

Proceedings of the Symposium
Incentivizing Mountain Communities
for Ecosystem Services in the Context
of a Changing Climate

International Conference on Biodiversity, Climate Change Assessment and Impacts on Livelihoods



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 (HKH) – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – 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 and downstream issues. ICIMOD supports regional transboundary programmes through partnerships with regional partner institutions, facilitates the exchange of experiences, and serves as a regional knowledge hub. We strengthen networking among regional and global centres of excellence. Overall, we are working to develop economically and environmentally-sound mountain ecosystems to improve the living standards of mountain populations and to sustain vital ecosystem services for the billions of people living downstream – now and in the future.



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Proceedings of the Symposium
Incentivizing Mountain Communities
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11 January 2017, Kathmandu, Nepal

**International Conference on Biodiversity, Climate Change Assessment
and Impacts on Livelihoods**

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**International Conference on Biodiversity,
Climate Change Assessment and Impacts on Livelihood**
10-12, JANUARY 2017, KATHMANDU, NEPAL

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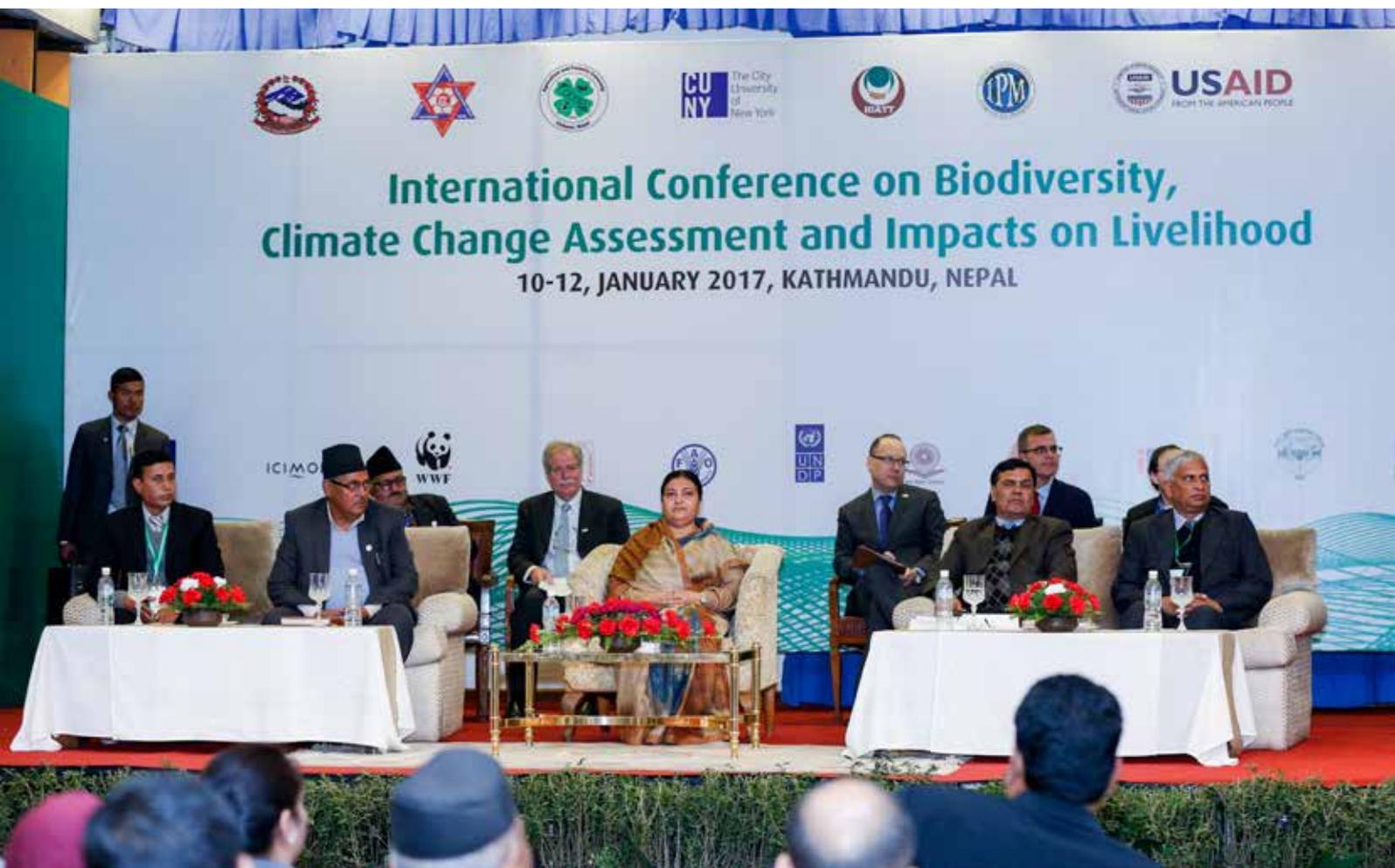
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The Context

