuss transboundary cooperation. Representatives from European and Southeast Asian countries also shared their experiences in the symposium, which produced detailed documents with recommendations.

Key Partners

- Forest Research Institute (FRI), India
- Ministry of Environment, Forests and Climate Change, India

“Sharing of knowledge, data, and human resources is critical to the success of transboundary cooperation.”

Dasho Namgay Wangchuk

Director General

Council for RNR Research of Bhutan





MOUNTAIN INNOVATIONS AND COMMUNITY PRACTICES

From Honey to Nettles, Value Chain of Products in Kailash Grows Rapidly

The Indian butter tree is a superb multi-tasker. It controls erosion, grows in poor soil, its seeds are made into butter, its flowers make a tasty honey – and it can help farmers out of poverty. That's why it's earned a role in value chain interventions to benefit marginalized farmers across the Indian and Nepali parts of the transboundary Kailash Sacred Landscape.

While Indian farmers used improved beehives to enhance the quality of honey from butter trees, women in Nepal benefitted from another forest crop: Himalayan nettle, locally known as 'allo'. Trained in weaving, knitting and design, they're transforming the natural fibre into purses and crafts for urban markets, part of a woman-friendly value chain in places where most men are gone as remittance workers and women entrepreneurs are rising to the fore.

Meanwhile, vegetables and yak milk products are the focus of efforts in Tibet. Soap nut, too, proved its worth across Kailash, particularly for farmers trained to separate the raw nuts by quality grade and fetch better prices.

Each area of the transboundary region is gaining its own roster of specialties, but the goal is the same: develop value chains to improve livelihoods across the Kailash landscape.

Key Partners

- Central Himalayan Environment Association (CHEA)
- Research Centre for Applied Science and Technology (RECAST), Tribhuvan University, Nepal
- SABAH Nepal
- Tibet Academy of Agricultural and Animal Husbandry Sciences (TAAAS)

37% increase in price of allo sold by producers in Kailash pilot sites

77% decrease in the amount of fuelwood needed to process allo fibre using new technologies



Pollination by Bees in Pakistan Improves Apple Quality

Do you want larger, shapelier, brighter apples? Action research in villages in northwest Pakistan suggests that one way to improve apple production, both in yield and quality, is to pollinate with honeybees.

Working with farmers in six villages in northern Chitral, researchers found that honeybee pollination increases the size of the apple, its shape, and its colour.

Overall production was also much higher in orchards where bees were deployed intentionally to supplement other pollinating insects.

The apple orchards of the Chitral Valley, at the border of Afghanistan's narrow Wakhan Corridor, have been the focus of research aimed at learning more about the role of honeybees in pollination. The

bees were placed in orchards when 10 to 15 per cent of the flowers had bloomed.

ICIMOD has also worked with Chitral beekeepers on honey production and improving the value chain for local honey. As it happens, apples flower early in the year, when pollen strength isn't high enough for honey, so pollination services aren't paired with honey production. But researchers and farmers are learning that even when honeybees aren't making honey, they can have an important impact on livelihoods.



Key Partners

- Aga Khan Rural Support Programme
- Chitral Beekeepers Association
- Khyber Pakhtunkhwa Agriculture University, Peshawar, Pakistan

Addressing Water Shortage Spurs Ginger Farming in Myanmar

The upland villages near the Myanmar tourist hub of Inlay Lake had been left out of its growing economy, and ginger farming could help them out of poverty. But a key ingredient was missing: water.

Ginger doesn't require much water, but when there's only a single pond left during the dry season and it's already crowded with buffalo, farmers don't have many options. ICIMOD's first step: Address the water problem through rooftop rainwater harvesting, new ponds, and better management. The idea proved so popular that households not involved in the pilot began building the water systems themselves.

Key Partners

- Ministry of Environmental Conservation and Forestry (MOECF), Shan State, Myanmar
- Myanmar Institute for Integrated Development (MIID)

The concept spread to five additional villages, with USAID and Winrock replicating ICIMOD's pioneering work and doubling its impact. Improved ginger farming is now underway, bamboo handicraft production will start soon, and the once-dry villages are set to benefit from the economy around Inlay Lake.

10%	increase in market price of ginger for local producers
84,000	additional gallons of water available after constructing and repairing water tanks
2,800,000	litres of water stored in new and improved community ponds



Action Research Supports Restoration of Chinese Wetlands

Wetlands in the Erhai Lake basin of Yunnan Province are a rich habitat for plants and animals and play a key role in water purification for China's second largest highland lake. Located near the scenic and populous city of Dali, it is one of Yunnan's leading tourist destinations. But pollution from pesticides and other sources threaten the health of the Dali wetlands.

Action research in the wetlands is supporting restoration through a

multi-pronged approach that includes understanding the change scenario through geospatial tools; analysing the ecosystem value of that particular lake and its wetlands; and working with local communities and Chinese authorities to develop and test effective management methods.

Wetlands help to control floods, reduce the velocity of water and sedimentation, promote aquifer recharge, and supply food, water and livelihood services to

local people. The research supports efforts by the central government of China and the provincial government of Yunnan, which have initiated a wetlands restoration project to improve the quality of water in Erhai Lake.

If the model being tested in the Dali area is successful in bringing economic benefits to local people while maintaining wetlands quality, local provincial governments may adopt it elsewhere, improving the quality of similar ecosystems across China.



Key Partners

- Centre for Mountain Ecosystem Studies (CMES), Kunming Institute of Botany/World Agroforestry Centre (ICRAF)
- Yunnan Institute of Environmental Science

Solar Pumps Help Women Farmers as well as Environment

An unexpected benefit was discovered in the course of field research on solar water pumps. The intent of the project in Nepal's Saptari District was to enable farmers to irrigate fields in clean, affordable ways, looking in particular at how the pumps are really used by farmers and to see if the green alternative, which is good on paper, is practical on the ground.

The surprise: the solar pumps aren't just environmentally friendly and cheaper to operate, they're gender friendly. Diesel pumps are heavy and unwieldy to operate. Manual treadle pumps have reproductive health risks for women. Electricity for electrical pumps is often unavailable. But solar pumps start with the push of a button, and that could

make an important difference for women – who often grow their own vegetables for the market, keep the income, and increasingly must replace men who are absent as migrant labourers.

Solar pumps are as powerful as diesel pumps, but cleaner, less expensive, quieter, and easier to use. The operating cost, after the price of the pump itself, is essentially free. The added findings on gender equity could make them an even more realistic alternative.

20,500 NPR saved annually on diesel (USD 190)

206,000 NPR of additional profit each household can earn (USD 1,900)

Key Partners

- Atom Solar, India
- Sun Farmer, Nepal





CAPACITY BUILDING

Community Forest Groups Use Satellite Imagery to Monitor Ecosystems

Villagers in Nepal are joining the space age by learning simple ways of using satellite technology to monitor the health of nearby forests and watersheds.

Across the country, local people have long helped to manage and keep track of the status of their area's forests by participating in community forest user groups. They walk the forests, take field measurements, log what they see, and provide crucial on-the-ground knowledge. But they can't get everywhere, examine data over time, or have the comparative

scientific information that satellites can provide from the sky – just as satellites can't provide the close-up human perspective that people who live around forests possess.

Efforts are now being made to combine space-age tools and grassroots skill sets. Members of 17 community forest user groups in the Khayar Khola watershed

in Chitwan District were trained in 2015 to read satellite imagery, gain a basic understanding of 3D visualization, and compare satellite images with ground photographs to confirm and expand upon findings to improve the depth of monitoring. Communities can use the information to manage forests in a more sustainable, effective way.

Key Partners

- Kathmandu University
- Ministry of Forests and Soil Conservation (MOFSC), Nepal
- REDD Implementation Centre



From Cooking to Sanitation Management, Communities Build Skills to Enhance Kailash Pilgrimage Experience

Thousands of visitors come to China each year to circumambulate Mount Kailash, a destination for global tourists that is also sacred to Buddhists, Hindus, Jains, Sikhs, and followers of Bon. The crowds of visitors to the area around Kailash in the Tibet Autonomous Region are good for the local economy, but can also threaten the environment – and the pilgrimage experience can be harmed, too.

ICIMOD is helping communities along the route to improve sanitation, manage waste effectively, and end open defecation. Entrepreneurs are also catering more effectively to the large numbers of Indian and Nepali pilgrims who are vegetarians, learning to prepare South Asian vegetarian cuisine in addition to Tibetan-style meat dishes. A dozen restaurants are now equipped

to better serve South Asian visitors, while transportation services have also been improved, with guides from yak transportation teams benefitting from safety and health training.

Improved waste management, tourist comfort and safety, cultural sensitivity and environmental protection are being linked more closely in the Kailash region to protect the fragile, high-altitude environment that is home to many communities and sacred to many faiths around the world.



Key Partners

- Chengdu Institute of Biology (CIB)
- Sichuan University
- Tibet Academy of Agricultural and Animal Sciences (TAAAS)

Women Farmers Become Entrepreneurs as Tulsi Value Chain Expands

In yards across the Himalayas, families often grow 'tulsi', or holy basil, for its spiritual significance. But tulsi, which also makes a tasty herbal tea, is also becoming a viable cash crop for small farmers, particularly women.

ICIMOD's work in India to develop the value chain for tulsi made notable strides this year as farmers moved beyond basic production and enhanced their capacities in product improvement and marketing, which meant more profit for rural women.

Key Partner

- Himalayan Action Research Centre (HARC)

For instance, when growers sell the whole tulsi plant, much of it has to be discarded by middlemen, who also have processing costs. But if they pluck the leaves beforehand and dry them on a net, one of this year's improvements, the product is ready for packaging, spoilage is reduced, and colour and quality are retained.

In the end, women farmers take home more of the money, landless women earn a living processing the tulsi, and unused land where monkeys used to damage rice crops is being cultivated for tulsi, which animals don't destroy.

Women's cooperatives in the project have also built their own business plans, improved internal governance, and developed marketing strategies – and in process, are evolving from small farmers into entrepreneurs.

10,000 INR women can earn every three months (USD 150)

200 packets of 'Switch On' tea recently sent to France



Financial Literacy Training Helps Households Use Remittances to Prepare for Disasters

I ncreasingly in the Hindu Kush Himalayas, men are out of the villages, labouring elsewhere. So if floods come, it is mainly women who must cope. That's the situation in flood-prone Assam, India, the site of action research in 2014–2016 on flood preparedness, and it's also the situation in Udayapur, Nepal, where the Assam concept was taken up in 2015–2017 in the Koshi River basin.

At the heart of the expanding action research is a question: Will women, if provided with access to information such as financial training and extension services, be able to utilize a portion of their incomes effectively to reduce their family's vulnerability?

The answers so far have been encouraging, and the concept has expanded into Nepal. In the Nepal work, low-income women were also provided with capacity building for livelihood diversification and disaster training, responding in part to what researchers learned about differences between local needs in Assam and Udayapur.

Learning from India has informed the concept as it spread into Nepal, where low-income women were also provided with capacity building for livelihood diversification and disaster training. At its core, the project explores how remittances can be used by households to improve the ability to prepare and respond to disasters and their aftermath in ways that can be replicated elsewhere. The project is now being taken up in Pakistan as well.

The action research explores how remittances can be used by households to improve their ability to prepare and respond to disasters and reduce vulnerability.



Key Partners

- Aaranyak, India
- Centre for the Study of Labour and Mobility (CESLAM), Nepal
- Institute of Integrated Resource Management (IIRM), India
- Nepal Institute of Development Studies (NIDS), Nepal
- Swayam Sikshyan Prayog (SSP), India
- World Wildlife Fund (WWF), Pakistan

Local Council Established to Improve Protected Area Management in the Kailash Sacred Landscape

Api Nampa Conservation Area (ANCA) is a protected area in the far northwest corner of Nepal, bordering India and the Tibet Autonomous Region of China. It lies within the Kailash Sacred Landscape and is home to species that include snow leopards, blue sheep, and grey wolves. It's Nepal's newest community-led conservation area, and from a global and regional perspective it's a pioneering effort to manage biodiversity by defining the landscape through ecosystems, an approach encouraged by the Convention on Biological Diversity.

Local people are leading its management through the ANCA Management Council, which includes elected representatives from villages within the nearly 2,000 square kilometre area. To prepare for the council's formation, local opinion leaders, including community activists and journalists, were taken on exposure visits to Annapurna Conservation Area and elsewhere to learn the on-the-ground realities of managing and living near protected areas from scholars, scientists, women's groups, and others. ICIMOD

experts also trekked for 17 days from village to village, meeting the people living within ANCA and building consensus.

The ANCA Management Council has now been elected and the protected area can begin operating with the support and ownership of local people – a crucial factor for the long-term preservation of this fragile mountain ecosystem.

Key Partners

- Api Nampa Conservation Area (ANCA)
- Department of National Parks and Wildlife Conservation (DNPWC), Nepal





2015 GORKHA EARTHQUAKE RESPONSE

One-Stop Portal Created for Key Quake-Related Data

Finding and sharing data after a major disaster is both a critical need and a significant challenge, but in Nepal, after the Gorkha Earthquake, there is now a one-stop site where aid workers, researchers, and government departments can access credible data quickly and in a clear, user-friendly format.

ICIMOD partnered with the Government of Nepal's Ministry of Home Affairs (MOHA) to create an online hub that streamlines information from multiple sources into a comprehensive National Disaster Relief and Recovery Information Platform (NDRRIP). The online platform pulls together key data with interactive maps, charts, graphics, photographs, and 3D visualizations to provide information at the national, district, municipal, and village levels and on specific areas, such as education, health, heritage, geohazards, and tourism.

If a user needs the numbers, for example, on home destruction in Kathmandu, a few keystrokes reveal the grim facts: 43,502 fully damaged and 56,024 partially damaged homes. There's also context, with numbers drawn from the 2011 census

showing that the earthquake damaged nearly half the homes that existed in 2011.

What about homes in a mountain district that wasn't an epicentre and might be receiving less attention? In Ramechhap, as the portal reveals, there were 26,743 homes lost and 13,173 damaged in the quake – nearly all of the district's 2011 total – along with damage to 33 health facilities, 54 government buildings, and 151 schools. All this in spite of being at the edge of the quake zone, with strong but not severe quake intensity and comparatively fewer deaths.

The site also shares information on relief agencies engaged in each district, along with supplies distributed, including the numbers of tents, tarpaulins, blankets, quintals of rice, and cartons of water. From deaths and injuries to loss of livestock and damage to schools, health posts, heritage sites, and more, the portal uses ICIMOD technical expertise and data from sources such as the Government of Nepal to disseminate the data that aid workers and government departments need for relief and reconstruction and researchers will need in the future.

Key Partners

- Environmental Systems Research Institute (ESRI)
- Ministry of Home Affairs (MOHA), Nepal



Scientists from Around the World Collaborate to Spot Geohazards in Work that Leads to *Science* Paper

Many of the earliest responders to the Gorkha quake were volunteers scientists from around the world, connected to Nepal by technology and ICIMOD. Within a few days of the quake, dozens of scientists were volunteering to assess what happened in faraway Nepal and analyse impending risks. The worldwide rapid response team,

coordinated by ICIMOD, inventoried landslides and mapped dangerous obstructions such as landslide-dammed lakes and rivers, sharing the results quickly with the Government of Nepal and aid agencies and later with the scientific community in a study published in the journal *Science*.

One striking observation: Most of the 4,312 landslides found by the team occurred north of Kathmandu, where the plate dropped close to a meter. Far fewer landslides were found where the plate lifted up, in the hills around the city and to the south, which rose around a meter and a half. There were also fewer landslides overall than expected, perhaps due to the lack of a surface rupture or other geological characteristics.

Over 60 volunteer scientists came together for the global effort, and 43 authors ultimately contributed to the resulting *Science* paper, "Geomorphic and Geologic Controls of Geohazards Induced by Nepal's 2015 Gorkha Earthquake."

Key Partners

- NASA
- University of Arizona
- University of Utrecht



Heritage Loss Documented with ICIMOD-Devised Tool

Kathmandu is famed for its architecture, from spectacular temples and palace squares to the traditional homes and neighbourhoods that give the city much of its character. But in less than a minute, the Gorkha Earthquake toppled historic palaces, temples, and thousands of homes. To support future restoration efforts, it was important to move quickly to document the damage, ensuring that heritage assessment focused not only on well-known historic sites but on Kathmandu's distinctive neighbourhoods and communities.

Realizing that paper-and-pen documentation would limit the capacity to capture a full picture, ICIMOD set out to create a tool that would take advantage of digital imagery and enable before-and-after comparisons. Within ten days, with the help of community volunteers and Kathmandu University students,

ICIMOD had combined the pre-existing inventory with new documentation into a dynamic platform that incorporates old and new information, maps and visualizes the damage, and sets the stage for future restoration projects that include communities and neighbourhoods.

Key Partners

- Kathmandu Municipal Corporation (KMC)
- Kathmandu University



Over 2,000 Helicopter Missions Get Support from ICIMOD Team

Many areas hit hardest by the earthquake were remote, roadless, and reachable quickly only by helicopter. But pilots flying into the Himalayas to pick up the injured and ferry in relief supplies and medical teams had a perilous job, compounded by unseasonable rain and weather patterns and the infamously difficult flying conditions around the world's highest mountains.

The international community was responding generously to Nepal's crisis, and helicopters had arrived within days from China, India, and the US to join the Nepal Army and private operators in relief and rescue missions. But many helicopters had to turn back because of dangerous conditions compounded by uncertainty, finding locations was slow and difficult, and hundreds of thousands of quake victims were at risk.

That's where ICIMOD came in. A team of atmospheric scientists, responding to a request from the Home Ministry, set up an office at the Nepal Army hangar to support rescue and relief flight planning. Using satellite remote sensing and GIS technology, ICIMOD helped to identify and evaluate landing sites, map flight paths, and calculate load limits based on detailed information on elevation.

