ICIMOD Working Paper 2015/9

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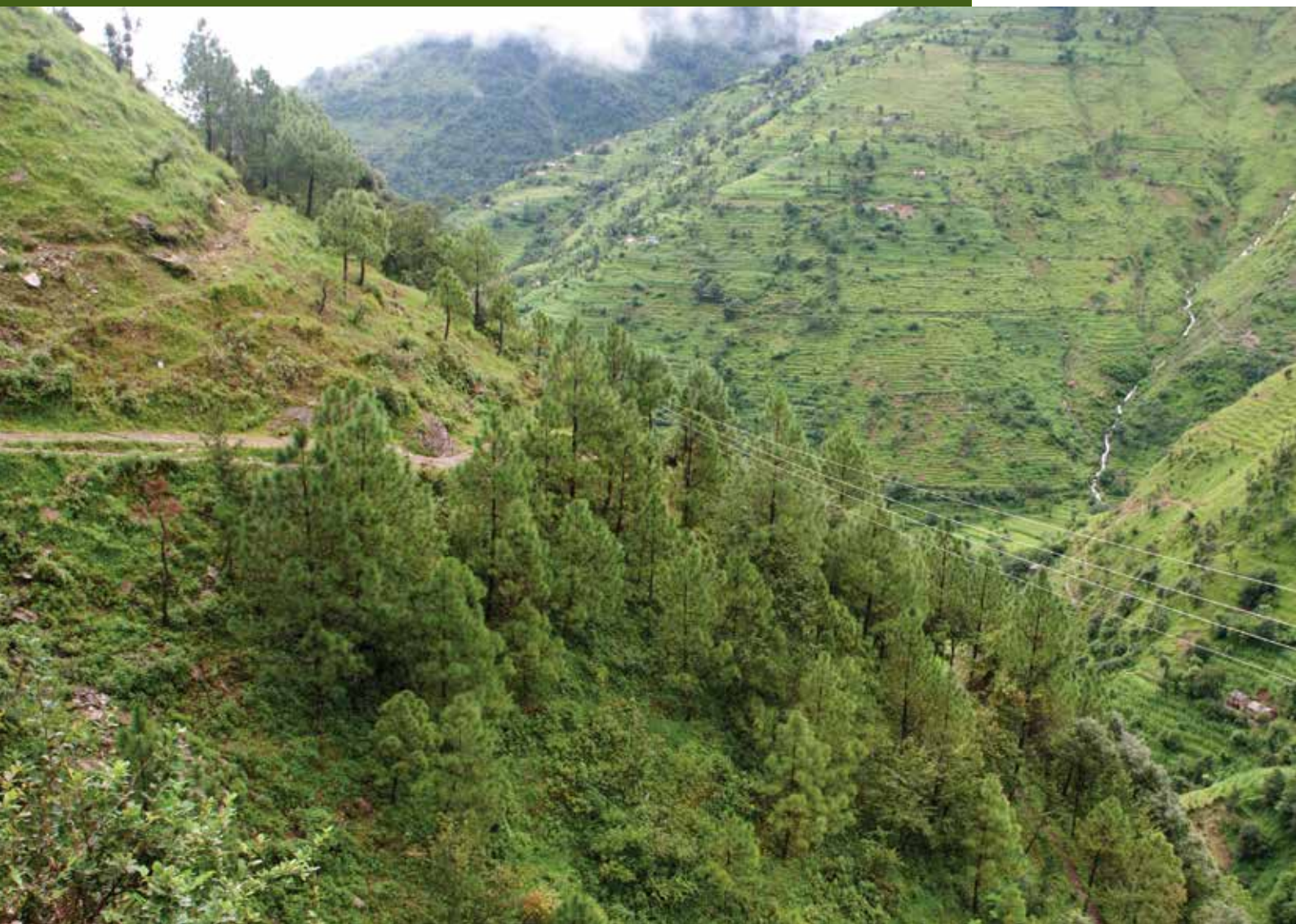
FOR MOUNTAINS AND PEOPLE