The Hindu Kush Himalaya (HKH) is a global asset with rich cultural and biological diversity. The region is characterized by diverse ecosystems, and a wealth of natural resources. But limited accessibility and remoteness of location have led its human inhabitants into poverty. Managing ecosystems in the region is challenging not only due to its remoteness, but also due to the high dependency of local livelihoods on natural resources. Managing upstream ecosystems for a sustainable supply of ecosystem services that people living both upstream and downstream presently enjoy requires a proper consideration of the resilience of these ecosystems. Innovative approaches to incentivizing upstream communities are necessary as subsistence livelihood options for them are limited to land use practices, agriculture, and forests.

Payment for ecosystem services (PES) is an evolving concept for incentivizing service providers through market-based solutions. However, in the mountains, especially in the HKH, pure market-based solutions may not be effective. Mountain communities have limited arable land which means putting it to commercial use is not a real possibility. They also have a higher dependency on natural ecosystems than people living downstream. Mountain areas are inaccessible, with limited transport and other infrastructure. Moreover, the changing climate poses additional challenges to mountain communities where low agricultural productivity is already a problem. Therefore, a promising hybrid model which considers both market and non-market instruments may work as a potential PES scheme. This also means that payment may not be necessarily in cash. It could, for example, be in the form of development projects to incentivize upstream communities, and encourage their efforts towards managing upstream ecosystems.

The ICIMOD-supported symposium, Incentivizing Mountain Communities for Ecosystem Services in the Context of a Changing Climate, was designed to generate a discussion on incentivizing mountain communities – particularly in the HKH, and request researchers and policy makers to debate and agree on a possible modality on an incentive based mechanism for a sustainable supply of ecosystem services in the context of a changing climate.



Objectives of the Symposium

Biodiversity has been an important subject of research and global discourse as it forms the basis of peoples' lives and livelihoods. Biodiversity is closely linked to climate, culture and conservation efforts. Protecting biodiversity while meeting the needs of people in the context of a changing climate remains a great challenge. Climate change has emerged as one of the most important environmental, social and economic issues of the day. Its impacts are most severe for the global poor. South Asia, in particular, is one of the regions most affected by climate change. The International Conference on Biodiversity, Climate Change Assessment and Impacts on Livelihood (ICBCL) was organized in Kathmandu from 10 to 12 January 2017 against this backdrop.

The three-day conference focused on exploring approaches from the natural and social sciences to support economic development, particularly in developing countries which face serious climate hazards, biological invasion, biodiversity loss, agriculture and water stress. The conference brought together 300 national and 100 international scientists, policy makers and development workers to facilitate the integration of science, technology, policy and action. The focus was on finding innovative applications for scientific and technological research to promote rural enterprises, and support broad improvements in nutrition, health and living standards. As part of the conference, ICIMOD organized a symposium with eminent experts in the fields of ecosystem services and biodiversity conservation from Bhutan, China, India, Bangladesh and Nepal participating.

The major objectives of the symposium were to:

- Explore general trends related to understanding ecosystem services, and its significance for the HKH
- Debate research-policy linkages to support incentives for ecosystem services
- Develop a common framework for incentives for ecosystem services in the Himalaya