Before ICIMOD's arrival, pilots had to make due with aerial maps that lacked enough detail; afterwards, they were receiving customized maps with 3D terrain images, destinations marked with GPS coordinates and elevations, and enough

98 Average number of helicopter missions flown daily

2,751 Number of sorties flown during ICIMOD service period

information about villages and terrain landmarks to help them find destinations and significantly cut down flight time.

ICIMOD experts worked dawn-to-dusk at the airport until the number of daily sorties decreased in late May, when they shared data and files with the Nepal Army and trained officials in the use of online tools to support helicopter pilots in their continuing work.



Quake Repair Leads to Greener Kilns

The towering chimneys of around 110 brick kilns in the Kathmandu Valley shattered in the April 25 earthquake, causing an estimated USD 11 million in damage and leaving the kilns almost non-operational just when bricks would be needed the most for rebuilding. One reason for the widespread collapse was the design of the kilns, most of which were old-style models that are energy-intensive, inefficient, and highly polluting as well as vulnerable to earthquakes.

ICIMOD responded by working with kiln owners to rebuild in ways that not only improve seismic strength, but can trim coal consumption by up to 30 per cent and reduce the emission of harmful pollutants. Technical support to kiln owners, in collaboration with the brick industry and engineers who specialize

in sustainable kiln design, led to a practical rebuilding guide that includes engineered designs and drawings. The stronger, greener designs were set to be implemented in 20 kilns during the post-quake brick season.

Key Partners

- Climate and Clean Air Coalition (CCAC)
- Climate Health Research Network (CHeRN)
- Federation of Nepal Brick Industries (FNBI)
- MinErgy





Research Work Proves Resilient As It Restarts after Quake

The earthquake struck at the heart of ICIMOD's working areas in Nepal. It wrecked research stations, decimated villages where ICIMOD has worked for years, and forced staff, partners and stakeholders to put aside projects to respond to the overwhelming immediate needs. Deep knowledge of quake-hit areas and extensive personal contacts enabled the people of ICIMOD to make a strong impact in the weeks and months immediately after the disaster, often working around the clock to support relief and recovery efforts.

Ultimately, though, it was time to assess the damage to research sites and determine how to return to work. For instance, ICIMOD has been conducting glaciological, meteorological, and hydrological fieldwork in Langtang Valley, where the earthquake triggered an avalanche that buried Langtang village and flattened buildings for miles around with an air blast packing half the force of an atom bomb. The blast damaged some of ICIMOD's 12 meteorological and hydrological stations in the area,

including in Kyanging Gompa, a three-hour walk from Langtang village, and a weather station by Yala Glacier. Five meteorological stations were destroyed by the 200-mile-an-hour air blast, one was toppled, one was buried, and a hydrological station was damaged.

ICIMOD proved its resiliency. By the end of the year, ICIMOD had repaired broken weather stations, replaced broken sensors and solar panels, and continued its scientific work by conducting surveys of surface height change of the debris-covered Langtang and Lirung glaciers.

In other areas of Nepal, working closely with communities in project areas, ICIMOD restarted its activities with an additional focus on leveraging previous efforts to strengthen mountain communities' ability to rebound from the impacts of the earthquake.

ICIMOD was deploying its expertise to understand what had happened and forge ahead with the research that had been interrupted and was now, in many cases, more important than ever.



KNOWLEDGE GENERATION AND USE

Scientists Find Everest Glaciers on Verge of Vanishing by 2100

Glaciers in the Everest region could lose over 90 percent of their mass by 2100, an ICIMOD team learned when researchers integrated field observations of ice thickness and glacier mass balance with remote sensing, weather station data, and historical records. The scientists used a gridded model to track how the 400 km² of glaciers in the Dudh Koshi

basin, home to Everest and other towering peaks, change daily and could change under future scenarios.

The study covered a range of climate possibilities, from worst-case hot-and-dry conditions to more conservative scenarios. In all scenarios, the glaciers continued to melt, losing from 70 to

99 per cent of their mass. Even increased precipitation couldn't make up for the accelerating shrinkage, partly because rising temperatures over the course of this century are likely to push up the snowline, exposing more of the glaciers to higher temperatures and reducing the snow accumulation that could help rebuild the mass.

The findings drew attention from global media, including the *Washington Post*, *The New York Times*, and *The Guardian*.



Key Partners

- Institut de Recherche pour le Développement (IRD)
- Laboratoire de Glaciologie et Géophysique de l'Environnement (LGGE)
- Laboratoire d'étude des Transferts en Hydrologie et Environnement (LTHE)
- Utrecht University

Himalayan Water Atlas Compiles Research on Climate Change and Water Issues

How is climate change impacting water resources in the Himalayas? That's a big question, and now there's a comprehensive atlas that policy makers and practitioners can turn to for answers and information.

The Himalayan Climate and Water Atlas is the first publication of its kind, a thorough look at issues, trends, and projections in five of the region's major river basins: the Indus, Brahmaputra, Ganges, Salween, and Mekong.

With nearly 100 pages of maps, graphs, analyses, and policy recommendations, it's essentially a one-stop guide to the issues. Synthesizing recent research in climate science, it covers trends such as changes in temperature, precipitation, glacial melt, and extreme events, addressing issues basin by basin and including the best available projections.

The Atlas was launched in Paris at the 2015 United Nations Climate Change Conference (COP 21), garnering extensive media coverage. Country-specific information will be extracted and shared with individual countries for targeted impact.

Key Partners

- Centre for International Climate and Environmental Research-Oslo (CICERO)
- GRID-Arendal



Flood-Affected People Take Centre Stage as Knowledge Experts at Bihar Roundtable

Bihar is India's poorest state, and also the most flood-prone, with 73 per cent of its area routinely flooded by rivers from the Himalayas. Floods impact over three-quarters of the people of North Bihar. Yet all too often, the people who live through those floods every year aren't treated as experts. At a typical development workshop, outside experts talk while community members listen.

ICIMOD recognized the need for change and pioneered an innovative approach at a roundtable on flooding in the Ganges plain where the power dynamic was reversed. On the dais were flood-affected people from five regions, half of them women, who told their stories, pinpointed the major issues as they see it, and shared their experience of what works and doesn't work in flood response and adaptation. In the audience, the experts listened, asked questions, and synthesized what they heard.

The method drew new attention to issues such as sanitation in floods, garnered praise from the government and stakeholders, and points the way to a more truly collaborative way of engaging community members – not just as aid recipients, but as on-the-ground experts in their own right.



“We face extreme sanitation and drinking water problems during the time of floods. We don't know where to defecate, and most of the time, we defecate in the same water that we drink, (leading to) diseases like diarrhea.”

Bela Devi, Saharsa District, quoted in *Times of India* story on the roundtable

Key Patners

- Centre for Environmental Sciences of Central University of South Bihar, India
- Megh Pyne Abhiyan, India

Nepal's Digital Agriculture Atlas Launched

Decision makers and researchers who need information on agriculture can now find data at their fingertips using the Digital Agriculture Atlas of Nepal, an easy-to-access one-stop source on cereals, cash crops, legumes, vegetables, fruits, and livestock across the country.

Drawn from over 30 years of crop statistics, the Atlas is a tool that enables users to visualize information clearly and quickly through customizable maps, diagrams, and tables. For example, users

looking for comparative information on milk production can learn that Jhapa has over 48,000 milk cows, while high-altitude Dolpa has less than 2,000. It's the sort of information that once would have been time-consuming to gather from different departments, but has now been collected and made accessible to users anywhere in the world.

Developed by ICIMOD with the Ministry of Agricultural Development (MOAD) under the SERVIR-Himalaya Initiative, the online application launched in August will assist with agricultural and food security analysis and planning and will make data produced by the ministry and other relevant agencies widely available.

Key Partners

- Ministry of Agricultural Development (MOAD), Nepal



Innovative Uses for Geospatial Tools, Crowdsourcing and Other New Methods Emerge from Small Grants Programme

The SERVIR-Himalaya Small Grants Programme has spurred innovative ways to help decision makers do everything, from expanding banana production to monitoring forest biomass from the sky.

One application, for instance, aims to improve the effectiveness of forest fire control by bringing communities into the communication loop. In addition to including local people on the automated

updates on forest fires along with district forest officers and other officials, it enables communities to let firefighters know about fires that aren't captured by satellites, which only pass over twice a day. Other apps and programmes use mobile phones, crowdsourcing, and earth observation information to address agriculture, food security, disaster reporting, and a wide range of other issues.

The overall objective of the SERVIR-Himalaya Small Grants Programme is to enhance the regional capacity for evidence-based decision making, expand the network of organizations, universities and institutions, and promote the application of Earth observation data and geospatial tools in decision making. There were eight small grants and six small skills projects funded through the project.



Small Grant Recipients

- Bangladesh University of Engineering And Technology, Bangladesh
- Center for Environmental and Geographic Information Services, Bangladesh
- Geospatial Research and Education Lab, Institute of Space Technology
- HELVETAS Swiss Intercooperation Nepal
- Institute of Water Modelling, Bangladesh
- Kathmandu Living Labs, Nepal
- Kathmandu University, Nepal
- Mountain Agriculture Research Centre and Karakorum University
- Nepal Foresters' Association
- Pokhara Campus, Institute of Forestry, Tribhuvan University
- South Asian Forum for Environment, India
- The Energy and Resources Institute, India

Benefit Sharing Leads to Success in Hydropower Projects

Mountains offer ideal conditions for hydropower, but uneven distribution of benefits can lead to friction between communities and project developers. ICIMOD set out to learn what works and doesn't work by undertaking the first comprehensive research of hydropower benefit sharing in Nepal, analysing over 30 years' worth of projects, including 70 per cent of Nepal's total installed power.

Examining 18 projects ranging from as small as four megawatts to as large as several hundred megawatts, researchers found a variety of missed opportunities, but also identified creative ways to spread the water wealth. In one case, for instance, a hydropower project was linked to an innovative land purchase scheme, which helped to enable farmers, even those who were previously landless, to benefit from increased irrigation by harvesting up to three crops a year.

By analysing the effectiveness of the available benefit sharing mechanisms, researchers are developing a better understanding of how benefits can reach

communities. The next step: Engage in discussions with independent power producers, the Government of Nepal, and other stakeholders so that knowledge will inform policy making and equitable benefit sharing mechanisms will underpin future hydropower projects.

Key Partner

- Niti Foundation, Nepal



Post-Quake Research Clarifies Links between Migration and Community Resilience

It's often thought that migration remittances can boost a community's resilience to disaster. But would that prove to be the case after the 2015 earthquake, or would the lack of youth to help with rescue and reconstruction mean that, in practice, migration makes people more vulnerable?

Research after the earthquake found that while migration added to vulnerability in the immediate aftermath because of a lack of hands to dig people from the rubble, social media connected the migrants to their homes in ways that made a powerful difference. Not only did workers send aid to their families from afar; they often fed their entire villages.

But the encouraging findings come with caveats. For one thing, many migrant workers had poured their savings into houses and lost the fruit of their labours when the houses collapsed. They now faced the prospect of more years of hard labour just to recoup the loss, suggesting that investing in infrastructure alone is a risky strategy for families.

Findings from the research will be published in 2016, but preliminary results have been shared with decision makers to help inform discussions on labour and migration.



Fresh Approach to Food, Energy, and Water Nexus Proves Influential

If energy and water are subsidized to boost crop production, could it lead to more and cheaper food but a shrinking, degraded water supply? Growing crops for biofuels might promise more abundant, cleaner energy, but what happens to food security when cultivable land is diverted?

The Water-Energy-Food Security Nexus Approach, an increasingly influential concept pioneered by ICIMOD and applied in 2015 to climate change adaptation and sustainable development, is a tool to highlight precisely those questions and linkages.

The approach steers the focus away from individual sectors, which can result in competing and counterproductive strategies, and stresses an integrated perspective that identifies trade-offs and maximizes positive impact and policy coherence.

An ICIMOD article applying the approach to climate adaptation, published by *Climate Policy*, quickly logged over 5,200 views and became the second most-read

article on the site. Another influential article applies the concept to the United Nations Sustainable Development Goals in South Asia, while previous work has highlighted Himalayan upstream-downstream linkages.

ICIMOD research is helping to lead the way towards balanced, effective strategies to improve the future of mountain people and ecosystems.



Special Issue of International Journal of Water Resources Development Devoted to ICIMOD Research

A special issue of the *International Journal of Water Resources Development* was devoted in 2015 to sharing the research of ICIMOD experts on a range of Himalayan water-related challenges from the status of glaciers to socioeconomic and policy aspects of water management.

ICIMOD was approached by the journal to compile and edit the special issue, “Himalayan Water at the Crossroads: Issues and Challenges,” which was externally peer reviewed and featured eight articles by ICIMOD researchers and partners. Topics include an overview of changes in glaciers between 1980 and 2010, a report on risk assessment

for glacial lake outburst floods, and a review of the impact of climate change on the Indus, Ganges, and Brahmaputra river basins.

The issue was launched at the Fifteenth World Water Conference of the International Water Resources Association (IWRA), held in Edinburgh, Scotland, and made open access online at ICIMOD’s request to increase accessibility to researchers and stakeholders dealing with these issues in the Himalayas and around the world.

10,931 Number of article views one year after publication

2,642 Views of article on climate change’s impact on three river basins, the 10th most-read article on the site since 2011



Future of Yak in Transboundary Landscape Tackled in Special Research Volume

Yak are integral to the culture and livelihoods of the high Himalayas, but border closures and restrictions have altered the traditions of nomadic pastoralists and closed the road to genetic exchange, while negative impacts are magnified by changing ecosystems and socioeconomic pressures.

China's Tibet-Qinghai Plateau supports the world's strongest yak population, but smaller populations outside that area are becoming in-bred and vulnerable. Yak herders across the region – from China to Afghanistan, Bhutan, India, Nepal and Pakistan – face stresses such as rangeland degradation, climate change, and socioeconomic shifts.

A special research volume examining these pressures and approaches to managing them makes a significant step towards a comprehensive understanding of the ecological, socioeconomic, and cultural role of the yak. By collecting and disseminating key science and management insights

from regional specialists, *Yak on the Move: Transboundary Challenges and Opportunities for Yak Raising in a Changing Hindu Kush Himalayan Region* will help decision makers and stakeholders across the region address the future of yaks and the people they sustain.

Yak herders face challenges that include rangeland degradation and restricted mobility across borders, which limits the yak gene pool



Bhutan Glacial Lake Outburst Flood Draws Quick Response from ICIMOD

On the evening of June 28, a yak herder in Bhutan witnessed an alarming sight when Lemthang Tsho Lake burst its embankment, the start of a glacial lake outburst flood (GLOF). Early warning systems alerted downstream communities as the onrushing water swept away bridges, caused a landslide, and left the lake as nothing but a stream. Concern

about remaining hazards, including the threat of other GLOFs, prompted the Government of Bhutan to ask for ICIMOD's assistance in investigating the event.

A field team was soon on its way, an example of the quick response to the needs of its regional member countries

that ICIMOD is poised to provide. The scientific team, put together by the SERVIR-Himalaya Initiative and Cryosphere Monitoring Programme, assessed the site and other nearby glacial lakes. They allayed fears about those particular lakes and gained more understanding of the dynamic of GLOFs, which pose an increasing risk as climate change intensifies. Findings were presented to Bhutan's Minister of Economic Affairs and other government officials.



Key Partners

- Department of Disaster Management
- Department of Geology and Mines
- Gasar District Administration

FACILITATING REGIONAL COOPERATION



Koshi Basin Information System Shares Data Across Borders

A vast amount of data about the Koshi River Basin is now at your fingertips, even in the field from a mobile phone. It has long been a challenge for users working on transboundary issues to find reliable data that doesn't stop at borders, which is why ICIMOD's Koshi River Basin Programme has long had a goal of creating a knowledge base that collects data generated by the programme and its partners across the region, which includes parts of China, India, and Nepal.

The Koshi Basin Information System (KBIS), which has received over 200 unique visits a month since its launch in 2014, was joined in the summer of 2015 by an app that allows users to access the platform from their mobile phones. The system brings together up-to-date information on climate change and variability, water and agriculture, socio-economic dynamics, and disaster-related concerns through satellite maps, vector imaging, tables and graphics.

"The KBIS is a wonderful setup. We have used it to look at data related to our project such as rainfall, land use and land cover, and drainage maps."

Rajiv Sinha, Head of Department of Earth Sciences, Indian Institute of Technology, Uttar Pradesh



Key Partners

- AN Sinha Institute of Social Sciences, India
- Danish Hydrological Institute, India
- Department of Hydrology and Meteorology, Nepal
- Institute of Geographic Sciences and Natural Resources Research, China
- Institute of Mountain Hazards and Environment, Chinese Academy of Sciences
- International Water Management Institute, Nepal

Festival Builds Links between Pakistan, China within Karakoram-Pamir Landscape

The success of efforts to protect transboundary ecosystems relies in part on building bridges of friendship and cooperation between neighbouring countries and people. Building those connections within the Karakoram-Pamir Landscape was the goal of a 2015 festival that not only drew thousands of participants from China and Pakistan, but was so successful it was extended four additional days and will be taken up by the regional government as a regular event.

Organizing an international festival is a complex feat – particularly in this case, when it concerned a landscape straddling Pakistan's Gilgit-Baltistan and the Kashgar prefecture of China's Xinjiang Uygur Autonomous Region. Security concerns are part of the challenge; so are the differing administrative structures of the two countries that cooperate within the initiative, which addresses the fragile high-altitude ecosystem of the Karakoram and Pamir Mountains.

The festival not only brought together the two governments in collaboration, including high-level officials, but engaged people of the transboundary area in cultural exchange and showcased indigenous products. In the spirit of cross-boundary friendship, 50 elders from Gilgit-Baltistan were invited to visit Chinese villages and offices across the border.

Initially planned as a two-day programme, it was extended to six days at the initiative of the Government of Gilgit-Baltistan, Pakistan, which bore the extra expenses and plans to take it up in the future as an annual event. China is also exploring a similar programme.