Transforming Mountain Forestry in the Hindu Kush Himalayas

Toward a Third-Generation Forest Management Paradigm



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 partnerships 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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Transforming Mountain Forestry in the Hindu Kush Himalayas

Toward a Third-Generation Forest Management Paradigm

Rajan Kotru[1]
Brij Mohan Singh Rathore[1]
Nawraj Pradhan[1]
Laxmi Dutta Bhatta[1]
Gopilal Acharya[1]
Bhaskar Karky[1]
Shreedip Sigdel[1]
Padam P Bhojvaid[2]
Neelu Gera[2]
Sudhirendar Sharma[3]

[1] International Centre for Integrated Mountain Development
[2] Forest Research Institute
[3] The Ecological Foundation

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Production team
Susan Sellars-Shrestha (Consultant editor)
Amy Sellmyer (Editor)
Punam Pradhan (Graphic designer)
Asha Kaji Thaku (Editorial assistant)

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Message from the Ministry of Environment, Forest, and Climate Change, Government of India

Transcription of video message delivered by Minister Prakash Javadekar at the inauguration of the symposium

Dignitaries, Ministers from neighboring countries, Ministers from various states, Members of Parliaments, other dignitaries on and off the dais. It is a very important initiative by ICIMOD and Forest Research Institute to organize this four days seminar towards transforming mountain forestry for the welfare of mountain people, forests and environment in Himalayan ecosystems.

This is important because Himalaya has peculiar mountain features. We call it baby mountain. The science tells us that it's still growing. The composition of the Hindu Kush Himalayan ecosystem is a very interesting science and there is need to develop the sustainable forest ecosystem in the Hindu Kush Himalayan region, which has transboundary issues also, because Nepal, Bhutan and on other side Sunderbans of Bangladesh, Pakistan, all are interconnected. Therefore, this symposium is a first of such kind of symposium, especially focusing on mountain forestry in Hindu Kush Himalayan region. Forests cover of about 25% of the Hindu Kush Himalayas and provide vital ecosystem services. They provide timber and non-timber resources, that helps to sustain local livelihoods, ensure the provision of food, water, energy and protect the environment by sequestering carbon. I hope experts will deliberate extensively in this seminar. I have asked my director general and additional director general, who are present here, to brief me after the symposium in detail about the main findings and recommendations which will come out for developing the ecosystems. The Prime Minister of India Shri Narendra Modi is committed to develop the ecosystems which can ensure the sustainable development in the Himalayas. That is why in the budget we have also declared Himalayan Initiatives. They are about research into climate change specifically, but also includes forest development and many other things that impact entire ecosystems, weather patterns and river flow. At the same time they also have an impact on climate change. The mountain forests, if grown properly will help in creating new carbon sinks. This is a major development because as the cattle and human population is increasing, with increasing pressure on forests, there is a denudation happening in the states along the Himalayan borders. But there are states which have done extremely well. Bhutan, Nepal, India, many states of India, such as Sikkim, Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Meghalaya and many others have showcased different experiments that have been carried out successfully. The symposium gives an opportunity to share the best practices, and make an impact on everybody to adopt such good practices. This will really help sustainable development. It is, therefore, important for the stakeholders in the entire Himalayan region to promote sustainable and inclusive forest management that brings together practice, policy and science. There are many trans-boundaries issues also, such as law, administration, management, illegal trade, corridor connectivity, human wildlife conflict, water management, floods, and value chain sustainability. These issues need to be resolved through solutions based on strong trans-boundary cooperation. And here are more than 200 experts who have come together. I hope that the symposium fulfills its objective to establish common understanding of forest ecosystem dynamics and the management of mountain forest ecosystems in the Hindu Kush Himalayas to set the research and development agenda on the trans-boundary scale.

I understand that an important trans-boundary programme on Kailash Sacred Landscape is being implemented by India, China, and Nepal through ICIMOD. The main objective of the programme is to improve livelihood and build ecosystem resilience through regional cooperation with enabling policy environment. It is also in the process of getting nominated as UNECSO World Heritage Site for its outstanding universal value and its cultural and natural heritage significance to the entire world. We hope that more such programmes are started with trans-boundary cooperation.