Highlights

Inaugural Session

The President of Nepal, Bidhya Devi Bhandari, inaugurated the conference. She spoke about the importance of nature conservation in combating the negative impacts of global climate change (Annex I). She highlighted the importance of transboundary cooperation saying, "Nature conservation should extend beyond national borders. Transboundary cooperation is necessary for conservation." David Molden, Director General of the International Centre for Integrated Mountain Development (ICIMOD), shared the dais with President Bhandari. Molden said he was grateful to be part of the conference, and highlighted the importance of mountain regions, particularly the Hindu Kush Himalaya (HKH). Underscoring the value of biodiversity and ecosystem services, Molden referred to the HKH as repository of biodiversity – with 488+ protected areas, 330 important bird areas, 33 Ramsar sites, and 1000+ languages. He spoke of challenges related to various drivers of change, including climate change, and underlined the existing and potential impacts of climate change on biodiversity and ecosystem services. Molden acknowledged the timeliness of the conference, and noted the pertinence of the conference subject in terms of linking the social and biological nexus. He concluded his remarks with ICIMOD's commitments to the wellbeing of the HKH, and successful completion of the conference.

Building on the theme of the conference, the ICIMOD-supported symposium, Incentivizing Mountain Communities for Ecosystem Services in the Context of a Changing Climate, was organized on 11 January 2017 (Annex II). More than 200 delegates from 25 countries representing diverse sectors, institutions and agencies working in the HKH on ecosystem services, climate change, sustainable development, poverty, human-health and wellbeing, food and security, development and economy participated.

The symposium featured one keynote speech, and six presentations. The discussions focused on incentivizing mountain communities, particularly in the HKH, for their contributions to securing ecosystem services. SP Singh, a renowned educationist, ecologist and former Advisor to the State Planning Commission, Government of Uttarakhand, Dehradun, and former Vice-Chancellor of Hemwati Nandan Bahuguna Garhwal University, Uttaranchal, delivered the keynote speech. Krishna Chandra Poudel, Secretary, Ministry of Forest and Soil Conservation, Government of Nepal, presided over as chair of the event. The panelists included Nakul Chettri, Senior Biodiversity Specialist and Project Coordinator–Kangchenjunga Landscape Conservation and Development Initiative, ICIMOD; Xu Jianchu, Professor, Kunming Institute of Botany, Chinese Academy of Sciences; Satish Chandra Garkoti, Professor, School of Environmental Sciences, Jawaharlal Nehru University; AKM Nazrul Islam, Professor, Department of Botany, University of Dhaka; Lungten Norbu, Senior Watershed Specialist, Department of Forests and Park Services, Royal Government of Bhutan; and Rajesh Rai, Environmental Economist, South Asian Network for Development and Environmental Economics (SANDEE).



Symposium

1. Himalayan Ecosystem Services: Expanding the Application of the Concept in a Changing World

– *Surender P Singh*

The symposium began with a keynote speech from Surender P Singh, during which he focused on ecosystem services in the Indian Himalaya. His presentation covered three main points: the flow of ecosystem services from the Himalaya to the Gangetic plains, internal services flow, and the economic valuation of ecosystem services. He highlighted biodiversity, saying it is crucial to maintaining the flow of ecosystem services. He said that an ecosystem with many species is more productive than an ecosystem with fewer ones. He noted that despite being an anthropogenic concept, ecosystem services are not valued by people, and that we have little knowledge of the services we receive from ecosystems. He highlighted the significance of the ecosystem services the Himalaya provide to 1.3 billion people living both upstream and downstream. He provided scientific evidences for the flow of ecosystem services from the Himalaya to the Gangetic plains, and argued that the research in this field is scant. He pointed towards the need for good science to establish the fact that the Himalaya provide a vaster array of services to humanity than we currently acknowledge.



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2. Ecosystem Services Perspectives in ICIMOD's Transboundary Landscapes

– *Nakul Chettri, Pratikshya Kandel, Yi Shaoliang, Philip Bubb, Wu Ning and Eklabya Sharma*

Nakul Chettri started his presentation with introductions to ICIMOD and the HKH. He highlighted the importance of the HKH in terms of providing ecosystem services to communities in the Himalaya and beyond. He discussed the rich biodiversity of the HKH and explained the importance of the region in terms of the overall number of species found, and the threatened and endemic species among them. He also explained the history of the concept of ecosystem services, and discussed the details of how it has evolved over time. He discussed ecosystem services perspectives in the HKH, and our understanding of it in relation to the research that is being done in the region. He pointed out that the HKH is a data deficit region, and that ICIMOD has identified six transboundary landscapes in the area to fill in the data gaps. He illustrated, with examples from the Kangchenjunga Landscape and Phobjikha, Bhutan, how dependent we are on services provided by ecosystems in these regions. He stressed on working on ecosystem assessment in a manner that will contribute to the Sustainable Development Goals of the United Nations and the Aichi Targets of the Convention on Biological Diversity.