Key Partners

- Aga Khan Rural Support Programme (AKRSP)
- Department of Local Government, Government of Gilgit-Baltistan, Pakistan
- Forest, Wildlife and Environment Department (FWED), Government of Gilgit-Baltistan, Pakistan
- General Administration, Government of Gilgit-Baltistan, Pakistan
- Government of Kashgar Prefecture, Xinjiang Uygur Autonomous Region, China
- Government of Xinjiang Uygur Autonomous Region, China Health Department, Department of Health, Government of Gilgit-Baltistan, Pakistan
- Immigration Department, Government of Xinjiang Uygur Autonomous Region, China
- Tourism Department, Government of Gilgit-Baltistan, Pakistan
- Tourism Department, Government of Xinjiang Uygur Autonomous Region, China
- World Wildlife Fund (WWF) Pakistan
- Xinjiang Institute of Ecology and Geography, China

Yarshagumba Workshop Enables Regional Progress towards Sustainable Harvest

When parasitic mushroom spores infect the larvae of ghost moths living in Himalayan soil, a thin finger-like fungus bursts from the head of the dead caterpillar and sets off an annual gold rush in mountain communities. The strange fungus-caterpillar fusion, yarshagumba (*Ophiocordyceps sinensis*), has become a major source of income for

people who fan out across the northern alpine grasslands of Bhutan, India, Nepal and China's Tibetan Plateau to gather the pricey medicinal herb.

But the hunt for this fungal gold has led to overharvesting and environmental degradation. A regional transboundary workshop in Bhutan this year provided

an opportunity for representatives of member countries – particularly those linked with the Kailash Sacred Landscape, which includes yarshagumba-rich areas in China, India, and Nepal – to analyse policy options, discuss management approaches, and exchange knowledge and experience with each other and counterparts in Bhutan, which has made significant strides in yarshagumba management.

Recommendations proposed during the workshop, and now on track for implementation in relevant parts of India and Nepal, included limits on numbers of gatherers and requiring campsites to be at lower rather than higher elevations to protect fragile habitats.



Key Partner

- Department of Forest and Parks Services, Ministry of Agriculture and Forests, Bhutan

Two Eastern Himalaya Transboundary Initiatives Make Progress

Two transboundary initiatives in the eastern Himalayas moved ahead in 2015 with milestones that included pilot projects and the endorsement and implementation of regional cooperation frameworks (RCFs).

The Kangchenjunga Landscape shared by Bhutan, India, and Nepal is a region of great biodiversity that includes the

world's third-tallest peak, Kangchenjunga, the source of many vital Himalayan rivers and watersheds. In 2015, Nepal and Bhutan endorsed the RCF, while India has agreed on the content and is in process of endorsing it. Nine pilot sites are focusing on concerns shared across the Kangchenjunga Landscape, such as human-elephant conflict, tourism development, and niche product development, as well as country-specific issues such as unique cultural areas.

The Landscape Initiative of the Far Eastern Himalayas (HI-LIFE) spreads across parts of China, India, and Myanmar at the junction of three global biodiversity hotspots and two major river systems, the Brahmaputra and Salween, and includes parts of India's Namdapha National Park and Tiger Reserve.

Following HI-LIFE's RCF, a soft guideline that outlines the principles of transboundary cooperation, an innovative process tool called 'Landscape Yatra' brought interdisciplinary teams to pilot sites in China and Myanmar to develop a shared vision for the area and determine next steps.

The Kangchenjunga Landscape is shared by Bhutan, India and Nepal, while the Landscape Initiative for the Far Eastern Himalayas spreads across parts of China, India, and Myanmar

Key Partners

- GB Pant Institute of Himalayan Environmental and Development (GBPIHED)
- Forest Department, Ministry of Environmental Conservation and Forestry (MoECAf), Myanmar
- Kunming Institute of Botany (KIB), Chinese Academy of Sciences (CAS)
- Research Centre for Applied Science and Technology (RECAST), Tribhuvan University, Nepal
- Wildlife Conservation Division (WCD), Department of Forests and Park Services, Ministry of Agriculture and Forests, Bhutan



Community-Based Flood Warning Grows in India; Expands to Nepal, Afghanistan

When water levels rise in flood-prone rivers, villagers are increasingly able to react quickly enough to save lives and livelihoods – whether they live in Assam, India, or the Koshi River basin of Nepal, or, in the latest upscaling of a successful ICIMOD initiative, in Afghanistan.

Community-Based Flood Early Warning Systems (CBFEWS) are low-cost, community-run systems that are easy to run and repair, give speedy warnings when rivers rise, and are being piloted, improved, and operated through ICIMOD programmes across the Hindu Kush Himalayas.

Research and development for the evolving CBFEWS technology is done at the Godavari Knowledge Park, where new technologies are tested as part of continuing efforts to upscale the programme across the Hindu Kush Himalayas.

ICIMOD's focus has been on developing and disseminating technology that can be operated by communities themselves to generate warnings to villages downstream. This approach, beginning with a project in Assam and expanding through piloting and feedback, is now being taken to three additional rivers in India, three sites along Nepal's Koshi River basin, and the Baghlan region of Afghanistan.

As the work upscaled and evolved, partners from Afghanistan and India even joined colleagues in Nepal for a CBFEWS training that was ICIMOD's first regional training after the quake, with participants braving aftershocks to come to Nepal and learn to install and operate the early warning instruments.

ICIMOD has focused on developing and disseminating technology that can be operated by communities themselves

Key Partners

- Aaranyak, Assam, India
- Department of Hydrology and Meteorology (DHM), Nepal
- FOCUS Afghanistan



China Wetlands Symposium Brings Together Regional Experts

ICIMOD has developed significant expertise on wetlands in the Hindu Kush Himalayas over the course of a number of research projects and pilots on wetlands resources, including knowledge on improved management of wetland resources.

A three-day symposium in Dali, China, near the site of ICIMOD's wetlands action research in Yunnan Province, brought together researchers and professionals from around the region to share findings, provide policy input and create a platform for the exchange of information. Three

Chinese research institutions partnered with ICIMOD in organizing the August gathering, Regional Expert Consultative Symposium on Managing Wetlands Ecosystems in the Hindu Kush Himalayas: Securing Services for Livelihoods.

50% of the world's wetlands have been lost since 1990

5,000 sq. km. of wetlands lost annually in Asia

Key Partners

- Chengdu Institute of Biology
- Kunming Institute of Botany
- Ramsar Convention Secretariat
- Yunnan Institute of Environmental Science



Charter Signed to Formalize Himalayan University Consortium as Knowledge Network

The Himalayan University Consortium (HUC) brings together 33 universities from the Hindu Kush Himalayas and ten associate members from Europe and the United States, facilitating their collaboration on academic research to expand knowledge of the mountain region.

The signing of the new charter in 2015 lays out the roles and responsibilities of

the growing number of participants in the membership network. ICIMOD will continue to play the role of facilitator, helping to link the regional and global institutions, programmes, and scholars and promoting the gathering of mountain knowledge.

The charter was signed at a summit that brought together the heads of current and potential HUC member institutions

– presidents, directors, rectors, vice chancellors and others – to discuss ways to move the HUC forward and strengthen the work of its members.

Initiatives of HUC in 2015 included research grants, faculty exchange programmes, training workshops, scholarships and a lecture series. With the charter signed, the consortium will identify regional issues for research, education, training, and more opportunities for academic collaboration that can ultimately benefit the environment and people of the mountains.

“HUC’s vision is to support sustainable mountain development in the HKH, and to contribute to global knowledge through collaborative research, education and training.”

Long Ruijun, Director, Science and Technology Department, Lanzhou University, China



REGIONAL AND GLOBAL OUTREACH

Telefilm “Dhuwa” Entertains While Teaching about Air Pollution

What’s funny about air pollution? It turns out there’s a lot to laugh about – and a lot to learn – when a popular comedic duo joins forces with scientists to create a telefilm on the issue.

“Dhuwa” (Smoke) follows the misadventures of a chain-smoking villager and garbage-burning urban homeowner who end up in the same

hospital room, learning the lessons they resisted. Their antics are watched by two animated parrots, also voiced by the comedians, whose running commentary is filled with information about pollution in geographically diverse terrain – plains, hills and mountains – and its impact on health, the environment and climate change.

“The witty dialogue and animated characters make the film a fun watch.”

Nepali Times

In its brief 37 minutes, the film tackles major themes such as the transboundary nature of air pollution and its major sources, including vehicles, industries, cooking fires, and open fires.

“Dhuwa” was shown in October on Nepal Television after its critically praised Kathmandu premiere, was screened in Sikkim in India, and can be shown in a Hindi version elsewhere across the region. Follow-up research will be used to determine if the approach had an impact on viewer behaviour.



Key Partners

- Institute of Advanced Sustainability Studies (IASS)
- MaHa Sanchar

ICT Award Honours Innovative Tools to Aid Work on Ecosystems, Livelihoods, and Risk Reduction

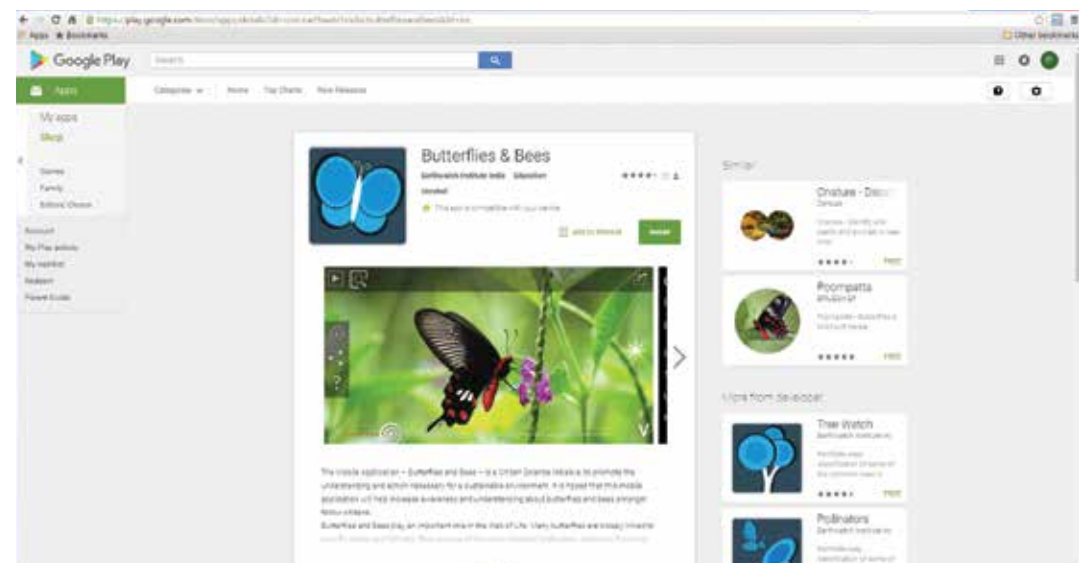
What do butterflies, rising rivers, unstable mountainsides, and the Sherpas of the Everest region have in common? All were the focus of new knowledge tools and applications honoured in 2015 with ICIMOD's ICT for Mountain Development Award, which recognizes the innovative use of information and communication technology (ICT) to support mountain development and conservation in the Hindu Kush Himalayas.

From Earthwatch Institute India came the Butterflies and Bees App, which enables citizen scientists and students to use cell phones to identify butterflies and bees in the field, gaining a better understanding of important pollinators and their current status.

In Nepal, a collaborative effort called StoryCamp Everest created a virtual experience of the Everest region, blending Google Maps with panoramic images and the voices and stories of Sherpa people.

Two winning teams came from Bangladesh. One team focused on landslide risk reduction by combining local knowledge and historical information with geospatial techniques and tools to develop an online GIS-based early warning system for the Chittagong area. Another Bangladesh winning team devised a pair of new mobile services for flood early warning, one of which is top-down and passes information from national to local levels, while the other is bottom-up and conveys local water level data to the national level.

The annual competition is open to individuals and organizations, including universities, government- and donor-funded projects, the private sector and INGOs.



Winners and their Projects:

- Bayes Ahmed/BUET-Japan Institute of Disaster Prevention and Urban Safety, Bangladesh, for Early Warning System for Communities in Chittagong Metropolitan Area
- Earthwatch Institute, India, for Bee and Butterfly App
- Raihanul Haque Khan/Flood Forecasting and Warning Center (FFWC) of the Bangladesh Water Development Board (BWDB), Bangladesh, for Mobile Services for Flood Early Warning:
- Saurav Dhakal/StoryCycle, Nepal, for StoryCamp Everest

ICIMOD Joins India's National Mission on Himalayan Studies

The Government of India has enlisted the expertise of ICIMOD as part of its newly launched effort to protect the complex and fragile Himalayan ecosystem.

The National Mission on Himalayan Studies, an initiative of India's Ministry of Environment, Forests and Climate Change, will address sustainable development by building scientific knowledge, expanding expertise, and finding workable and replicable solutions to issues impacting the Indian Himalayas.

ICIMOD will sit on the Scientific and Technical Advisory Committee, where it will help to provide scientific and technical advice, make recommendations to the project steering committee, and advise the management team of the National Mission on Himalayan Studies on engagement and capacity development.

International Organization for Migration Awards Observer Status to ICIMOD

Around 15 per cent of the world's estimated 105 million labour migrants come from Himalayan countries, where their earnings contribute so strongly to the economy that in Nepal alone remittances make up a quarter of GDP. Now ICIMOD is one of a select group of international organizations and entities to hold observer status at the International Organization for Migration (IOM), the world's principal organization in the field of migration.

In addition to organs of the United Nations, around 35 organizations hold IOM observer

status, including the European Union, League of Arab States, and the International Committee of the Red Cross. ICIMOD was awarded the status during the IOM's 106th Session, held in Geneva in November 2015, which will facilitate work with the IOM and help bring attention to the potential of migration and remittances to expand adaptive capacity, reduce vulnerabilities, support livelihood diversification, improve gender equity, and enhance development in the Hindu Kush Himalayas.



Quake Response Honoured with ESRI Humanitarian Award

ICIMOD's strong response to the Gorkha Earthquake was recognized in 2015 with the ESRI Humanitarian Award, which honoured ICIMOD for the quick, targeted and effective way in which its local responders and global experts were brought together to support the Government of Nepal and relief agencies with the use of cutting-edge applications and skills.

One key challenge in a disaster is to collect, manage, and disseminate reliable information to maximize the success of relief and recovery work on the ground. ICIMOD moved quickly to gather an international coalition of institutions to provide critical information, particularly in areas such as geospatial information. Working around the clock with the help of volunteer scientists around the globe, ICIMOD created a geoportal to provide interactive maps, charts and infographics about the earthquakes and relief efforts, identify landslide and geohazard risks, and provide crucial flight information for helicopter pilots flying rescue and relief missions.

Based in California, ESRI (Environmental Systems Research Institute) is a major international supplier of mapping software and geodatabase management applications.

“ICIMOD's resolve and tireless efforts in the face of such devastation truly inspire us. Their work has already had huge impact and they continue to drive relief and recovery efforts in Nepal”

- Jack Dangermond, President, ESRI



Global Glacier Scientists Gather for International Glaciological Society Forum

Two-hundred and forty scientists from 26 countries came to Kathmandu in March to share the latest findings on glaciers and glacier change during the first symposium of the International Glaciological Society (IGS) to be held in Nepal. Hosted by ICIMOD, the six-day gathering helped to fill knowledge gaps about glaciers in the Hindu Kush

Himalayas, where the mountains of the Hindu Kush Himalayas contain the greatest concentration of glacier ice outside the polar regions.

Topics in the forum included advances in measurements, modelling, and interpretation of glaciological and cryospheric changes in the high

mountains of Asia. The IGS brings global experts together several times a year to share knowledge of glaciers in different regions. Results from the symposium are published in the peer-reviewed journal *Annals of Glaciology*.



“Glaciers in high mountain Asia are the highest on earth, and we have built a strong foundation for future research through this symposium”

Doug MacAyeal, President of the International Glaciological Society

Five-year Strategy and New Initiatives Emerge from Climate and Clean Air Coalition Meeting

More than 120 participants from over 35 countries met in Kathmandu as part of the working group of the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC), a global effort to bring together governments, civil society and the private sector to improve air quality and reduce factors contributing to climate change.

The participants, who included representatives from governments and non-governmental organizations,

developed a five-year strategic plan of action. They also reviewed and agreed on disbursement of funding for new initiatives, including soot-free urban bus fleets, a new regional assessment on air pollution and short-lived climate pollutants in Asia, and research into agricultural enteric methane, such as methane produced by cattle. Participants also discussed monitored and evaluation tools and ways to catalyse different sectors to drive reductions in short-lived climate pollutants.

Strategic Engagement with Corporate Sector Enhanced by Work with SAARC CCI

Organizations that are the voice of industry in the HKH region are increasingly working in partnership with ICIMOD to achieve shared objectives and enhance the role of the corporate sector in promoting sustainable mountain development.

ICIMOD in 2015 signed a memorandum of agreement with the South Asian Association for Regional Cooperation Chambers of Commerce and Industry (SAARC CCI) to support the private sector's capacity to foster sustainable development.

The organizations will cooperate on development of sustainable business solutions, policy dialogues on mutual topics of interest, joint events, and strengthening linkages with national chambers of commerce and industry in the region. ICIMOD's role will include sharing information on climate change and conservation of the region's environment, water resources and energy.

ICIMOD also partnered with the Federation of Indian Chambers of Commerce and Industry (FICCI) to support strategic business engagement and highlight the social and environmental risks and opportunities for business in mountain goods and services.



Climate + Change Exhibition Initiative Comes to India

Climate+Change continued its roll across the Himalayas in 2015 with its arrival in New Delhi, launching the Indian segment of the open-ended initiative that combines an evolving exhibition with outreach, documentation, creative expression, and education around climate issues.