I wish all the success to this symposium which as a first brainstorming of this kind, will definitely bring out new dimensions and new solutions. It will pave the way for more active trans-boundary cooperation to maintain Himalayan ecosystems and make them more beautiful, more sustainable, and more worthwhile to live with. I wish this programme a great success.

Thank you and all the best.

Foreword

The International Centre for Integrated Mountain Development (ICIMOD) stands for mountains and people, and therefore we clearly understand the important role forests, and their interface with other ecosystems in the Hindu Kush Himalayas (HKH) play for in the livelihoods of the people in the region, while helping ecosystems sustain multiple services. The many valuable ecosystem services provided by mountain forests, including climate stabilization, carbon sinks, protection of hydro-ecological functions, and biodiversity conservation, desperately need greater attention.

Frequently, from all across the HKH, we hear disturbing stories of forest fires, devastating floods, drying springs, loss of biodiversity, spread of invasive species, and increasing human-wildlife conflicts. These are clear indicators that mountains are becoming hotspots of 'ecological instability', and such instability will only aggravate if we persist with our business-as-usual actions. Does this mean we have a mountain forestry crisis on our hands? Or is it a crisis of forest management?

The HKH region is marked by change. There is a continuous out-migration of people, especially men, because there is an earnest desire to move beyond subsistence. People are becoming more educated, and finding fewer opportunities to apply their learning in mountains. Information technology is providing people with faster and more comprehensive access to information and speeding up globalization processes and market forces are playing an increasing role in once isolated mountain valleys.

Given this context of change, it is therefore time for a shift in paradigm in the way mountain forests are maintained and managed. It is time for a third generation of forest management that takes into account the changing nature of the Himalayas and the changing aspirations of people dependent on forests.

We have already gone through two paradigms: the first marked by state control of forests, and a second, involving more community and more participatory approaches. What are the key ingredients of the third generation of forest management?

Holistic and integrated approaches are required at the landscape level recognizing that forests cannot be looked at in isolation. For example, there are forest-water interactions critical for communities and people downstream; the way people use forests has implications for energy, water, and for agriculture downstream; and there is an important role for commercial benefits.

The third generation of forest management must take long- and short-term perspectives. We know that many benefits from forests are derived after several generations, and forest conservation ideals are already imbedded in our first and second generation of forest management. In addition, a short-term perspective would take into account more immediate benefits to people, especially those living in poverty on the fringes of development. The Dehradun "Transforming Mountain Forestry Symposium" is the first meeting of its kind. This report contains the results of the deliberations of this important symposium. I now look forward for policy and practice related deliberations and analysis providing resonance in the region based on the workshop for the whole region to make forestry create positive impacts for people and ecosystems alike.

David Molden, PhD
Director General
ICIMOD

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The main contributors of this publication would like to acknowledge the efforts and contributions of the many people from different institutions and disciplines who have contributed to the design, delivery, and outputs of this event. We especially thank those participants and presenters from seven countries of the HKH and participants from other 15 countries of the globe who provided invaluable background information, data, and analysis during the symposium held in January 2015. Our deep gratitude is expressed to Mr Hem Pande, Special Secretary, Ministry of Environment, Forest and Climate Change (MOEFCC), India; Dr S.S. Garbyal, Former Director General Forests, MOEFCC; and Dr S.S. Negi, Director General Forests, MOEFCC, for their support in organizing the symposium and contributing toward its key recommendations. We are thankful to Mr Sharad Chandra Poudel, Former Secretary, Ministry of Forest and Soil Conservation (MoFSC), Nepal; Dr Bishwa Nath Oli, Chief, Foreign Aid Coordination Division, MoFSC, Nepal; Dr Rajan Pokharel, Former Director General, Department of Forests, Nepal, for their encouragement and motivation to organize the symposium. Our special thanks go to Dr G.S. Gorraya, Deputy Director General, Indian Council of Forestry Research and Education; Dr N.S.K. Harsh, Forest Research Institute; Mr Kunal Satyarthi, Forest Research Institute; Prof S.P. Singh, Chair, Governing Council of the Central Himalayan Environment Association; Dr P.P. Dhyani, Director, GB Pant Institute of Himalayan Environment and Development; Dr Rakesh Shah, Chairperson, Uttarakhand Biodiversity Board; Dr David Molden, Director General, ICIMOD; and Dr Eklabya Sharma, Director of Programme Operations, ICIMOD, for their support and guidance. We would also like to thank all our partners in India – Central Himalayan Environment Association (CHEA), GB Pant Institute for Himalayan Environment Development (GBPIHED), Wildlife Institute of India (WII), Uttarakhand Biodiversity Board, and the Uttarakhand Department of Forest for their invaluable support during the symposium.