3. Ecological Calendars: Enabling the Participation of Indigenous and Civil Society to Cope with Climate Change in the Asian Highlands

– *Xu Jianchu*

Xu Jianchu highlighted the 24 solar terms inscribed on the List of the Intangible Heritage of Humanity during the 11th session of UNESCO in 2016. Presenting an overview of ecosystems in Asia, he explained that Asia has some of the most diverse ecosystems in the world, resulting from diverse bioclimatic zones arising from extreme elevation ranges. He said that Asia has rich cultural diversity, and that the people of the continent have immense traditional knowledge in terms of understanding and managing ecosystems, and the services they provide. The presentation explored, in detail, the ecological calendar and its different bands. He discussed the extent of climate change in the Asian highlands, phenology being a good indicator for climate signals. He mentioned the China Phenology Observation Network (CPON), and its 45 stations and 70 observers that are distributed mainly in eastern China.

He pointed out that there are no stations in the alpine region, and in the highlands. He discussed the 24 Solar Terms in the context of the Ecological Calendar Project which has four consortium partners: Cornell University, Kunming Institute of Botany – Chinese Academy of Sciences, University of Bayreuth, and Euro-Mediterranean Center on Climate Change. The project involves an inventory of ecological calendars, participatory action research, and anticipated capacity for indigenous knowledge with recalibrated calendars. He also spoke about the ecological calendar network in the Asian highlands which features a multidisciplinary, participatory, regional networking approach. Jianchu also requested interested organizations, institutions, and individuals to come together and form partnerships.



4. Role of Traditional Agroforestry Systems in Generating Ecosystem Services in the Trans-Himalayan Landscape of India

– *Satish C Garkoti*

Satish C Garkoti presented a case study from Ladakh, India, and explained how the traditional agroforestry system in Ladakh plays a crucial role in generating ecosystem services for the people of Ladakh. He talked about how indigenous communities have developed robust agroforestry systems wherever water is available in extreme weather conditions to adapt to the effects of climate change. He covered key features of the study area, including biophysical and socio-economic conditions of the region, major agroforestry systems, knowledge and practices of the indigenous communities of Ladakh, and major ecosystem services generated from traditional agroforestry systems. He highlighted the local community's roles in bringing greenery back to the cold desert landscape of Leh- Ladakh. He noted how role local culture plays a major role in assisting the generation and management of ecosystem services in the area, and brought to everybody's attention the need for recognizing and appreciating these efforts.



5. Ecosystem Services and Environmental Conditions: Perspectives from Bangladesh

– *AKM Nazrul-Islam*

AKM Nazrul-Islam discussed the ecosystem services and environmental conditions related to deciduous sal (*Shorea robusta*) forests and wetland habitats in Bangladesh. Deciduous sal forests provide ecosystem services such as wood, fuel wood, and medicine to local communities. They shelter many birds and wild animals, including primates. Rich litter fall on forest floor provides the soil important nutrients. Freshwater habitats (temporary marshes) support aquatic plant and animal life. They are a source of scenic beauty, and increase soil fertility towards the end of the monsoon season by supplying organic matter – decomposed aquatic plants – to cultivated fields. Furthermore, the mangrove forests (saline habitat) of the Sundarbans are an important livelihood resource for local people. These forests provide raw material to news print mills, fuel wood, and thatching materials. In addition, fishermen capture various fish species including hilsha fish and prawn throughout the year to sustain their livelihood. Similarly, local people collect honey, wax, fish, and crabs from the forest. These forests are also home to various wild species, including the Bengal tiger, spotted deer, wild boars, and many species of bird.