After the success of Climate+Change in Kathmandu and Pokhara, Nepal,

the initiative briefly travelled to parts of the Indian states of Uttarakhand and Arunachal Pradesh, collecting stories and working with communities to share the challenges and opportunities of life in a rapidly changing environment. These stories were exhibited during the launch of the initiative in December by the Indian Minister for Environment, Forest and Climate Change and representatives from Indian Himalayan mountain states.

As Climate+Change Indian Himalayan Region: Our Mountains, Our Future gains momentum, it will highlight stories of the rapidly changing environment, local perspectives, and creative solutions from the Indian Himalayas. The multi-pronged project was launched with the goal of fostering a broader climate smart community that responds constructively to the challenges of environmental change. It serves as a travelling platform to bring together science, policy and practice – with an emphasis on local solutions and inspiring effective responses.

“There are thousands of people doing amazing work. We are going to bring them together and promote the networking of change agents from across the Himalayan region.”

Prakash Javadekar

Minister for Environment, Forest and Climate Change, India



China, India, and Myanmar Host ICIMOD Days

Every year, the people who make ICIMOD's programmes happen in each country – from development partners to policy makers to researchers – come together to showcase their work, engage in dialogue, explore potential partnerships, and build connections for the future.

ICIMOD Day in Myanmar was held in Nay Pyi Taw on 25 March, with a keynote

speech by the Minister of Environmental Conservation and Forestry. The gathering in China, dubbed Partners' Day, was held in November just before the ICIMOD Board Meeting in Kunming, enabling board members and partners to meet face to face.

This year's gathering in India, timed to coincide with International Mountain Day on 11 December, expanded to a full

week, which included a soft launch of the Climate+Change exhibition and display of local products from India's mountain states.

Country days are a platform for mutual sharing and learning and a chance to network, engage in interactive sessions on new and ongoing activities, mobilize support and strengthen collaboration.

Key Partners

- Chinese Academy of Sciences
- Chinese Committee on ICIMOD (CNICIMOD)
- Ministry of Environmental Conservation and Forestry, Myanmar
- Ministry of Environment, Forest and Climate Change (MOEFCC), India



ICIMOD Partners in 2015

Afghanistan

Ministry of Agriculture, Irrigation and
Livestock (MAIL), Kabul (Focal Point)
Eshraq Institute of Higher Education
Focus Humanitarian Assistance
Kabul University (KU), Kabul
National Environmental Protection Agency
(NEPA)

Bangladesh

Ministry of Chittagong Hill Tracts Affairs,
Dhaka (Focal Point)
Institute of Water Modelling(IWM)
Bangladesh Meteorological Department (BMD)
Bangladesh University of Engineering and
Technology (BUET)
Bangladesh Water Development Board
Center for Environmental and Geographic
Information Services (CEGIS)
Ethnic Community Development Organization
(Eco Development)
Institute of Water Modelling(IWM)
Bangladesh University of Engineering and
Technology (BUET), Dhaka
University of Chittagong

Bhutan

Ministry of Agriculture and Forest, Royal
Government of Bhutan (Focal Point)
Bhutan Chamber of Commerce and Industry
Bhutan Media & Communication Institute
(BMCI)
Council for Renewable Natural Resources
Research of Bhutan (CoRRB), Thimphu
Department of Hydro-met Services (DHMS),
Ministry of Economic Affairs
Gross National Happiness Commission
(GNHC)
National Environment Commission (NEC)
National Land Commission (NLC)
National Land Commission Secretariat
Royal University of Bhutan (RUB)
Royal University of Bhutan (RUB), Thimphu
The Council for Renewable Natural Resources
Research of Bhutan, Ministry of Agriculture
and Forests
Ugyen Wangchuk Institute for Conservation
and Environment (UWICE), Bumthang

China

Chinese Academy of Sciences (CAS), Beijing
(Focal Point)
Asian International Rivers Center
Chengdu Institute of Biology (CIB)/ CAS
China – ICIMOD Committee

Institute of Geographic Sciences and Natural
Resources Research (IGSNRR)
Institute of Mountain Hazards and Environment
(IMHE)
International Solar Energy Centre for Tech.
Promotion and Transfer
Kunming Institute of Botany (KIB)
Kunming Institute of Zoology
Lanzhou University
National Natural Science Foundation of China
Sichuan University
Southwest Jiaotong University
Third Pole Environment (TPE)
Tibet Academy of Agriculture and Animal
Sciences (TAAAS)
University of Chinese Academy of Sciences
Xinjiang Institute of Ecology and Geography
Yunnan Academy of Social Sciences
Yunnan Institute of Environmental Science
Yunnan University

India

Ministry of Environment and Forests and
Climate Change (Focal Point)
A N Sinha Institute of Social Studies (ANSISS)
AARANYAK
Advanced Center for Water Resources
Development and Management
(ACWADAM)

Bihar State Disaster Management Authority (BSDMA)
 Central Himalayan Environment Association (CHEA)
 Centre for Ecology Development & Research
 CSK Himachal Pradesh Agricultural University
 DHI (India) Water and Environment Pvt Ltd
 Forest Research Institute, India
 GB Pant Institute of Himalayan Environment and Development
 Greentech Knowledge Solutions Private Limited
 Hemwati Nandan Bahuguna Gharwal University
 Indian Council of Agriculture Research- Research Complex for Eastern Region
 Indian Council of Forestry Research and Education
 Indian Institute of Technology Kanpur (IIT)
 Institute of Economic Growth, University of Delhi Enclave (IEG)
 Institute of Integrated Resource Management
 Megh Pyne Abhiyan
 National Institute of Administrative Research, Lal Bahadur Shastri National Academy of Administration
 National Institute of Disaster Management (NIDM)
 Shoolini University
 Sikkim University, Sikkim
 South Asian Forum for Environment (SAFE)
 Swayam Shikshan Prayog
 Tata Institute of Social Sciences (TISS)
 The Energy and Resource Institute
 The Mountain Institute- India
 Wildlife Institute of India (WII)

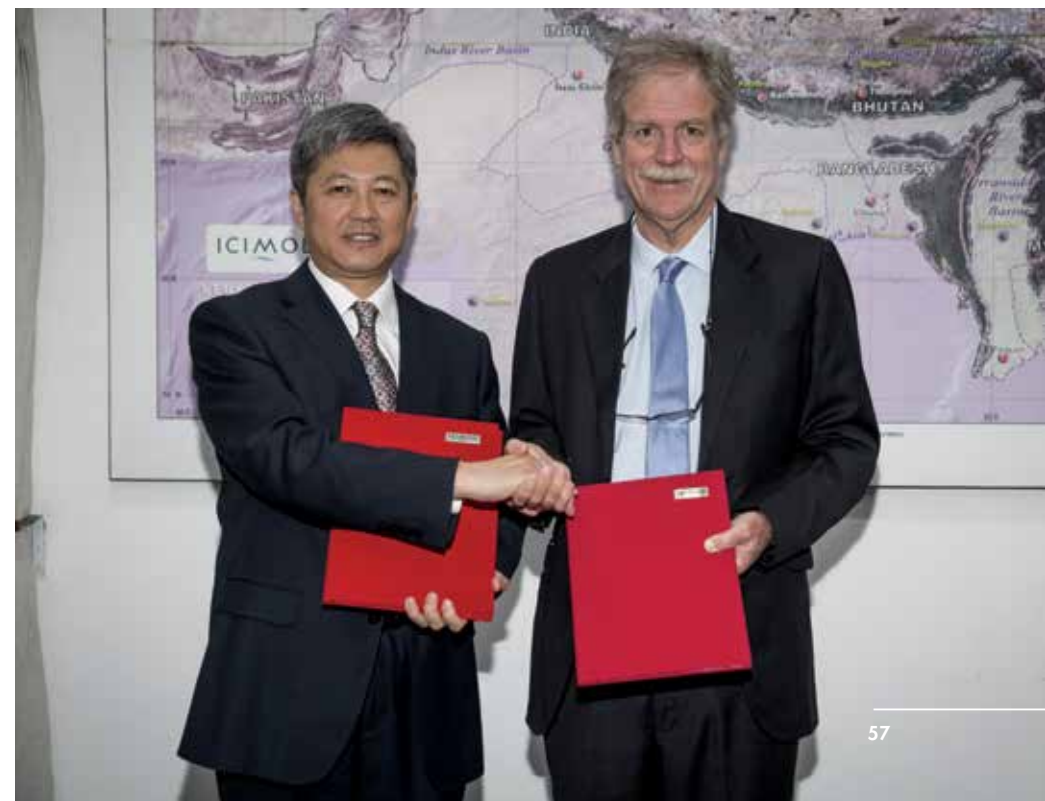
Myanmar

Ministry of Environmental Conservation and Forestry, Yangon (Focal Point)
 Forest Department/ Ministry of Environmental Conservation and Forestry
 Ministry of Hotels and Tourism
 Myanmar Institute for International Development (MIID)
 University of Forestry

Nepal

National Planning Commission, Kathmandu (Focal Point)
 Bird Conservation Nepal (BCN)
 Center for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED)
 Central Department of Geography, Tribhuvan University (CDG, TU)
 Central Department of Hydromology and Meterology
 Centre for the Study of Labour and Mobility/ Social Science Baha
 Climate Alliance for Himalayan Communities (CAHC)
 Department of Agriculture
 Department of Hydrology and Meteorology (DHM)
 Environment Conservation and Development Forum
 Environmental Camps for Conservation Awareness (ECCA)
 Green Governance Nepal
 HELVETAS Swiss Intercooperation Nepal (HELVETAS)

Institute of Forestry (IOF)
 Kathmandu Living Labs
 Kathmandu University (KU)
 Ministry of Forest and Soil Conservation
 Ministry of Population and Environment (MoPE)
 Ministry of Science, Technology and Environment (MoSTE)
 National Association of Village Development Committees in Nepal (NAVIN)
 Nepal Academy of Science and Technology (NAST)
 Nepal Development Research Institute, Kathmandu
 Nepal Forests' Association



Nepal Institute of Development Studies,
Kathmandu
Nepal Mountaineering Association
Nepal Water Conservation Foundation
(NWCF)
Patan Academy of Health Sciences (PAHS)
PHOTO.CIRCLE
Practical Action
Research Centre for Applied Science and
Technology (RECAST)
SAARC Business Association of Home Based
Workers
South Asian Network for Development and
Environmental Economics (SANDEE)
Tribhuvan University
Water and Energy Commission Secretariat
(WECS)
World Wildlife Fund (WWF)

Pakistan

Ministry of National Food Security and
Research, Islamabad (Focal Point)
Aga Khan Rural Support Programme (AKRSP)
Bio-inspired Simulation & Modeling of
Intelligent life laboratory
Institute for Information and Technology
Institute of Space Technology (IST)
Karakoram International University (KIU)
LEAD Pakistan
National University of Sciences and
Technology (NUST)
NWFP Agricultural University
Pakistan Agricultural Research Council (PARC)
Pakistan Meteorological Department (PMD)
Pakistan Wildlife Foundation (PWF)

Pir Mehr Ali Shah ARID Agriculture University &
Consortium of Research and Development
Organizations (PMAS-AAUR & CRDO)
Rural Support Programme Network (RSPN)
Shaheed Benazir Bhutto University
Sustainable Development Policy Institute (SDPI)
The South Asian Association for Regional
Cooperation (SAARC) Chambers of
Commerce and Industry (CCI)
University of Swat
Water and Power Development Authority
(WAPDA)
World Wide Fund For Nature (WWF)

Non-HKH Partners

Asian Disaster Preparedness Center (ADRC)
Asian Institute of Technology (AIT)
Center for International Climate and
Environment Research (CICERO)
Centre for Geoinformatics (Z_GIS), Austria
Chubu University (CU)
Climate & Health Research Network (CHeRN)
Department of Foreign Affairs and Trade
(DFAT)
DHI, Denmark
Disaster Prevention Research Institute (DPRI),
Kyoto University
Ev-K2-CNR Committee (Ev-K2-CNR)
Finnish Meteorological Institute (FMI)
Friedrich Schiller University (FSU)
India China Institute, The New School, USA
Institut de Recherche pour le Développement
(IRD)
International Initiative for Impact Evaluation
(3ie)

International Institute for Geo-Information
Science and Earth Observation (ITC), the
Netherlands
International Organisation for Migration (IoM)
Molina Center for Strategic Studies in Energy
and the Environment (MCE2)
Norwegian University of Life Sciences (UMB),
Norway
Norwegian Water Resources and Energy
Directorate (NVE)
Partnership Brokers Association (PBA)
Regional Integrated Multi-Hazard Early
Warning System for Africa and Asia
(RIMES)
SN Power
Statkraft
Swiss Federal Institute of Technology Zurich
(ETH)
United Nations Environment Programme
(UNEP)
United Nations Environment Programme
(UNEP)/GRID-ARENDAL
United Nations Office for Outer Space Affairs
United Nations University (UNU), Japan
United Nations World Food Programme (WFP-
Nepal)
University of Central Asia (UCA), Central
Administration Office, Kyrgyzstan
University of New Mexico (UNM), USA
University of the Highlands and Islands, UK
University of Washington
Wageningen University (WU)
World Conservation Monitoring Centre
(WCMC)
World Meteorological Organisation (WMO)
World Resource Institute (WRI)

ICIMOD Publications

From ICIMOD

ICIMOD disseminates much of the information gathered during programme activities in the form of printed and electronic publications targeted at policy makers, development workers, government experts and decision makers, students, and the interested public. All ICIMOD publications can be downloaded free of charge from www.icimod.org/himaldoc. Hard copies are provided free to institutions actively involved in sustainable development of the Hindu Kush Himalayan region.

Books and Booklets

The Himalayan Climate and Water Atlas: Impact of climate change on water resources in five of Asia's major river basins. ICIMOD, GRID-Arendal and CICERO 100pp Shrestha, AB; Agrawal, NK; Alfthan, B; Bajracharya, SR; Maréchal, J; van Oort, B (eds) ISBN 978 92 9115 356 5

Kangchenjunga Landscape Nepal: from conservation and development perspectives. Ministry of Forests and Soil Conservation (MoFSC), Government of Nepal; Research Centre for Applied Science and Technology (RECAST), Tribhuvan University; and International Centre for Integrated Mountain Development (ICIMOD). Kathmandu, Nepal. 126pp Chaudhary, R.P., Upreti, Y., Joshi, S.P., Shrestha, K.K., Basnet, K.B., Basnet, G., Shrestha, K.R., Bhatta, K.P., Acharya, K.P., and Chettri, N.

Special publication

Multi-scale forest biomass assessment and monitoring in the Hindu Kush Himalayan region: A geospatial perspective. Kathmandu: ICIMOD 219pp Murthy, MSR; Wesselman, S; Gilani, H (eds.) ISBN 978 92 9115 336 7

ICIMOD working papers

Development of Allometric Equations for *Paulownia tomentosa* (Thunb.) to Estimate Biomass and Carbon Stocks : An assessment from the ICIMOD Knowledge Park, Godavari, Nepal. ICIMOD Working Paper 2015/10. Kathmandu: ICIMOD 52pp Joshi, N. R.; Karki, S.; Adhikari, M. D.; Udas, E.; Sherpa, S.; Karki, B. S.; Chettri, N.; Kotru, R.; Ning, W. ISBN 978 92 9115 358 9

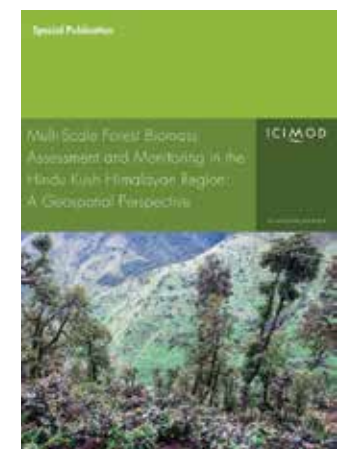
Transforming mountain forestry in the Hindu Kush Himalayas: Toward a third-generation forest management paradigm. ICIMOD Working Paper 2015/9. Kathmandu: ICIMOD

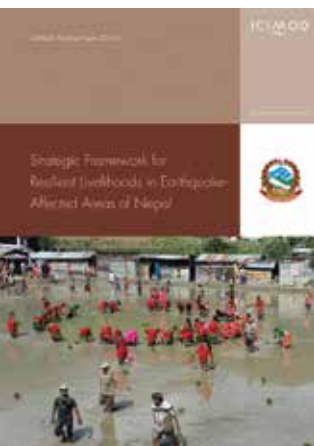
30pp Kotru, R; Rathore, BMS; Pradhan, N; Bhatta, LD; Acharya, G; Karki, B; Sigdel, S; Bhojvaid, PP; Gera, N; Sharma, S ISBN 978 92 9115 353 4

REDD+ in the Hindu Kush Himalayas: A stocktaking study from Bhutan, India, Myanmar, Nepal, and Pakistan. ICIMOD Working Paper 2015/8. Kathmandu: ICIMOD 68pp Roy, R; Karki, S; Karki, BS; Kotru, R; Sohail, M; Reinhardt, S ISBN: 978 92 9115 351 0

Shifting cultivation in Bangladesh, Bhutan and Nepal: Weighing government policies against customary tenure and institutions. ICIMOD Working Paper 2015/7. Kathmandu: ICIMOD 72pp Phuntsho, K; Aryal, KP; Kotru, R ISBN 978 92 9115 349 7

Strategic framework for resilient livelihoods in earthquake-affected areas of Nepal. ICIMOD Working Paper 2015/6. Kathmandu: ICIMOD





58pp Rasul, G; Sharma, B; Mishra, B; Neupane, N; Dorji, T; Khadka, M; Joshi, S ISBN 978 92 9115 347 3

Assessment of change in forest cover and biomass using geospatial techniques to support REDD+ activities in Nepal. ICIMOD Working Paper 2015/5. Kathmandu: ICIMOD 60pp Gilani, H; Murthy, MSR; Bajracharya, B; Karky, BS; Koju, UA; Joshi, G; Karki, S; Sohail, M ISBN 978 92 9115 344 2

Tools for Developing a Biocultural Community Protocol. ICIMOD Working Paper 2015/4. Kathmandu: ICIMOD 28pp Oli, KP; Rana, P; Shah, R; Rawal, RS; Chaudhary, R; Yang, Y; Yao, F; Kotru, R; Bhatta, LD ISBN 978 92 9115 332 9



A Strategic Framework for Sustainable Development in the Chittagong Hill Tracts of Bangladesh. ICIMOD Working Paper 2015/3. Kathmandu: ICIMOD 32pp Rasul, G ISBN 978 92 9115 342 8

Long-term environmental and socioecological monitoring in transboundary landscapes: An interdisciplinary implementation framework. ICIMOD Working Paper 2015/2. Kathmandu: ICIMOD 36pp Chettri, N; Bubba, P; Kotru, R; Rawat, G; Ghate, R; Murthy, MSR; Wallrapp, C; Pauli, H; Shrestha, AB; Mool, PK;

Chaudhary, D; Chaudhary, RP; Mathur, PK; Peili, S; Ning, W; Sharma, E ISBN: 978 92 9115 334 3

Scientific Framework for ICIMOD's Regional Programme on Adaptation to Change. ICIMOD Working Paper 2015/1. Kathmandu: ICIMOD 28pp ISBN 978 92 9115 339 8

Case Study

Strengthening Flash Flood Risk Management in the Hindu Kush Himalayas : The need for specific policies and better interfaces with local institutions 5pp Shrestha, A. B.; Pradhan, N. S.