Special thanks also goes to all the ICIMOD staff who have helped in making the symposium a grand success. We are especially thankful to Ms Anja Møller Rasmussen and Ms Amy Sellmyer for providing editorial support, Ms Punam Pradhan and Mr Dharma Maharjan for providing their support in layout design of the publication. We would also like to thank Ms Nira Gurung, Mr Udayan Mishra, Mr Shiva Hari Khatri, Ms Prabha Shrestha, and Ms Pramila Shrestha for all their support in communication and logistics during the symposium. Deep appreciation is also extended to Dr Rucha Ghate, Prof Wu Ning, Dr Golam Rasul, Dr M.S.R. Murthy and Dr Bhaskar Karky for their inputs to draft documents, as their contribution has richly complemented the workshop outcomes and helped to narrow down the key messages for sustainable development of mountain forestry in Hindu Kush Himalayas. We would like to appreciate the probing inputs given by Dr Sudhirendar Sharma to refine this document, thus giving it a sense of direction. A special thanks to all the volunteers and scientists from the Forest Research Institute and Indian Council of Forestry Research and Education (ICFRE), CHEA and WII for their time given during the proceedings of this event. Finally, we are grateful to Mr Manfred Seebauer, Chief Technical Advisor, GIZ at ICIMOD, who all along the conception and delivery of the symposium has provided guidance and encouragement to take up this timely deliberation on transforming mountain forestry in the HKH for future generations.

Acronyms

ABS	Access and Benefit Sharing
FCCI	Forest Certificate Council of India
FSI	Forest Survey of India
HKH	Hindu Kush Himalayas
ICIMOD	International Centre for Integrated Mountain Development
IUFRO	International Union of Forest Research Organizations
GEP	Gross Environment Product
NTFP	non-timber forest product
PES	payment for ecosystem services
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SAARC	South Asian Association for Regional Cooperation
UNFCCC	United Nations Framework Convention on Climate Change

Summary

A five-day international symposium on 'Transforming Mountain Forestry' was held in Dehradun, India from 18 to 22 January 2015 to explore options for sustainable forest management practices and policies that address the changing conditions in the Hindu Kush Himalayas (HKH). The symposium was jointly organized by India's Ministry of Environment, Forest and Climate Change (MOEFCC); the Forest Research Institute (FRI); and the International Centre for Integrated Mountain Development (ICIMOD). Over 250 regional and global experts, including law makers, scientists, practitioners, donors, civil servants, the media, market actors, legal experts, and representatives of civil society and the business community, attended the symposium, which sought to address the challenges of conservation and inclusive development while identifying transboundary opportunities to meet climatic challenges.

Forests cover about 25% of the HKH and interface with numerous ecosystems, providing an invaluable range of ecosystem services. The goods and services from forests sustain mountain agriculture, which is an integral part of ensuring food, water, and energy security in the context of the transboundary socio-economic, environmental, and cultural linkages of the region. The health and vitality of many forest ecosystems have been affected by climatic and land use changes; it is possible that the impact of the latter may outweigh that of the former.

To sustain forest ecosystem services in the context of climate change and other contemporary issues, the symposium sought to move towards a third-generation forest management paradigm, state controlled and participatory paradigms being the first two approaches to forest management in the region. The symposium recognized the role of mountain forests as carbon pools and recommended that regional member countries in the HKH develop policies that promote people-centric sustainable management practices backed by relevant research to ensure that forests continue to play this role in neutralizing the impacts of global warming. The need to link science with policy and practice was stressed and innovative ways to exchange knowledge to bridge information gaps were suggested, including the creation of horizontal and vertical links among stakeholders. Specific recommendations were made by the participants on the five symposium themes for consideration by the governments of the countries in the region.