6. Payment for Environment Services (PES) in Bhutan: Current Issues, Approaches and Practices

– *Norbu Lungten*

Norbu Lungten presented reviews on three PES schemes on drinking water implemented in Bhutan. The Government of Bhutan has acknowledged the importance of forests in providing provisioning goods and other ecosystem services. Bhutan's constitution has mandates to ensure 60% of the country will forever remain under forest cover. Rich natural resources and intact rural landscapes that sustain industries, hydropower, tourism and rural livelihoods, provide scope for and links to activate PES schemes in Bhutan. There are enabling policies, laws and intuitions that facilitate the establishment of innovative mechanisms like PES. The concept of PES has been recognized by the Forest Policy, 2011; the National Environment Policy, 2006; the National Food Security Strategy Paper, 2006; the National Water Act, 2011; and the Bhutan Sustainable Hydropower Development Policy, 2008. The initial lessons learned show that PES schemes are performing, but they are limited to three small sub-watersheds, and the benefits to stakeholders are small. Based on experiences from PES pilot sites, the following needs have been identified:



1. Upscale across diverse socio-economic and ecosystem specificities
2. Explore and extend to other types of PES (e.g., biodiversity conservation for tourism, watershed services for hydropower, and several ES bundled as one)
3. Establish clear and understandable terms and conditions for PES contractual agreements
4. Conduct regular monitoring of PES schemes by intermediaries to ensure activities are progressing per the agreed upon terms and conditions

5. Carry out extensive awareness and education campaigns on PES (concepts and practices) aimed at all stakeholders (including policy makers)
6. Value ecosystem services that provide continued negotiation and mutual agreement between ES users and providers as a basis for payment to providers
7. Build capacity for conducting ecosystem valuation

Uptake of these suggestions could result in more elaborate and sustainable PES systems, ensuring greater responsibility and benefit sharing amongst all participating stakeholders. Experiences from pilot PES schemes suggest that environment services users are the most important stakeholders for the sustainability of PES schemes which suggests ecosystem services should focus on the poor.

7. Ensuring the Availability of Drinking Water for Water Users through Payment for Ecosystem Services: a Case from the Baitadi Town Water Supply and Sanitation Project, Nepal)

– *Rajesh Rai, Laxmi D Bhatta, Madan Khadayat and Kamal Aryal*

Rajesh Rai talked about the process and methods involved in designing Payment for Ecosystem Services. With examples from the study area, Dasharath Chand Municipality in Baitadi district, Rai illustrated how the design of a given PES mechanism is driven by the needs of the area in which it is based. Dasharath Chand Municipality suffers from irregular water supply. Its households get just about 100 liters of water a day. In order to address these challenges, the government has started a new water supply project. He said that the main aim of designing a PES mechanism in this area will be to minimize watershed obstruction as a result of water diversion, and to encourage communities in the watershed to maintain water quality. To avoid ambiguity in relationships between land use and the flow of ecosystem services, the study adopted a participatory approach to preparing and identifying a preference list of ecosystem services and activities to maintain/improve watershed via focus group discussions. For analyzing the demand and supply of water, watershed condition, and water users, experimental design and household survey were conducted. These helped estimate the willingness to pay for ecosystem services among water users, and the interests of watershed communities. The issues that affect the quality and quantity of water supply to water users are sanitation, increased use of chemical fertilizers, grazing, drinking water distribution, and non-timber forest product (NTFP) management in upstream areas. Several activities have been identified to address these issues, and the cost of applying these is an estimated USD 10,987 during the first year, and USD 4,505 annually from the second year onwards. For municipal water users, water quality and quantity are the most important attributes. The estimated annual willingness to pay for doubling water availability is USD 4,505, and for doubling water quantity and availing clean water that can be drunk without treatment is USD 10,988. This indicates that implementing PES in the Baitadi Town Water Supply Project is financially feasible and socially acceptable. The implementation of this PES scheme will require a tripartite agreement between the watershed community, monitoring committee, and water user committee. PES designing is a rigorous and costly process so it must be incorporated with initial environmental examination (IEE) and/or environmental impact assessment (EIA). In cases where payment is insufficient, PES should incorporate a multi-sectoral approach to managing resources. The relationship between land use and ecosystem flow is complex, so output based payment may not be feasible. There is a need for input based payment – incentive payment for ecosystem services (IPES).



Discussion and Summary Recommendations

The organizers opened the floor to questions once the presentations were delivered. Discussion and recommendations followed. A summary of the same is presented here:

Question: Data shows that soil nutrition has increased, but crop production has not increased in the same order of magnitude. Why?

- *Rajan Ghimire, New Mexico State University, USA*

Response: Crop productivity is influenced by conflicts between wildlife and agriculture. The opportunity to increase crop yield could have been impacted by climate change in some areas.