Building Resilience to Droughts : Scaling up Weather Insurance in China, India, and Thailand 5pp Sirimanne, S.; Srivastava, S.; Kim, S. E.; Li, H. M. D.; Firer, A.; Sinha, S

Building Better Water Governance in Response to Climate Change and Water Stress : A Case Study of Lijiang, Yunnan Province, China 6pp Su, Y.; Grumbine, R. E.; Xu, J.; Hyde, K.

Improving the Practice and Policy of Springshed Management in India Dhawan, H. 5pp

Electronic publications

Proceedings of the national workshop on Payment for Ecosystem Services: Opportunities and Challenges in Nepal. Kathmandu: ICIMOD 70pp

Workshop Proceedings for Developing 'Theory of Change' Kangchenjunga Landscape Conservation and Development Initiative, 18-20 February, 2015. Kathmandu, ICIMOD 34pp

Proceedings of 3rd Regional strategic consultative meeting on the Kangchenjunga Landscape Conservation and Development Initiative, ICIMOD, Kathmandu, Nepal, 23—24 February 2015. Kathmandu, ICIMOD 34pp

Proceedings on Regional Technical Meeting on 'Conservation and Development Strategy' and 'Regional Cooperation Framework' for Kangchenjunga Landscape Conservation and Development Initiative. Kathmandu: ICIMOD 32pp

Manual for Mapping Rock Glaciers in Google Earth. Kathmandu: ICIMOD 38pp Stumm, D; Schmid, MO; Gruber, S; Baral, P; Shahi, S; Shrestha, T; Wester, P ISBN 978 92 9115 366 4

General publications

Annual Report 2014

Godavari Birds

Reviving the Drying Springs : Reinforcing Social Development and Economic Growth in the Midhills of Nepal, Issue Brief, February 2015 (Lang: English)

Reviving the Drying Springs : Reinforcing Social Development and Economic Growth in the Midhills of Nepal, Issue Brief, February 2015 (Lang: Nepali)

Partnership with Private Sector

Information sheets/flyers

Himalayan University Consortium (HUC): Promoting academic partnerships and collaboration for sustainable mountain development

Digital Agriculture Atlas of Nepal

Using Information and Communication Technology to Support Mountain Development

Karakoram-Pamir-Wakhan Landscape Conservation and Development Initiative

Promotion of the Rittha (Soap Nut) Value Chain in Nepal: Sustainable Livelihoods in the Kailash Sacred Landscape

Promotion of the Off-Season Vegetable Value Chain in India: Sustainable Livelihoods in the

Kailash Sacred Landscape

Promotion of the Nigalo (Himalayan Bamboo) Value Chain in Nepal: Sustainable Livelihoods in the Kailash Sacred Landscape

Promotion of the Chyura Soap and Lip Balm Value Chain in India: Sustainable Livelihoods in the Kailash Sacred Landscape

Promotion of the Chyura Honey Value Chain in India: Sustainable Livelihoods in the Kailash Sacred Landscape

Promotion of the Allo (Himalayan Nettle) Value Chain in Nepal: Sustainable Livelihoods in the Kailash Sacred Landscape

Partner Factsheet of Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) – India

Partner Factsheet of Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) – China

Partner Factsheet of Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) – Nepal

Himalayan Climate Change Adaptation Programme in China

An Integrated Springshed Management Approach Linking Science, Policy, and Practice: Collaborative applied research in the Kailash Sacred Landscape (India and Nepal)

Conservation and Development in the Far-eastern Himalayan Landscape: Implementing the transboundary Hi-LIFE Initiative

Mapping Decadal Land Cover Changes

Mainstreaming Disaster Risk Reduction (DRR)

Forest Fire Detection and Monitoring System
REDD+ Monitoring Using Remote Sensing Data and Techniques

Satellite-based Agricultural Monitoring

Climate Smart Villages : Building Affordable and Replicable Adaptation Pilots in Mountain Areas

Atmosphere Initiative

Myanmar Ecotourism Policy and Management Strategy

Videos

Dhuwa - A Telefilm on Air Pollution, Duration: 36:36 mins

Enhancing Adaptive Capacity at the Community Level
Duration: 3:18 mins

A Short Introduction to the Himalayan Climate Change Adaptation Programme (HICAP)
Duration: 3:18 mins

Regional Training Workshop for Journalists
Duration: 5:55 mins



ICIMOD researchers in external publications

Peer Reviewed Articles

Abbas, S; Qamer, FM; Murthy, MSR; Tripathi, NK; Ning, W; Sharma, E; Ali, G (2015) 'Grassland Growth in Response to Climate Variability in the Upper Indus Basin, Pakistan.' *Climate* 3(3): 697.

Ayala, A; Pellicciotti, F; Shea, JM (2015) 'Modeling 2m air temperatures over mountain glaciers: Exploring the influence of katabatic cooling and external warming.' *Journal of Geophysical Research: Atmospheres* 120(8): 3139-3157. 10.1002/2015JD023137

Bajracharya, SR; Maharjan, SB; Shrestha, F; Guo, W; Liu, S; Immerzeel, W; Shrestha, B (2015) 'The glaciers of the Hindu Kush Himalayas: current status and observed changes from the 1980s to 2010.' *International Journal of Water Resources Development* 31(2): 161-173. 10.1080/07900627.2015.1005731

Bettini, G; Gioli, G (2015) 'Waltz with development: insights on the developmentalization of climate-induced migration.' *Migration and Development*: 1-19. 10.1080/21632324.2015.1096143

Bhatta, LD; van Oort, BEH; Stork, NE; Baral, H (2015) 'Ecosystem services and livelihoods in a changing climate: Understanding local adaptations in the Upper Koshi, Nepal.' *International Journal of Biodiversity Science, Ecosystem Services & Management*: 1-11. 10.1080/21513732.2015.1027793

Brun, F; Dumont, M; Wagnon, P; Berthier, E; Azam, MF; Shea, JM; Sirguey, P; Rabatel, A; Ramanathan, AI (2015) 'Seasonal changes in surface

albedo of Himalayan glaciers from MODIS data and links with the annual mass balance.' *The Cryosphere* 9(1): 341-355. 10.5194/tc-9-341-2015

Butt, EW; Rap, A; Schmidt, A; Scott, CE; Pringle, KJ; Reddington, CL; Richards, NAD; Woodhouse, MT; Ramirez-Villegas, J; Yang, H; Vakkari, V; Stone, EA; Rupakheti, M; Praveen, PS; van Zyl, PG; Beukes, JP; Josipovic, M; Mitchell, EJS; Sallu, SM; Forster, PM; Spracklen, DV (2015) 'The impact of residential combustion emissions on atmospheric aerosol, human health and climate.' *Atmos. Chem. Phys. Discuss.* 15(14): 20449-20520. 10.5194/acpd-15-20449-2015

Chaudhary, S; Chettri, N; Uddin, K; Khatri, TB; Dhakal, M; Bajracharya, B; Ning, W (2014) 'Implications of land cover change on ecosystem, ecosystem services and livelihoods of people: a Case Study from the Koshi Tappu Wildlife Reserve, Nepal.' *Forestry - Journal of Institute of Forestry, Nepal* 14: 81-97.

Chaudhary, S; McGregor, A; Houston, D; Chettri, N (2015) 'The evolution of ecosystem services: A time series and discourse-centered analysis.' *Environmental Science & Policy* 54: 25-34. <http://dx.doi.org/10.1016/j.envsci.2015.04.025>

Chettri, N (2014) 'Reconciling Mountain Biodiversity Conservation in a Changing Climate: A Hindu Kush-Himalayan Perspective.' *Conservation Science* 2(1): 17-17. 10.3126/cs.v2i1.13766

Chettri, N (2015) 'Distribution of butterflies along a trekking corridor in the Khangchendzonga Biosphere Reserve, Sikkim, Eastern Himalayas.' *Conservation Science* 3(1)

Chinnasamy, P; Bharati, L; Bhattarai, U; Khadka, A; Dahal, V; Wahid, S (2015) 'Impact of planned water resource development on current and future water demand in the Koshi River basin, Nepal.' *Water International* 40(7): 1004-1020. 10.1080/02508060.2015.1099192

Chitale, VS; Behera, MD; Roy, PS (2015) 'Global biodiversity hotspots in India: significant yet under studied.' *Current Science* 108(2): 149-149.

Choudhary, D; Kunwar, MS; Rasul, G (2015) 'From Farmers to Entrepreneurs—Strengthening Malta Orange Value Chains Through Institutional Development in Uttarakhand, India.' *Mountain Research and Development* 35(1): 4-15. 10.1659/MRD-JOURNAL-D-14-00036.1

Dewan, C; Mukherji, A; Buisson, M-C (2015) 'Evolution of water management in coastal Bangladesh: from temporary earthen embankments to depoliticized community-managed polders.' *Water International* 40(3): 401-416. 10.1080/02508060.2015.1025196

Fang, Y-p; Zhao, C; Rasul, G; Wahid, SM (2016) 'Rural household vulnerability and strategies for improvement: An empirical analysis based on time series.' *Habitat International* 53: 254-264. <http://dx.doi.org/10.1016/j.habitatint.2015.11.035>

Ganttt, B; Hoque, S; Fahey, KM; Willis, RD; Delgado-Saborit, JM; Harrison, RM; Zhang, KM; Jefferson, DA; Kalberer, M; Bunker, KL; Conny, JM; Bhawe, PV; Weinstein, JP; Pye, HOT (2015) 'Factors Affecting the Ambient Physicochemical Properties of Cerium-Containing Particles Generated by Nanoparticle Diesel Fuel Additive Use.' *Aerosol Science and Technology* 49(6): 371-380. 10.1080/02786826.2015.1027809

- Gao, J; Xu, B; Wang, JN; Zhou, HY; Wang, YX; Wu, Y (2015) 'Correlations among leaf traits of typical shrubs and their responses to different light environments in shrub-grassland of southern China.' *Chinese Journal of Ecology* 34(9): 2424-2431.
- Gerlitz, J-Y; Apablaza, M; Hoermann, B; Hunzai, K; Bennett, L (2015) 'A Multidimensional Poverty Measure for the Hindu Kush-Himalayas, Applied to Selected Districts in Nepal.' *Mountain Research and Development* 35(3): 278-288. 10.1659/MRD-JOURNAL-D-14-00027.1
- Gertler, CG; Puppala, SP; Panday, A; Stumm, D; Shea, J (2016) 'Black carbon and the Himalayan cryosphere: A review.' *Atmospheric Environment* 125, Part B: 404-417. <http://dx.doi.org/10.1016/j.atmosenv.2015.08.078>
- Gurung, M; Partap, U; Choudhary, D (2015) 'Empowering Mountain Women through Community-based High Value Product Value Chain Promotion in Nepal' *International Journal of Agricultural Resources, Governance and Ecology* 11(3/4): 330-345.
- Herreid, S; Pellicciotti, F; Ayala, A; Chesnokova, A; Kienholz, C; Shea, J; Shrestha, A (2015) 'Satellite observations show no net change in the percentage of supraglacial debris-covered area in northern Pakistan from 1977 to 2014.' *Journal of Glaciology* 61(227): 524-536. 10.3189/2015JoG14J227
- Hoogesteger, J; Wester, P (2015) 'Intensive groundwater use and (in)equity: Processes and governance challenges.' *Environmental Science & Policy* 51(0): 117-124. <http://dx.doi.org/10.1016/j.envsci.2015.04.004>
- Hussain, A; Agrawal, NK; Leikanger, I (2015) 'Action for Adaptation: Bringing climate change science to policy makers - a synthesis report of a conference held in Islamabad on 23-25 July 2015.' *Conference Report Food Security*: 1-5. 10.1007/s12571-015-0529-7
- Hussain, A; Thapa, GB (2015) 'Fungibility of Smallholder Agricultural Credit: Empirical Evidence from Pakistan.' *European Journal of Development Research* (13 August 2015) 10.1057/ejdr.2015.55
- Immerzeel, WW; Wanders, N; Lutz, AF; Shea, JM; Bierkens, MFP (2015) 'Reconciling high-altitude precipitation in the upper Indus basin with glacier mass balances and runoff.' *Hydrology and Earth System Sciences* 19(11): 4673-4687. 10.5194/hess-19-4673-2015
- Jørgensen, K; Jogesh, A; Mishra, A (2015) 'Multi-level climate governance and the role of the subnational level.' *Journal of Integrative Environmental Sciences*: 1-11. 10.1080/1943815X.2015.1096797
- Jørgensen, K; Mishra, A; Sarangi, GK (2015) 'Multi-level climate governance in India: the role of the states in climate action planning and renewable energies.' *Journal of Integrative Environmental Sciences*: 1-17. 10.1080/1943815X.2015.1093507
- Junttila, V; Gautam, B; Karky, B; Maguya, A; Tegel, K; Kauranne, T; Gunia, K; Hamalainen, J; Latva-Kayra, P; Nikolaeva, E; Peuhkurinen, J (2015) 'Robustness of model-based high-resolution prediction of forest biomass against different field plot designs.' *Carbon Balance and Management* 10(1): 29.
- Kandel, P; Gurung, J; Chettri, N; Ning, W; Sharma, E (2015) 'Biodiversity research trends and gap analysis from a transboundary landscape, Eastern Himalayas.' *Journal of Asia-Pacific Biodiversity* <http://dx.doi.org/10.1016/j.japb.2015.11.002>
- Kargel, JS; Leonard, GJ; Shugar, DH; Haritashya, UK; Bevington, A; Fielding, EJ; Fujita, K; Geertsema, M; Miles, ES; Steiner, J; Anderson, E; Bajracharya, S; Bawden, GW; Breashears, DF; Byers, A; Collins, B; Dhital, MR; Donnellan, A; Evans, TL; Geai, ML; Glasscoe, MT; Green, D; Gurung, DR; Heijnen, R; Hilborn, A; Hudnut, K; Huyck, C; Immerzeel, WW; Liming, J; Jibson, R; Kääb, A; Khanal, NR; Kirschbaum, D; Kraaijenbrink, PDA; Lamsal, D; Shiyin, L; Mingyang, L; McKinney, D; Nahirnick, NK; Zhuotong, N; Ojha, S; Olsenholler, J; Painter, TH; Pleasants, M; KC, P; Yuan, Q; Raup, BH; Regmi, D; Rounce, DR; Sakai, A; Donghui, S; Shea, JM; Shrestha, AB; Shukla, A; Stumm, D; van der Kooij, M; Voss, K; Xin, W; Weihs, B; Wolfe, D; Lizong, W; Xiaojun, Y; Yoder, MR; Young, N (2015) 'Geomorphic and geologic controls of geohazards induced by Nepal's 2015 Gorkha earthquake.' *Science* 10.1126/science.aac8353
- Karna, YK; Hussain, YA; Gilani, H; Bronsveld, MC; Murthy, MSR; Qamer, FM; Karky, BS; Bhattarai, T; Aigong, X; Baniya, CB (2015) 'Integration of WorldView-2 and airborne LiDAR data for tree species level carbon stock mapping in Kayar Khola watershed, Nepal.' *International Journal of Applied Earth Observation and Geoinformation* 38(0): 280-291. <http://dx.doi.org/10.1016/j.jag.2015.01.011>
- Khan, AU; Saboor, A; Hussain, A; Karim, S; Hussain, S (2015) 'Spatial and Temporal Investigation of Multidimensional Poverty in Rural Pakistan.' *Poverty & Public Policy* 7(2): 158-175. 10.1002/pop4.99
- Khanal, NR; Hu, J-M; Mool, P (2015) 'Glacial Lake Outburst Flood Risk in the Poiqu/Bhote Koshi/Sun Koshi River Basin in the Central Himalayas.' *Mountain Research and Development* 35(4): 351-364. 10.1659/MRD-JOURNAL-D-15-00009
- Khanal, NR; Mool, PK; Shrestha, AB; Rasul, G; Ghimire, PK; Shrestha, RB; Joshi, SP (2015) 'A comprehensive approach and methods for glacial lake outburst flood risk assessment, with examples from Nepal and the transboundary area.' *International Journal of Water Resources Development* 31(2): 219-237. 10.1080/07900627.2014.994116