Question: What is the direct implication of an ecological calendar on farming systems? How far ahead are you in implementing this calendar?

- *Khem Raj Dahal, Tribhuvan University, Nepal*

Response: Ecological calendars help envision possible futures, and develop dynamic plans to deal with climate change uncertainties. However, nobody is using ecological calendars at this point, which is exactly why farmers must be called upon to incorporate ecological calendars into traditional knowledge systems as part of an effective local adaptation strategy.

The keynote address and presentations brought to the table diverse perspectives on ecosystem management and provisions for incentivizing communities through both monetary and non-monetary mechanisms. A way forward, presented below, was agreed upon:

1. Scientific evidence is necessary for achieving better understanding of and support for recognizing ecosystem services in the Himalaya and devising mechanisms for incentives
2. Ecosystem sustainability, which is strongly linked to traditional practices and culture, should be recognized and appreciated
3. Policies and practices need to be improved to sustain the flow of diverse ecosystem services – agro-ecosystems, wetlands, forests, etc. – which are vital for human wellbeing
4. Better planning, stakeholder engagement, and institutional and policy support must be taken into account along with PES for contributions to ecosystem resilience to be really effective
5. PES should be mainstreamed so that it may contribute to global agendas such as SDGs and Aichi targets



Closing Remarks from the Chair

Krishna Chandra Poudel, Secretary, Ministry of Forest and Soil Conservation, thanked all the resource persons for their excellent presentations. He reiterated that mountains play a great role in providing ecosystem services, fresh water, forest and biological resources, high value NTFPs, biological hotspots, sources of hydropower, and scenic beauty. However certain problems, such as loss of biodiversity, change in climate, decline in productivity, and scarcity of food and water are common in the world, and more prominent in the HKH. Poudel said that it is important to encourage uptake of knowledge shared during the conference, and that the success stories presented

must be replicated wherever applicable. Although biodiversity conservation has been discussed a lot, sustainable use, and access and benefit sharing still need to be explored. Sustainable use of biological resources is part of sustainable life on earth, a fact which has been emphasized on in the Convention on Biological Diversity. Poudel expressed hope that excellent PES systems will be identified in the future and shared at different forums. He suggested that scientists and practitioners explore PES beyond livelihoods for the prosperity of people, including biodiversity conservation and sustainable tourism. He underscored the importance of natural resources for the prosperity of local people beyond simply sustaining livelihoods.



On the final day of the conference, Eklabya Sharma, Director Programme Operations, ICIMOD, shared the dais with Dhani Ram Paudel, Minister of Education, Government of Nepal, during the closing session. Sharma acknowledged the organizers for giving biodiversity, climate change assessment and livelihood due consideration at the event, and recognizing how a nexus of drivers and impacts affect biodiversity and human wellbeing. He thanked the organizers for allowing ICIMOD the opportunity to not just participate in the conference but also support a special symposium as part of the event. Sharma highlighted the significance of Himalayan biodiversity and ecosystem services, and spoke about the Hindu Kush Himalayan Monitoring and Assessment Programme (HIMAP), initiated by ICIMOD for generating baseline and developing mechanisms for periodic assessment, and monitoring of HKH ecosystems, economic development and environment. He also highlighted the role of the Himalayan University Consortium, facilitated by ICIMOD, where Tribhuvan University, the main organizer, is a major stakeholder. He concluded his closing remarks saying the conference has proved a great platform for experts, amateurs, and young mind from various academic institutions to get together to share knowledge.



Annexes

Annex I

जैविक विविधता, जलवायु परिवर्तन र जीवनयापनमा परेको असर सम्बन्धी अन्तर्राष्ट्रिय

सम्मेलनको समुद्घाटन समारोह २०७३

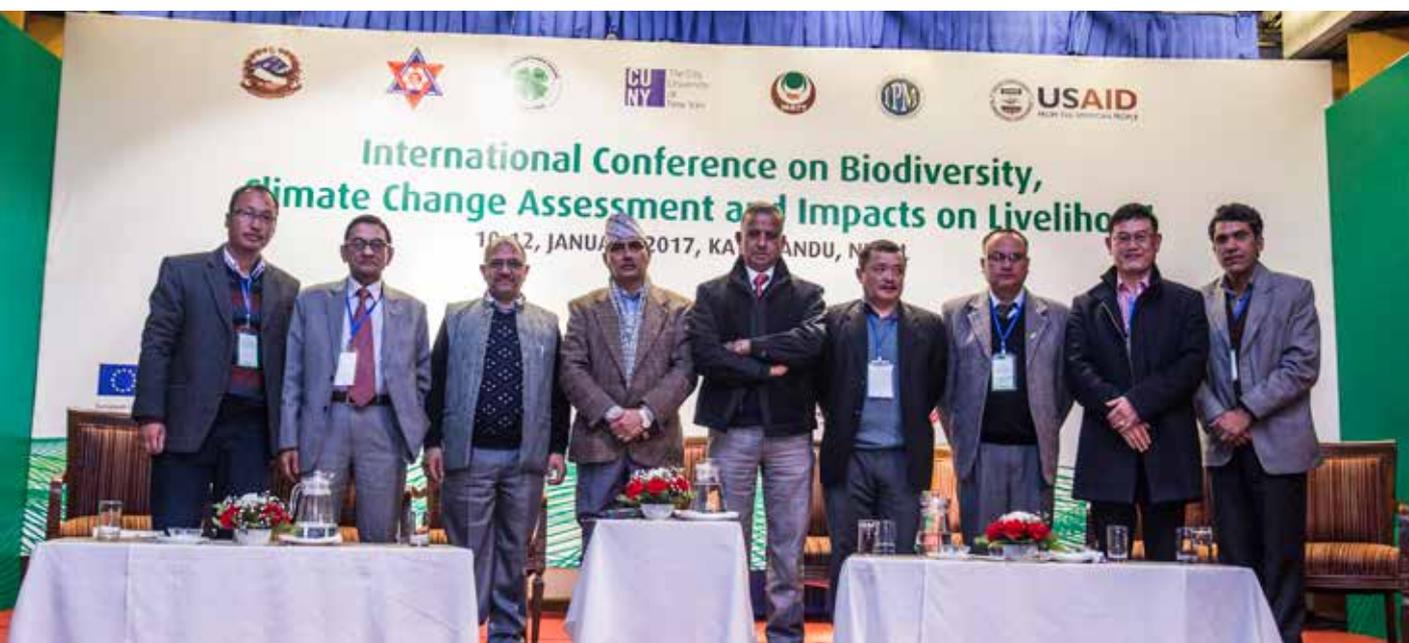
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मिति: २०७३/०९/२६ गते मंगलवार ।

सि. नं.	समय	कार्यक्रम
१	बिहान ११:००	कार्यक्रमको अतिथि तथा अन्य महानुभावहरुको आगमन तथा आसनग्रहण
२	११:३०	सम्माननीय राष्ट्रपतिज्यूको आगमन तथा स्वागत <ul style="list-style-type: none">सम्माननीय राष्ट्रपतिज्यूको स्वागत : फूलको गुच्छाद्वारा आयोजक पदाधिकारीबाट ।राष्ट्रिय गानसम्माननीय राष्ट्रपतिज्यूको आसन ग्रहणकार्यक्रम पुस्तिका अर्पण
३	११:३५	स्वागत मन्त्र य एवं कार्यक्रम बारे जानकारी : आयोजक समितिको अध्यक्ष प्रा. डा. प्रमोद कुमारभाज्यूबाट ।
४	११:४०	सम्माननीय राष्ट्रपतिज्यूबाट कार्यक्रमको समुद्घाटन: पानसमा दीप प्रज्वलन गरेर ।
५	११:४५	मन्त्रब्य : <ul style="list-style-type: none">Dr David Molden, Director General, ICIMODMr Peter A. Malnak, Mission Director, USAID NepalMs Rensje Teerink, Ambassador, European Union
६	११:५५	मन्त्रब्य माननीय: जनसंख्या तथा वातावरण मन्त्री श्री जयदेव जोशीज्यूबाट
७	१२:००	सम्माननीय राष्ट्रपतिज्यूबाट सम्बोधन
८	१२:०५	कृतज्ञता ज्ञापन : श्रीमान् आयोजना समिति सचिव एवं विभागीय प्रमुख वनस्पति शास्त्र, केन्द्रिय विभाग त्रिभुवन विश्वविद्यालयका प्रा. डा. मोहन सिवाकोटी ज्यूबाट
९	१२:०९	मन्त्रब्य सहित कार्यक्रमको समापन : श्रीमान् उपकुलपति त्रिभुवन विश्वविद्यालयका प्रा. डा. त्रिथराज खनियाँ ज्यूबाट
१०	१२:१३	फोटो सेसन
११	१२:१८	सम्माननीय राष्ट्रपतिज्यूको विदाई ।