- Kim, BM; Park, J-S; Kim, S-W; Kim, H; Jeon, H; Cho, C; Kim, J-H; Hong, S; Rupakheti, M; Panday, AK; Park, RJ; Hong, J; Yoon, S-C (2015) 'Source apportionment of PM10 mass and particulate carbon in the Kathmandu Valley, Nepal.' *Atmospheric Environment* 123, Part A: 190-199. <http://dx.doi.org/10.1016/j.atmosenv.2015.10.082>
- Kotru, R; Rawal, RS; Mathur, PK; Chettri, N; Chaudhari, SA; Uddin, K; Murthy, MSR; Singh, S (2014) 'Effective Management of Trans boundary Landscapes – Geospatial Applications.' *ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* XL-8: 1309-1317. 10.5194/isprsarchives-XL-8-1309-2014
- Kraaijenbrink, P; Meijer, SW; Shea, JM; Pellicciotti, F; De Jong, SM; Immerzeel, WW (2015) 'Seasonal surface velocities of a Himalayan glacier derived by automated correlation of unmanned aerial vehicle imagery.' *Annals of Glaciology* 57(71) 10.3189/2016AoG71A072
- Kulkarni, S; Sobhani, N; Miller-Schulze, JP; Shafer, MM; Schauer, JJ; Solomon, PA; Saide, PE; Spak, SN; Cheng, YF; Denier van der Gon, HAC; Lu, Z; Streets, DG; Janssens-Maenhout, G; Wiedinmyer, C; Lantz, J; Artamonova, M; Chen, B; Imashev, S; Sverdluk, L; Deminter, JT; Adhikary, B; D'Allura, A; Wei, C; Carmichael, GR (2015) 'Source sector and region contributions to BC and PM2.5 in Central Asia.' *Atmospheric Chemistry and Physics* 15(4): 1683-1705. 10.5194/acp-15-1683-2015
- Lama, L; Kayastha, RB; Maharjan, SB; Bajracharya, SR; Chand, MB; Mool, PK (2015) 'Glacier area and volume changes of Hidden Valley, Mustang, Nepal from ~1980s to 2010 based on remote sensing.' *Proceedings of the International Association of Hydrological Sciences* 368: 57-62.
- Mishra, SK; Agnihotri, R; Yadav, PK; Singh, S; Prasad, M; Praveen, PS; Tawale, JS; Rashmi; Mishra, ND; Arya, BC; Sharma, C (2015) 'Morphology of atmospheric particles over semi-arid region (Jaipur, Rajasthan) of India: Implications for optical properties.' *Aerosol and Air Quality Research* 15(3): 974-984. 10.4209/aaqr.2014.10.0244
- Mohanty, SK; Mohapatra, SR; Kastor, A; Singh, AK; Mahapatra, B (2015) 'Does Employment-Related Migration Reduce Poverty in India?' *Journal of International Migration and Integration* 10.1007/s12134-015-0436-y
- Mustafa, D; Gioli, G; Qazi, S; Waraich, R; Rehman, A; Zahoor, R (2015) 'Gendering flood early warning systems: the case of Pakistan.' *Environmental Hazards* 14(4): 312-328. 10.1080/17477891.2015.1075859
- Nepal, S; Shrestha, AB (2015) 'Impact of climate change on the hydrological regime of the Indus, Ganges and Brahmaputra river basins: a review of the literature.' *International Journal of Water Resources Development* 31(2): 201-218. 10.1080/07900627.2015.1030494
- Nolte, CG; Appel, KW; Kelly, JT; Bhawe, PV; Fahey, KM; Collett Jr, JL; Zhang, L; Young, JO (2015) 'Evaluation of the Community Multiscale Air Quality (CMAQ) model v5.0 against size-resolved measurements of inorganic particle composition across sites in North America.' *Geoscientific Model Development Discuss.* 8(5): 3861-3904. 10.5194/gmdd-8-3861-2015
- Pradhan, NS; Sijapati, S; Bajracharya, SR (2015) 'Farmers' responses to climate change impact on water availability: insights from the Indrawati Basin in Nepal.' *International Journal of Water Resources Development* 31(2): 269-283. 10.1080/07900627.2015.1033514
- Prakash, A; Singh, S; Brouwer, L (2015) 'Water Transfer from Peri-urban to Urban Areas: Conflict over Water for Hyderabad City in South India.' *Environment and Urbanization Asia* 6(1): 41-58. 10.1177/0975425315585194
- Putero, D; Cristofanelli, P; Marinoni, A; Adhikary, B; Duchi, R; Shrestha, SD; Verza, GP; Landi, TC; Calzolari, F; Busetto, M; Agrillo, G; Biancofiore, F; Di Carlo, P; Panday, AK; Rupakheti, M; Bonasoni, P (2015) 'Seasonal variation of ozone and black carbon observed at Paknajol, an urban site in the Kathmandu Valley, Nepal.' *Atmos. Chem. Phys. Discuss.* 15(16): 22527-22566. 10.5194/acpd-15-22527-2015
- Ragetti, S; Pellicciotti, F; Immerzeel, WW; Miles, ES; Petersen, L; Heynen, M; Shea, JM; Stumm, D; Joshi, S; Shrestha, A (2015) 'Unraveling the hydrology of a Himalayan catchment through integration of high resolution in situ data and remote sensing with an advanced simulation model.' *Advances in Water Resources* 78: 94-111. 10.1016/j.advwatres.2015.01.013
- Rai, RK; Shyamsundar, P; Nepal, M; Bhatta, LD (2015) 'Differences in demand for watershed services: Understanding preferences through a choice experiment in the Koshi Basin of Nepal.' *Ecological Economics* 119: 274-283. <http://dx.doi.org/10.1016/j.ecolecon.2015.09.013>
- Rasul, G (2015) 'Managing the food, water, and energy nexus for achieving the Sustainable Development Goals in South Asia.' *Environmental Development* (Available online 4 December 2015) <http://dx.doi.org/10.1016/j.envdev.2015.12.001>
- Rasul, G (2015) 'Water for growth and development in the Ganges, Brahmaputra, and Meghna basins: an economic perspective.' *International Journal of River Basin Management* 31(2): 1-14. 10.1080/15715124.2015.1012518
- Rasul, G; Hussain, A (2015) 'Sustainable Food Security in the Mountains of Pakistan: Towards a Policy Framework.' *Ecology of Food and Nutrition*: 1-19. 10.1080/03670244.2015.1052426
- Rasul, G; Sharma, B (2015) 'The nexus approach to water–energy–food security: an option for

- adaptation to climate change.' *Climate Policy*: 1-21. 10.1080/14693062.2015.1029865
- Rawat, PK; Pant, CC; Nibanupud, HK (2015) 'Environmental geoinformatics of fast growing Himalaya's foothill towns and surrounding: concept and implementation.' *Earth Science Informatics* 10.1007/s12145-015-0225-3
- Roy, PS; Behera, MD; Murthy, MSR; Roy, A; Singh, S; Kushwaha, SPS; Jha, CS; Sudhakar, S; Joshi, PK; Reddy, CS; Gupta, S; Pujar, G; Dutt, CBS; Srivastava, VK; Porwal, MC; Tripathi, P; Singh, JS; Chitale, V; Skidmore, AK; Rajshekhar, G; Kushwaha, D; Karnataka, H; Saran, S; Giriraj, A; Padalia, H; Kale, M; Nandy, S; Jeganathan, C; Singh, CP; Biradar, CM; Pattanaik, C; Singh, DK; Devagiri, GM; Talukdar, G; Panigrahy, RK; Singh, H; Sharma, JR; Haridasan, K; Trivedi, S; Singh, KP; Kannan, L; Daniel, M; Misra, MK; Niphadkar, M; Nagbhatla, N; Prasad, N; Tripathi, OP; Prasad, PRC; Dash, P; Qureshi, Q; Tripathi, SK; Ramesh, BR; Gowda, B; Tomar, S; Romshoo, S; Giriraj, S; Ravan, SA; Behera, SK; Paul, S; Das, AK; Ranganath, BK; Singh, TP; Sahu, TR; Shankar, U; Menon, ARR; Srivastava, G; Neeti; Sharma, S; Mohapatra, UB; Peddi, A; Rashid, H; Salroo, I; Krishna, PH; Hajra, PK; Vergheese, AO; Matin, S; Chaudhary, SA; Ghosh, S; Lakshmi, U; Rawat, D; Ambastha, K; Kalpana, P; Devi, BSS; Gowda, B; Sharma, KC; Mukharjee, P; Sharma, A; Davidar, P; Raju, RRV; Ketewa, SS; Kant, S; Raju, VS; Uniyal, BP; Debnath, B; Rout, DK; Thapa, R; Joseph, S; Chhetri, P; Ramchandran, R (2015) 'New vegetation type map of India prepared using satellite remote sensing: Comparison with global vegetation maps and utilities.' *International Journal of Applied Earth Observation and Geoinformation* 39(0): 142-159. <http://dx.doi.org/10.1016/j.jag.2015.03.003>
- Saboor, A; Khan, AU; Hussain, A; Ali, I; Mahmood, K (2015) 'Multidimensional deprivations in Pakistan: Regional variations and temporal shifts.' *The Quarterly Review of Economics and Finance* 56: 57-67. <http://dx.doi.org/10.1016/j.qref.2015.02.007>
- Sadavarte, P; Venkataraman, C; Cherian, R; Patil, N; Madhavan, BL; Gupta, T; Kulkarni, S; Carmichael, GR; Adhikary, B (2016) 'Seasonal differences in aerosol abundance and radiative forcing in months of contrasting emissions and rainfall over northern South Asia.' *Atmospheric Environment* 125, Part B: 512-523. <http://dx.doi.org/10.1016/j.atmosenv.2015.10.092>
- Savéan, M; Delclaux, F; Chevallier, P; Wagnon, P; Gonga-Saholiariliva, N; Sharma, R; Neppel, L; Arnaud, Y (2015) 'Water budget on the Dudh Koshi River (Nepal): Uncertainties on precipitation.' *Journal of Hydrology* 531: 850-862. 10.1016/j.jhydrol.2015.10.040
- Schmid, MO; Baral, P; Gruber, S; Shahi, S; Shrestha, T; Stumm, D; Wester, P (2014) 'Assessment of permafrost distribution maps in the Hindu Kush-Himalayan region using rock glaciers mapped in Google Earth.' *The Cryosphere Discuss.* 8(5): 5293-5319. 10.5194/tcd-8-5293-2014
- Senanayake, N; Mukherji, A; Giordano, M (2015) 'Re-visiting what we know about Irrigation Management Transfer: A review of the evidence.' *Agricultural Water Management* 149(0): 175-186. <http://dx.doi.org/10.1016/j.agwat.2014.11.004>
- Shahzad, N; Saeed, U; Gilani, H; Ahmad, S; Ashraf, I; Irteza, S (2015) 'Evaluation of state and community/private forests in Punjab, Pakistan using geospatial data and related techniques.' *Forest Ecosystems* 2(1): 7.
- Sharma, B; Rasul, G; Chettri, N (2015) 'The economic value of wetland ecosystem services: Evidence from the Koshi Tappu Wildlife Reserve, Nepal.' *Ecosystem Services* 12(0): 84-93. <http://dx.doi.org/10.1016/j.ecoser.2015.02.007>
- Sharma, CM; Dangal, MR; Pradhan, NS; Lama, RKT; Rai, SK (2015) 'Mountains and Rivers: Impacts of and Responses to Flash Flood in the Seti River in Nepal.' *Jacobs Journal of Hydrology* 1(1): 10.
- Sharma, E; Sherestha, AB (2015) 'Nepal 2015 Earthquake: Uncertainty Prevails in the Himalayan Arc.' *Proceedings of the Indian National Science Academy* 81(3) 10.16943/ptinsa/2015/v81i3/48233
- Shea, JM; Immerzeel, WW; Wagnon, P; Vincent, C; Bajracharya, S (2015) 'Modelling glacier change in the Everest region, Nepal Himalaya.' *The Cryosphere* 9(3): 1105-1128. 10.5194/tc-9-1105-2015
- Shea, JM; Wagnon, P; Immerzeel, WW; Biron, R; Brun, F; Pellicciotti, F (2015) 'A comparative high-altitude meteorological analysis from three catchments in the Nepalese Himalaya.' *International Journal of Water Resources Development* 31(2): 174-200. 10.1080/07900627.2015.1020417
- Shrestha, MS; Grabs, WE; Khadgi, VR (2015) 'Establishment of a regional flood information system in the Hindu Kush Himalayas: challenges and opportunities.' *International Journal of Water Resources Development* 31(2): 238-252. 10.1080/07900627.2015.1023891
- Sreenivas, K; Sekhar, NS; Saxena, M; Paliwal, R; Pathak, S; Porwal, MC; Fyze, MA; Rao, SVCK; Wadodkar, M; Anasuya, T; Murthy, MSR; Ravisankar, T; Dadhwal, VK (2015) 'Estimating inter-annual diversity of seasonal agricultural area using multi-temporal resourcesat data.' *Journal of environmental management* 161: 433-442. 10.1016/j.jenvman.2014.10.031
- Uddin, K; Chaudhary, S; Chettri, N; Kotru, R; Murthy, M; Chaudhary, RP; Ning, W; Shrestha, SM; Gautam, SK (2015) 'The changing land cover and fragmenting forest on the Roof of the World: A case study in Nepal's Kailash Sacred Landscape.' *Landscape and Urban Planning* 141(0): 1-10. <http://dx.doi.org/10.1016/j.landurbplan.2015.04.003>

Uddin, K; Gilani, H; Murthy, MSR; Kotru, R; Qamer, FM (2015) 'Forest Condition Monitoring Using Very-High-Resolution Satellite Imagery in a Remote Mountain Watershed in Nepal.' *Mountain Research and Development* 35(3): 264-277. 10.1659/MRD-JOURNAL-D-14-00074.1

Vaidya, RA (2015) 'Governance and management of local water storage in the Hindu Kush Himalayas.' *International Journal of Water Resources Development* 2(1): 253-268. 10.1080/07900627.2015.1020998

van Oort, B; Bhatta, LD; Baral, H; Rai, RK; Dhakal, M; Rucevska, I; Adhikari, R (2015) 'Assessing community values to support mapping of ecosystem services in the Koshi river basin, Nepal.' *Ecosystem Services* 13: 70-80. <http://dx.doi.org/10.1016/j.ecoser.2014.11.004>

Wahid, SM; Shrestha, AB; Murthy, MSR; Matin, M; Zhang, J; Siddiqui, O (2014) 'Regional Water Security in the Hindu Kush Himalayan Region: Role of Geospatial Science and Tools.' *Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci.* XL-8: 1331-1340. 10.5194/isprsarchives-XL-8-1331-2014

Wang, M; Yang, G; Gao, Y; Chen, H; Wu, N; Peng, C; Zhu, Q; Zhu, D; Wu, J; He, Y; Tian, J; Zhao, X; Zhang, Y (2015) 'Higher recent peat C accumulation than that during the Holocene on the Zoige Plateau.' *Quaternary Science Reviews* 114: 116-125. <http://dx.doi.org/10.1016/j.quascirev.2015.01.025>

Wesselink, A; Warner, JF; Syed, MA; Chan, F; Tran, DD; Huthoff, F; Thuy, NL; Pinter, N; Staveren, Mv; Wester, P; Zegwaard, A (2015) 'Trends in flood risk management in deltas around the world : are we going 'soft '? ' *International Journal of Water Governance* 3(4): 25-46. 10.7564/15-IJWG90

Xu, B; Wang, J; Guo, H; Shi, F; Wu, N (2014) 'Morphological adaptation of wild *Fritillaria unibracteata* to alpine conditions in the eastern

Qinghai-Tibet Plateau.' *Chinese Journal of Applied and Environmental Biology* 20(6): 955-961. 10.3724/SPJ.1145.2014.04045

Xu, D; Zhang, J; Rasul, G; Liu, S; Xie, F; Cao, M; Liu, E (2015) 'Household Livelihood Strategies and Dependence on Agriculture in the Mountainous Settlements in the Three Gorges Reservoir Area, China.' *Sustainability* 7(5): 4850-4869.

Yang, H; Luo, P; Wang, J; Mou, C; Mo, L; Wang, Z; Fu, Y; Lin, H; Yang, Y; Bhatta, LD (2015) 'Ecosystem Evapotranspiration as a Response to Climate and Vegetation Coverage Changes in Northwest Yunnan, China.' *PLOS ONE* 10(8): e0134795-e0134795. 10.1371/journal.pone.0134795

Zemp, M; Frey, H; Gärtner-Roer, I; Nussbaumer, SU; Hoelzle, M; Paul, F; Haeberli, W; Denzinger, F; Ahlström, AP; Anderson, B; Bajracharya, S; Baroni, C; Braun, LN; Cáceres, BE; Casassa, G; Cobos, G; Dávila, LR; Delgado Granados, H; Demuth, MN; Espizua, L; Fischer, A; Fujita, K; Gadek, B; Ghazanfar, A; Hagen, JO; Holmlund, P; Karimi, N; Li, Z; Pelto, M; Pitte, P; Popovnin, V; Portocarrero, CA; Prinz, R; Sangewar, CV; Severskiy, I; Sigurðsson, O; Soruco, A; Usabaliyev, R; Vincent, C (2015) 'Historically unprecedented global glacier decline in the early 21st century.' *Journal of Glaciology* 61(228): 745-762. 10.3189/2015JoG15J017

Zhang, J; Gurung, DR; Liu, R; Murthy, MSR; Su, F (2015) 'Abe Barek landslide and landslide susceptibility assessment in Badakhshan Province, Afghanistan.' *Landslides* 12(3): 597-609. 10.1007/s10346-015-0558-5

Zhu, D; Wu, N; Bhattarai, N; Oli, KP; Tsering, K; Rawat, GS; Chen, H; Yang, G; He, Y; Joshi, S; Rana, P; Ismail, M (2015) 'A comparative study of daytime-based methane emission from two wetlands of Nepal Himalaya.' *Atmospheric Environment* 106: 196-203. <http://dx.doi.org/10.1016/j.atmosenv.2015.02.008>

Zhu, D; Wu, Y; Chen, H; He, Y; Wu, N (2016) 'Intense methane ebullition from open water area of a shallow peatland lake on the eastern Tibetan Plateau.' *Science of The Total Environment* 542, Part A: 57-64. <http://dx.doi.org/10.1016/j.scitotenv.2015.10.087>

Zhu, D; Wu, Y; Wu, N; Chen, H; He, Y; Zhang, Y; Peng, C; Zhu, Qa (2015) 'Nitrous oxide emission from infralittoral zone and pelagic zone in a shallow lake: Implications for whole lake flux estimation and lake restoration.' *Ecological Engineering* 82: 368-375. <http://dx.doi.org/10.1016/j.ecoleng.2015.05.032>

Editorials

Hurni, H; Molden, D; Zimmermann, A; von Dach, SW (2015) 'Editorial.' *Mountain Research and Development*, 35, 219-219.

Molden, D; Hurni, H; von Dach, SW; Zimmermann, A (2015) 'Editorial.' *Mountain Research and Development*, 35, 3-3.

Molden, D; Hurni, H; von Dach, SW; Zimmermann, AB (2015) 'Focus Issue: Vulnerability and Resilience to Natural Hazards and Disasters in Mountains [editorial].' *Mountain Research and Development*, 35, 103-103.

Moorthy, KK; Satheesh, SK; Sarin, MM; Panday, AK (2015) 'South Asian aerosols in perspective: Preface to the special issue [editorial].' *Atmospheric Environment*, 125, Part B, 307-311.

Mukherji, A; Molden, D; Nepal, S; Rasul, G; Wagnon, P (2015) 'Himalayan waters at the crossroads: issues and challenges [editorial].' *International Journal of Water Resources Development*, 31, 151-160.

Papers in other Journals/Magazines/Newsletters

Banerjee, S; Bisht, S; Mahapatra, B (2015) 'Building adaptive capacity in Assam.' *Forced Migration Review: Disasters and displacement in a changing climate*, 66-68.

Rasul, G (2014) 'Conflict and cooperation in the Ganges-Brahmaputra-Meghna basin.' *Water* 21.

Book Chapters / Sections

Aryal, K; Choudhury, D (2015) 'Climate change: Adaptation, mitigation and transformations of swidden landscapes: Are we throwing the baby out with the bathwater?' In Cairns, MF (eds), *Shifting cultivation and environmental change: indigenous people, agriculture and forest conservation* London and New York, Routledge.

Cronin, AA; Prakash, A; Mehta, PK (2015) 'Conclusions and way forward.' In Cronin, AA; Mehta, PK; Prakash, A (eds), *Gender Issues in Water and Sanitation Programmes: Lessons from India*, 287-299. New Delhi, SAGE Publications India.

Jain, A; Choudhury, D; Pradhan, NS (2015) 'Communicating Climate Change in the Hindu Kush Himalayas: Examples from Bhutan, India and Nepal.' In Sawhney, P; Perkins, MA (eds), *Emerging Climate Change Adaptation Issues in the Asia-Pacific Region*, 164-181, IGES.

Kotru, R; Douglas, WT; Pradhan, N (2015) 'Kailash Sacred Landscape.' In Vasilijević, M; Zunckel, K; McKinney, M; Erg, B; Schoon, M; T, RM (eds), *Best Practice Protected Area Guidelines Series* 31-32. Gland, Switzerland, IUCN.

Molden, DJ; Shrestha, AB; Nepal, S; Immerzeel, WW (2016) 'Downstream Implications of Climate Change in the Himalayas.' In Biswas, AK; Tortajada, C (eds), *Water Security, Climate Change and Sustainable Development*, 65-82, Springer Singapore. 10.1007/978-981-287-976-9_5

Nakul, C; Rasul, G; Sharma, E (2015) 'Managing Ecosystem Services for Enhancing Climate Change Adaptation in the Hindu Kush Himalayas.' In Grover, VI; Borsdorf, A; Breuste, J; Tiwari, PC (eds), *Impact of Global Changes on Mountains: Responses and Adaptation*, 210-228, CRC Press.

Neupane, N (2015) 'Solving Transborder Water Issues in Changing Climate Scenarios of South Asia.' In Pistor, K; De Schutter, O (eds), *Governing Access to Essential Resources*, 288-301, Columbia University Press.

Prakash, A; Cronin, AA; Mehta, PK (2015) 'Introduction: Achieving the desired gender outcome in water and sanitation.' In Cronin, AA; Mehta, PK; Prakash, A (eds), *Gender Issues in Water and Sanitation Programmes: Lessons from India*, 1-21. New Delhi, SAGE Publications India.

Prakash, A; Goodrich, CG (2015) 'Crossing boundaries: Gender and IWRM in education and research.' In Cronin, AA; Mehta, PK; Prakash, A (eds), *Gender Issues in Water and Sanitation Programmes: Lessons from India*, 63-76. New Delhi, SAGE Publications India.

Rasul, G; Sharma, B (2015) 'Water, Food, and Energy Nexus in South Asia: Implications for Adaption to Climate Change.' In Leal Filho, W (eds), *Handbook of Climate Change Adaptation*, 1329-1350. Berlin, Heidelberg, Springer Berlin Heidelberg. 10.1007/978-3-642-38670-1_81

Conference Papers

Dhonju, HK; Murthy, MSR; Duwal, S (2015). Dasymetric Mapping of Census Data for Nepal towards Improved Disaster Risk Assessment Studies. International Workshop on the role of Land Professionals and SDI in Disaster Risk Reduction: in Context of Post 2015 Nepal Earthquake", 25-27 Nov, 2015, Kathmandu, Nepal. Kathmandu, Nepal.

Dhonju, HK; Awasthi, DR; Gurung, DR (2015). Disaster events based dynamic risk assessment system for Nepal. International Workshop on the role of Land Professionals and SDI in Disaster Risk Reduction: in Context of Post 2015 Nepal Earthquake", 25-27 Nov, 2015, Kathmandu, Nepal. Kathmandu, Nepal.

Nepal, S; Zheng, H; Penton, DJ; Neumann, LE (2015). Comparative performance of GR4JSG and J2000 hydrological models in the Dudh Koshi catchment of the Himalayan region. Proceedings of the 21st International Congress on Modelling and Simulation (MODSIM2015), Gold Coast, Australia. Gold Coast, Australia: 2395-2401.

Penton, DJ; Neumann, LE; Karki, R; Nepal, S (2015). Verifying Temperature Lapse Rates in the Eastern Himalayas using Landsat 7 and 8. Proceedings of the 21st International Congress on Modelling and Simulation (MODSIM2015), Gold Coast, Australia. Gold Coast, Australia: 2353-2359.

Uddin, K; Wahid, SM; Murthy, MSR (2015). Mapping of Koshi Basin Wetlands Using Remote Sensing. 5th International Conference on Water & Flood Management (ICWFM-2015).

Full Books/Reports/Papers

Chaudhary, RP; Upreti, Y; Joshi, SP; Shrestha, KK; Basnet, KB; Basnet, G; Shrestha, KR; Bhatta, KP; Acharya, KP; Chettri, N (2015) *Kangchenjunga Landscape Nepal: From Conservation and Development Perspectives*. Kathmandu, Nepal: Ministry of Forests and Soil Conservation (MoFSC), Government of Nepal; Research Centre for Applied Science and Technology (RECAST), Tribhuvan University; and International Centre for Integrated Mountain Development (ICIMOD)

Cronin, AA; Mehta, PK; Prakash, A (eds) (2015) *Gender issues in water and sanitation programmes: lessons from India*. New Delhi, India: SAGE Publications India

Goodrich, C; Bhattarai, M; Bose, A; Bantilan, C (2015) *Gender Implications of Social Protection Interventions: recent literature, concepts, methods, analytics, and survey tools*, Socioeconomics Discussion Paper Series (Vol. 31). Patancheru, India: ICRISAT

ICIMOD Board of Governors 2015

Regional Board Members

Afghanistan



HE Mr Raz Mohammad Raz
Chairperson,
ICIMOD Board of Governors;
Deputy Minister of Irrigation and Infrastructure,
Ministry of Agriculture, Irrigation and Livestock

Bangladesh



Mr Naba Bikram Kishore Tripura
Secretary,
Ministry of Chittagong Hill Tracts Affairs

Bhutan



Dasho Tenzin Dhendup
Secretary,
Ministry of Agriculture and Forest

China



Prof. Ding Zhongli
Chairman,
CN-ICIMOD;
Vice President;
Chinese Academy of Sciences

India



Mr Ashok Lavasa
Secretary,
Ministry of Environment and Forests and Climate Change

Myanmar



Dr Nyi Nyi Kyaw
Deputy Director General, Forest Department,
Ministry of Environmental Conservation and Forestry

Nepal



Dr Yuba Raj Khatriwada*
Vice Chairman,
National Planning Commission,
Government of Nepal

Pakistan



Mr Seerat Asghar
Secretary, Ministry of National Food Security and Research

Independent Board Members



Dr Lars-Erik Liljelund**
Chief Executive,
The Foundation for Strategic Environmental Research (Mistra),
Sweden



Dr Thomas Labahn
Germany



Dr Margaret Catley-Carlson***
Canada Water Network,
Vancouver,
Canada



Dr Yanfen Wang
Vice President
Graduate University of Chinese Academy of Sciences (GUCAS)
China



Lyonpo Dr Kinzang Dorji
President
Bhutan Indigenous Games and Sports Association (BIGSA)
Bhutan



Prof. Hans Hurni
Switzerland



Dr Asuncion Lera St Clair
Senior Principal Scientist
Low Carbon Future



HE Kjell Pettersen
Chair, ICIMOD Support Group
Ambassador
Royal Norwegian Embassy



HE Urs Herren
Vice Chair, ICIMOD Support Group
Ambassador
Embassy of Switzerland

ICIMOD Support Group

* Dr Govind Raj Pokharel served as the Regional Board Member from Nepal from January 2015 to October 2015

**Completed tenure as Chair PAC and Vice-Chair of Board of Governors in November 2015

***Began tenure as Chair PAC and Vice-Chair Board of Governors in November 2015

The Director General of ICIMOD is a member of the ICIMOD Board of Governors Ex-officio.

ICIMOD Staff 2015

Directorate

Molden, David
Sharma, Eklabya
Ghimire, Shekhar
Shrestha, Basanta Raj
Rana, Anju
Joshi, Sami
Shrestha-Rajbhandari, Ritu M
Shrestha Acchyata

Strategic Planning, Monitoring and Evaluation

Ahmad, Farid
Ahmad, Tariq
Kadel, Lalu Maya
Shah, Ghulam Muhammad

Strategic Cooperation

Pathak, Santosh Raj
Shakya, Naina Rana
Tandukar, Pramod

REGIONAL PROGRAMMES

Adaptation to Change

Choudhury, Dhrupad
Agrawal, Nand Kishor
Ali, Ajaz
Bisht, Suman
Holmgren, E Valdemar
Leikanger, Iris
Pradhan, Monika

Shrestha, Krishna
Syangden, Bhawana

Transboundary Landscapes

Kotru, Rajan
Chaudhari, Swapnil
Chettri, Nakul
Ismail, Muhammad
Karky, Bhaskar Singh
Pant, Basant
Rai, Himaa
Rasaily, Rekha
Shakya, Bandana
Shrestha, Sushant

River Basins

Shrestha, Arun Bhakta
Bajracharya, Nani
Manandhar, Liza
Pirani, Aneel
Prakash, Anjal
Shrestha, Mandira Singh
Shrestha, Kanchan
Shrestha, Govinda
Wahid, Shahriar

Cryosphere and Atmosphere

Panday, Arnico K
Mool, Pradeep
Baduwal, Nirmala
Basnyat, Ayushma
Ghale, Neetu
Kanwal, Fozia

MENRIS

Bajracharya, Birendra
Pradhan, Sudip
Shrestha, Anjeli
Tshering, Chopel

HUC

Gurung, Dipshikha

THEMATIC AREAS

Livelihoods

Rasul, Golam
Ali, Ghulam
Bajracharya, Sugat
Banerjee, Soumyadeep
Bhushan Udas, Pranita
Chowdhury, Devjit Roy
Dorji, Tashi
England, Matthew
Ghate, Rucha
Gioli, Giovanna
Gurung, Min Bahadur
Gurung, Kamala
Gurung-Goodrich, Chanda
Hussain, Abid
Joshi, Surendra Raj
Mahapatra, Bidhubhusan
Maharjan, Amina
Mishra, Arabinda
Notarianni, Marcello
Pandey, Abhimanyu

Partap, Uma
Seddiqi, Omaid
Sharma, Bikash
Shrestha, Anu Joshi
Shrestha, Mamata
Subedi, Nani Ram
Tuladhar, Sabarnee
van Strien, Marjorie

Ecosystem Services

Wu, Ning
Aryal, Kamal
Bhatta, Laxmi Dutt
Bisht, Neha
Gentle, Popular
Gurung, Janita
Kandel, Pratikshya
Karki, Seema
Phuntsho, Karma
Pradhan, Nawraj
Rana, Pradyumna
Rathore, Brij Mohan Singh
Rijal, Srijana Joshi
Shrestha, Prabha
Soe, Paing
Sohail, Muhammad
Wang, Jinniu
Yi, Shaoliang

Water and Air

Mukherji, Aditi
 Acharya, Sushma
 Adhikary, Bhupesh
 Bajracharya, Sagar Ratna
 Bhawe, Prakash
 Bhuchar, Sanjeev
 Dangol, Pradeep Man
 Dhakal, Madhav Prasad
 Joshi, Sharad Prasad
 Joshi, Sarita
 Khadgi, Vijay Ratan
 Koch, Inka
 Lamichhane, Nabina
 Litt, Maxime
 Nepal, Santosh
 Pradhan, Bidya
 Pradhan, Neera
 Puppala, Siva Praveen
 Rai, Sundar Kumar
 Shea, Joseph
 Shrestha, Rajendra Bahadur
 Sinisalo, Anna
 Stumm, Dorothea
 Surapipith, Vanisa
 Vaidya, Ramesh
 Wester, Philippus

Geospatial Solutions

Murthy, MSR
 Ali, Amm Mostafa
 Bajracharya, Samjwal Ratna
 Bajracharya, Rajan
 Bajracharya, Sameer
 Bhandari, Shova
 Chitale, Vishwas
 Dangol, Gauri

Dhonju, Hari Krishna
 Gilani, Hammad
 Gurung, Deo Raj
 Joshi, Govinda
 Maharjan, Sudan
 Matin, Mir Abdul
 Qamer, Faisal Mueen
 Shakya, Kiran
 Shrestha, Finu
 Uddin, Kabir
 Wesselman, Sebastian

Knowledge Management and Communication

Rasmussen, Anja Moller
 Acharya, Gopilal
 Bajracharya, Jitendra
 Dangol, Bikash
 Gurung, Nira
 Jha, Anil
 Khatri, Shiva Hari
 Maden, Utsav
 Maharjan, Dharma
 Manandhar, Bindiya
 Mishra, Udayan
 Pandey, Sushil Raj
 Pradhan, Punam
 Sellmyer, Amy
 Sharma, Bishwonath
 Sherchan, Ujol
 Sherpa, Samden Lama
 Shrestha, Subasana
 Tamang, Jiwan
 Tandukar, Deependra
 Thaku, Asha Kaji
 Thapa, Ram Sharam
 Thomas, Susan Hale

Administration and Finance

Amatya, Shree Mani
 Bajracharya, Narendra
 Bajracharya, Ujjwal
 Chitrakar, Indu
 Dabas, Rahul
 Dhakhwa, Prerana
 Jirel, Birkha Bahadur
 KC, Sudama
 Kansakar, Chandra BS
 KC, Rishi
 KC, Dhruba
 Magar, Bishnu
 Maharjan, Kishore
 Maharjan, Krishna
 Maharjan, Ram
 Maharjan, Chini Kaji
 Mali, Rajendra Prakash
 Pradhan, Saisab
 Pradhan, Pallavi
 Rana, Ganga Bahadur
 Ranjit, Rabindra
 Sadashankar, Pashupati
 Segaar, Liesbeth
 Sharma, Yuvraj
 Sharma, Achala
 Shrestha, Shyam
 Shrestha, Mohan Krishna
 Shrestha, Kishore
 Shrestha, Kiran Man
 Shrestha, Nabindra Raj
 Shrestha, Pramila Bajracharya
 Shrestha, Rajani
 Shrestha, Ram Kumari
 Shukla, Radheshyam
 Singh, Sabak Kumar
 Subedi, Jai Bahadur

Tamang, Mik Mar
 Thapa, Chomu Prerna
 Thapa, Shambhu
 Thapa, Rekha Khatri
 Upadhyaya Gairapiplée, Umesh
 Vaidya, Jenny

Visiting Scientist

Hossain, Faisal
 Immerzeel, WW
 Mobarak, Ahmed
 Wagnon, Patrick

Country Offices

Jasra, Abdul Wahid (Pakistan)
 Rezai, Jawid Ahmad (Afghanistan)
 Haris, Ayub (Pakistan)
 Muhammad, Aslam (Pakistan)

SANDEE

Joshi, Malvika
 Kafle, Anuradha
 Lohano, Heman Das
 Nepal, Mani
 Pradhan, Neesha
 Somanathan, E

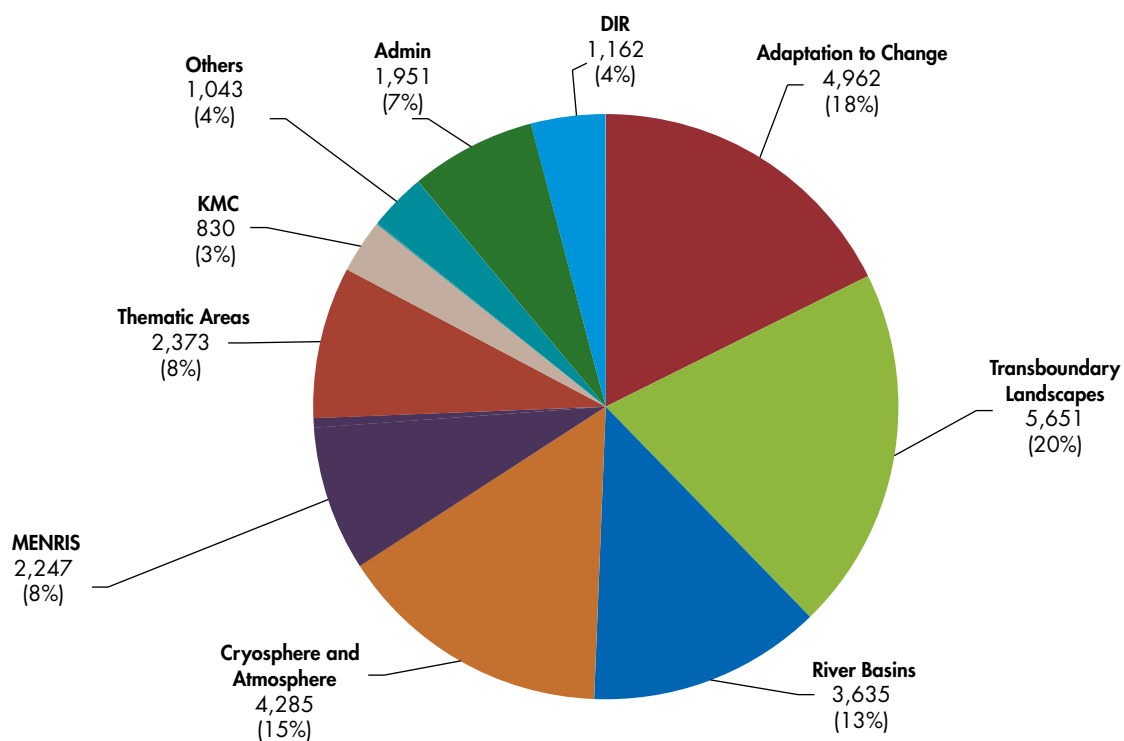
Financial Report

ICIMOD Income and Expenditure Accounts 2006-2015

The Financial management of the Centre is implemented through the establishment of programme and core funds and project funds. All unrestricted contributions made by sponsors and member countries are credited to the core programme funds. All restricted contributions made by sponsors, governments, and non-government sources for specific projects are credited to project funds.