ANNEX II: Programme Agenda

09.00–09.25	Keynote Himalayan Ecosystem Services: Expanding the application of the concept in a changing world - <i>Surender P Singh</i>
09.25–09.35	Ecosystem services perspectives in ICIMOD’s transboundary Landscapes - <i>Nakul Chettri, Pratikshya Kandel, Yi Shaoliang, Philip Bubb, Wu Ning and Eklabya Sharma</i>
09.35–09.45	Ecological Calendars: Enabling the participation of indigenous and civil society to cope with climate change in the Asian highlands - <i>Xu Jianchu</i>
09.45–09.55	Role of Traditional Agroforestry Systems in generating Ecosystem Services in a Trans-Himalayan landscape of India - <i>Satish C Garkoti, RL Semwal and Padma Ladon</i>
09.55–10.05	Ecosystem Services and Environmental Conditions Perspectives in Bangladesh - <i>AKM Nazrul- Islam</i>
10.05–10.15	Payment for Environment Services (PES) in Bhutan – Current Issues, Approaches and Practices - <i>Lungten Norbu</i>
10.15–10.25	Ensuring the Availability of Drinking Water to Water Users through Payment for Ecosystem Services (A Case of Baitadi Town Water Supply and Sanitation Project, Nepal) - <i>Rajesh Rai, Laxmi Bhatta, Madan Khadayat and Kamal Aryal</i>
10.25–10.45	Discussion
10.50–11.00	Remarks by Chair



Annex III: Closing Ceremony

Time: 4:00 to 5:00 PM

Chair of closing session: Prof. Mohan Siwakoti (conference Secretary and Head of Central Department of Botany)

Chief Guest: Mr. Dhani Ram Paudel (Honorable Minister of Education)

Guests of honor: Prof. Ishwari P Dhakal (Vice Chancellor Agriculture and Forestry University)

Chair of the conference: Prof. Pramod K. Jha

1. Welcome and summary of the conference with resolution: *Prof. Naba Raj Devkota*
2. Remarks by:
 - (i) Remarks from participants : *Prof. Mohammad Atiqur Rahaman* (Bangladesh)
 - (ii) *Dr. Nir Krakauer* (City University of New York, USA)
 - (iii) *Prof. Surender P Singh* (Senior Scientist, INSA, India)
 - (iv) *Prof. Rangaswamy Muniappan* (IPM innovation lab, Virginia Tech., USA)
 - (v) *Dr. Eklabya Sharma* (Director of Programme Operation, ICIMOD)
 - (vi) *Mr. Sarbajit P. Mahato* (Secretary of Ministry of Science and Technology)
 - (vii) *Dr. Bishwo N Oli* (Secretary, Ministry of Population and Environment)
3. Presentation of souvenir to keynote speaker
 - (i) *Prof. Rangaswamy Muniappan* (IPM innovation lab, Virginia Tech., USA)
 - (ii) *Prof. Shock C. Clinton* (Oregon State University, Oregon, USA)
 - (iii) *Prof. Steve Adkin* (University of Queensland, Queensland, Australia)
 - (iv) *Prof. Surender P Singh* (Senior Scientist, INSA, India)
 - (v) *Mr. Sarbajit Parsad Mahato* (Secretary of Ministry of Science and Technology)
 - (vi) *Dr. Bishwo N Oli* (Secretary, Ministry of Population and Environment)
4. Address by the chair of the organizing committee *Prof. Pramod Kumar Jha*
5. Address by guest of Honor *Prof. Ishwari P Dhakal* (Vice Chancellor of Agriculture and Forestry University)
6. Closing address by chief guest: *Mr. Dhani Ram Paudel* (Minister of Education)
7. Closing and vote of thanks by *Prof. Mohan Siwakoti*
(Conference Secretary and Head of Central Department of Botany)



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