ICIMOD Expenses by Programme 2015

(in thousand US dollars)



Core and Programme Funds

(In US Dollars)

SOURCE	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
A. Regional	276,196	245,249	359,116	334,209	630,277	539,592	830,902	1,007,583	1,315,009	1,573,979
Afghanistan	10,000	5,770	7,873	10,742	14,658	14,658	35,342	37,000	45,000	54,000
Bangladesh	20,000	10,000	11,240	11,758	-	12,348	12,988	67,000	45,000	54,000
Bhutan	7,500	8,243	-	32,543	25,651	35,000	30,000	37,000	45,000	54,000
China	100,000	100,000	100,000	100,000	150,000	150,000	150,000	366,000	400,000	400,000
India	113,106	72,075	50,794	149,189	160,223	171,713	292,750	366,000	439,818	540,000
Myanmar	-	19,706	29,223	10,746	35,222	35,222	29,822	36,583	45,322	52,109
Nepal	13,784	21,246	23,566	19,231	20,175	20,819	80,000	98,000	123,746	144,000
Pakistan	11,806	8,209	136,420	-	224,348	99,832	200,000	-	171,123	275,870
B. Non-Regional	2,733,819	2,860,492	4,739,611	4,066,646	3,858,895	3,463,530	4,990,609	4,917,062	7,092,872	6,863,373
Austria	120,357	137,097	160,883	136,364	94,444	98,124	85,642	795,756	819,672	673,401
Australia (DFAT)	-	-	-	-	-	-	-	-	462,150	1,351,873
Denmark	-	214,264	-	-	-	-	-	-	-	-
DFID	-	-	-	-	-	-	1,770,968	831,818	2,725,523	1,904,149
Germany	931,632	888,988	1,002,060	1,536,038	1,225,203	1,446,528	1,186,611	544,959	587,990	670,256
Netherlands	600,000	540,000	60,000	-	-	-	-	-	-	-
Norway	581,830	580,143	1,843,281	817,625	841,652	909,310	882,211	1,632,821	1,407,163	1,225,150
Sweden	-	-	779,676	714,550	714,550	-	-	-	-	-
Switzerland	500,000	500,000	893,711	862,069	983,046	1,009,568	1,065,177	1,111,708	1,090,374	1,038,544
C. Other Income	334,535	632,666	1,296,940	1,182,790	1,105,367	1,686,966	1,493,387	1,540,893	2,214,669	2,194,446
Total Core (A+B+C)	3,344,550	3,738,407	6,395,667	5,583,645	5,594,539	5,690,088	7,314,898	7,465,538	10,622,550	10,631,798
Project Funds	3,072,532	4,002,301	5,801,899	6,112,452	7,732,803	14,050,498	15,608,647	13,933,432	16,349,059	13,183,493
GRAND TOTAL	6,417,082	7,740,708	12,197,566	11,696,097	13,327,342	19,740,586	22,923,545	21,398,970	26,971,609	23,815,291
EXPENDITURE	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Programme Cost	1,938,261	2,395,461	3,672,008	4,447,710	4,654,126	3,303,616	3,393,004	3,535,127	5,389,127	5,660,599
Project Cost	3,103,868	3,808,778	4,785,076	5,998,834	7,653,146	9,797,169	13,007,025	13,487,150	16,213,368	19,364,885
Support Cost	493,003	537,721	752,133	541,655	1,067,357	1,050,206	599,401	395,043	2,063,076	1,951,747
Directorate Cost	523,626	552,520	714,544	701,408	650,827	1,077,021	1,002,101	818,913	1,085,839	1,161,841
Total Expenditures	6,058,758	7,294,480	9,923,761	11,689,607	14,025,456	15,228,012	18,001,531	18,236,233	24,751,410	28,139,072

Note : Support cost in 2015 includes exchange loss amounting to \$ 764,282

Details of Project Funds

(in US dollars)

Source	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Opening Balance of Project Funds (A)	1,513,584	1,482,248	1,675,771	2,692,594	2,806,212	2,885,869	7,139,198	9,740,820	10,187,101	10,322,792
Income Received during the year										
Australia	-	-	-	-	-	-	1,479,600	1,570,050	901,700	699,007
Austria	523,798	538,037	615,087	586,667	267,555	416,844	127,138	122,372	-	-
Finland	-	-	-	602,410	-	1,154,401	-	651,890	406,504	-
Germany	252,528	95,891	214,436	204,378	878,025	209,074	1,350,101	316,863	931,118	633,399
Norway	-	-	-	647,354	1,379,884	4,779,286	4,496,448	5,740,075	3,009,968	3,023,360
Sweden	-	-	-	350,925	343,425	1,845,325	1,736,409	1,907,387	1,690,240	880,783
Switzerland	420,477	510,690	1,179,487	190,307	271,158	85,481	151,514	-	84,392	88,181
USA	161,641	364,858	742,374	426,354	422,452	513,862	983,088	696,971	2,557,328	2,523,246
ITALY/IUCN	152,062	510,381	583,702	200,262	111,832	-	-	-	-	-
ADA	-	-	-	-	228,472	238,755	238,413	-	-	-
ADB	19,340	-	-	57,090	213,737	110,000	12,821	215,794	41,247	-
EU	429,077	30,717	136,875	71,228	-	60,355	2,786,458	-	-	1,733,904
CIP	-	85,690	31,990	40,000	43,173	65,683	80,407	-	-	-
FAO	50,425	106,785	101,274	98,700	384,118	686,632	230,165	169,356	272,406	54,935
IWMI	-	-	-	-	-	-	-	-	-	149,980
UNEP	101,560	55,500	176,300	270,000	424,534	442,284	358,342	110,280	304,000	137,896
UNESCO	4,000	12,400	14,600	2,000	65,000	48,000	-	-	-	-
WWF	-	-	5,000	-	-	-	-	-	-	-
IFAD	95,391	469,430	10,000	379,506	573,019	551,348	549,515	138,851	306,000	400,000
DFID	-	-	-	-	-	-	74,881	1,281,118	2,419,365	1,196,615
WI	-	-	69,636	-	-	-	-	-	-	-
FORD	-	100,000	200,000	-	200,000	-	-	-	-	-
IDRC	517,383	297,398	784,121	833,867	632,098	682,861	422,503	471,590	3,225,958	1,188,740
MacArthur	100,000	150,000	240,000	-	400,000	-	-	200,000	-	-
ICCO	168,845	146,790	-	152,779	164,403	173,938	-	-	-	-
CFC/FAO	-	301,143	-	-	-	-	-	-	-	-
Twente	71,209	132,183	172,767	-	-	70,211	2,688	-	-	-
CICERO	-	-	34,814	238,533	356,350	-	-	-	-	-
WorldBank	-	-	23,385	202,541	70,815	1,511,128	-	-	-	-
StatkraftAS	-	-	-	-	-	-	-	-	-	37,623
IGS	-	-	-	-	-	-	-	-	-	48,424
CRF	-	-	-	-	-	-	-	-	-	87,300
UNDP	-	-	337,075	327,375	-	89,030	226,218	32,283	-	-
Others	4,796	94,408	128,976	230,176	302,753	316,000	301,939	308,552	198,833	300,100
Total Income received during the year (B)	3,072,532	4,002,301	5,801,899	6,112,452	7,732,803	14,050,498	15,608,647	13,933,432	16,349,059	13,183,493

Total available Projects Funds (A+B)	4,586,116	5,484,549	7,477,670	8,805,046	10,539,015	16,936,367	22,747,845	23,674,252	26,536,160	23,506,285
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EXPENDITURES	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total Expenditure in Projects (C)	3,103,868	3,808,778	4,785,076	5,998,834	7,653,146	9,797,169	13,007,025	13,487,150	16,213,368	19,364,885

Closing Balance of Project Funds (A+B-C)	1,482,248	1,675,771	2,692,594	2,806,212	2,885,869	7,139,198	9,740,820	10,187,102	10,322,792	4,141,400
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International Centre for Integrated Mountain Development
Statement of Assets, Liabilities, Loan and Fund Balances
as of 31 December 2015

All amounts in US dollars

Fund Balances	Schedule	As at 31 December, 2015	As at 31 December, 2014
General Reserve	1		3,676,655
Operational Reserve	1	4,688,569	5,120,147
Exchange Equalisation Reserve	1	6,780,100	503,606
Restricted Programmes Support Fund Balance (net) [Note 3(f) of Schedule 13]		503,606	
Government of Germany Austrian Development agency		(184,893)	(45,642)
Restricted Core Programme Support Fund Balance (net) [Note 3(g) of Schedule 13]		-	465,821
Department of Foreign Affairs and Trade (DFAT), Australia Department for International Development (DFID), UK		855,192	
Special Projects Fund Balance (net)	6D	1,527,474	346,732
Amounts to be incurred on projects		6,440,065	1,648,193
Amounts to be recovered		(2,298,665)	10,865,411
Total Sources of Funds		18,311,448	22,038,304
Assets and Liabilities			
Fixed Assets	2	3,355,758	2,716,117
Capital Work-in-Progress		78,510	
Current Assets, Loans and Advances:			
Cash and Bank Balances	3	16,707,625	21,815,457
Loans and Advances	4	3,589,219	1,965,533
Less: Current Liabilities and Provisions	5	20,296,844	23,780,990
Net Current Assets		(5,419,664)	(4,458,803)
Total Application of Funds		18,311,448	22,038,304

Notes forming part of the financial statements 13

Schedules referred to above form an integral part of the Statement of Assets, Liabilities and Fund Balances

In terms of our report attached

For Deloitte Haskins & Sells LLP
Chartered Accountants

Alka Chadha

Alka Chadha
Partner



David James Molden

David James Molden
Director General

Shekhar Colimire

Shekhar Colimire
Director, Administration and Finance

Rajendra Prakash Mali

Rajendra Prakash Mali
Budget & Finance Officer

Place: Koltkata, India
Date: 25/12/2016

Place: Kathmandu, Nepal
Date: 25/12/2016

For International Centre for Integrated Mountain Development

International Centre for Integrated Mountain Development
Operating Statement for the Year Ended
as of 31 December 2015

All amounts in US dollars

	Schedule	Year ended 31 December, 2015	Year ended 31 December, 2014
INCOME			
Contribution from Donors			
Restricted Programme Support	6A	1,119,190	1,134,438
Restricted Core Programme Support	6B	3,256,022	3,187,673
Core and Other Programmes Support	6C	4,062,140	4,085,770
Special Projects	6D	13,183,493	16,349,059
Other Income	7	2,194,446	2,214,669
	(A)	<u>23,815,291</u>	<u>26,971,609</u>
EXPENDITURE			
Programme Cost			
Restricted	8	1,724,262	1,095,970
Restricted Core	9A	2,868,281	3,288,436
Core and Others	9B	1,068,056	1,004,721
Special Project Cost	10	19,364,885	16,213,368
Core Support Cost			
Directorate Cost	11	1,161,841	1,085,839
Administrative Support Cost	12	1,030,128	1,047,009
Depreciation [Note 3(a)(iii) of Schedule 13]		157,337	146,935
Foreign Exchange (Gain)/ Loss (net)		764,282	869,132
	(B)	<u>28,139,072</u>	<u>24,751,410</u>
Surplus/ (Deficit) of Income over Expenditure	(A-B)	<u>(4,323,781)</u>	<u>2,220,199</u>
Less: Surplus/ (Deficit) of Special Projects' income over expenditure transferred to Special Project Fund Balances (net)		(6,181,392)	135,691
Less: Surplus/ (Deficit) of Restricted Programme Support's income over expenditure transferred to Restricted Programme Support Fund Balances (net)		(605,072)	38,468
Less: Surplus/ (Deficit) of Restricted Core Programme Support's income over expenditure transferred to Restricted Core Programme Support Fund Balances (net)		387,741	(100,763)
Net Surplus of Operational Reserve before appropriation		<u>2,074,942</u>	<u>2,146,803</u>
Transfer to General reserve (Refer Note 3(b) of Schedule 13)		414,989	-
Net Surplus adjusted to Operational Reserve		<u>1,659,953</u>	<u>2,146,803</u>
Notes forming part of the financial statements	13		

Schedules referred to above form an integral part of the Operating Statement

In terms of our report attached

For Deloitte Haskins & Sells LLP
Chartered Accountants



Alka Chadha
Partner



For International Centre for Integrated Mountain Development


David James Molden
Director General


Shekhar Chakmire
Director, Administration and Finance


Rajendra Prakash Mali
Budget & Finance Officer

ICIMOD Members, Sponsors, and Funding Partners

CORE FUNDING

Regional member countries

Afghanistan
 Bangladesh
 Bhutan
 China
 India
 Myanmar
 Nepal
 Pakistan

PROGRAMMATIC FUNDING

- Austrian Development Agency (ADA)
- Bundesministerium für Wirtschaftliche Zusammenarbeit (BMZ), (German Federal Ministry for Economic Development Cooperation) Germany
- Department for International Development (DFID), United Kingdom
- Department of Foreign Affairs and Trade (DFAT), Australia
- European Union (EU)
- Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), Germany
- Government of Sweden, (Swedish International Development Cooperation Agency [Sida])
- International Development Research Centre, Canada (IDRC)
- International Fund for Agricultural Development (IFAD)
- National Aeronautics and Space Administration (NASA)
- Norwegian Ministry of Foreign Affairs; Royal Norwegian Embassy, Kathmandu
- United States Agency for International Development (USAID)

Non-regional countries

Australia, Department of Foreign Affairs and Trade (DFAT)
 Austria, Austrian Development Agency (ADA)
 Norway, Ministry of Foreign Affairs
 Switzerland, Swiss Agency for Development and Cooperation (SDC)
 United Kingdom, Department for International Development (DFID)

STRATEGIC AND PROJECT FUNDING

- Asian Network for Sustainable Agriculture and Bioresources (ANSAB)
- Consortium for the Sustainable Development of the Andean Ecoregion (CONDESAN)
- Climate Research Fund (CRF)
- DANIDA Fellowship Center (DFC)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- Food and Agriculture Organization of the United Nations (FAO)
- Institute for Global Environment Strategies (IGES)
- Institute for Advanced Sustainable Studies (IASS), Germany
- International Glaciological Society
- International Water Management Institute (IWMI)
- Ministry for Foreign Affairs of Finland
- Norwegian Refugee Council
- Skoll Global Threats Fund, USA
- SVP Industrial Development – Statkraft AS
- Swiss Agency for Development and Cooperation (SDC)
- United Nations Environment Programme (UNEP)
- University Corporation for Atmospheric Research (UCAR)
- Universiteit Utrecht
- Development Alternatives, Inc. (DAI)
- Wageningen University

About ICIMOD

The International Centre for Integrated Mountain Development, ICIMOD, is a regional knowledge development and learning centre serving the eight regional member countries of the Hindu Kush Himalayas – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and based in Kathmandu, Nepal. Globalization and climate change have an increasing influence on the stability of fragile mountain ecosystems and the livelihoods of mountain people. ICIMOD aims to assist mountain people to understand these changes, adapt to them, and make the most of new opportunities, while addressing upstream-downstream issues. We support regional transboundary programmes through partnership with regional partner institutions, facilitate the exchange of experience, and serve as a regional knowledge hub. We strengthen networking among regional and global centres of excellence. Overall, we are working to develop an economically and environmentally sound mountain ecosystem to improve the living standards of mountain populations and to sustain vital ecosystem services for the billions of people living downstream – now, and for the future.



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