This document also gives some details on discussion held during various plenary, parallel, and brainstorming sessions held during the symposium. It starts with the overall introduction of the symposium, the need for the symposium, and various themes and sub-themes discussed during the symposium. After the introduction, a detailed report of various sessions are presented which helped the symposium come up with recommendations in all five specific themes as mentioned below.

Recommendations

The role of mountain forests as carbon pools was widely acknowledged by the participants in the symposium. To ensure that forests continue to play this role in neutralizing the impacts of global warming, the symposium recommended that member states develop policies that promote people-centric sustainable management practices backed by relevant research. More specifically, the symposium made the following recommendations on the five overarching symposium themes. The details of the symposium that helped in forming these recommendations are presented in the rest of the document.

Institutions and governance

Governance and institutions are at the heart of any paradigm shift in managing mountain forests. Landscape-led governance institutions could be the way forward in finding common meeting points for member countries to identify policy provisions that can foster transboundary cooperation. The symposium recommended the following actions for institutions and governance:

- Prepare for landscape-level governance institutions in the long run (such as the Alpine Convention and the Mekong River Basin Commission)
- Identify policy provisions in the eight HKH countries to foster transboundary cooperation, and find meeting points for sub-regional level trials
- Ensure that women and gender concerns are an integral part of conservation and development efforts from conceptualization to implementation and monitoring

Forest dynamics and management

There is a need to link science with policy and practice for better forest management. Innovative ways to exchange knowledge to bridge information gaps were suggested to create horizontal and vertical links among stakeholders. The symposium recommended the following actions in relation to forest dynamics and management:

- Maintain and enhance the HKH mountain forest 'carbon pool'
- Prioritize mixed forests for their greater resilience to disturbances of any kind, including fire, pests, and erosion, and the improved habitats they offer for wildlife
- Promote the sustainable use of mountain forests, which implies proactive planned thinning and may result in the fixing of higher amounts of carbon than in the absence of any forest management
- Harvest timber so that diverse regeneration niches develop in a landscape approach
- Monitor the forested area by remote sensing
- Establish permanent plots and small wildlife enclosures in forests
- Develop a wildlife management concept that is compatible with sustainable mountain forestry and human welfare
- Use land use policies and plans to guide development investments

Linking incentives to stewardship

Ways to improve forest management by involving and engaging communities were explored and incentives to enhance the community stewardship of forests by developing both fiscal and non-fiscal mechanisms for payment for ecosystem services were showcased through case studies. The symposium recommended the following actions in relation to linking incentives to stewardship:

- Scope out the emerging theme of incentives for the stewardship of mountain forests
- Ensure secure tenure and inclusive access and benefit sharing with a clear focus on women
- Invest in ecosystem valuation science and the monitoring of ecosystem services
- Analyse, learn, and share from existing incentive-based mechanisms in the HKH

From subsistence to regional markets

Developing and managing transboundary markets holds promise for improving the economic basis of local livelihoods in the region. The countries in the region need to work together to remove regulatory hurdles by evolving standards and to maximize value realization by sticking to niche products from the mountain regions. Towards this the symposium recommended the following actions:

- Bring in technical interventions and good practices to benefit local communities
- Develop a network of markets with minimal regulatory hurdles attained through transboundary cooperation among policymakers and practitioners
- Scale up value chains to 'minimum of quantity' levels
- Evolve standards at the HKH level for sustainable management, products, and processes that are linked with a clear focus on poverty and inclusiveness
- Maximize value realization and stick to niche products to ensure the viability of community-based enterprises

Forestry knowledge forums and regional cooperation for policy, practice, and science

Supporting formal and informal networks, encouraging legal trade in mountain products, and inter-sectoral dialogue were identified by the symposium as areas that can contribute to transboundary cooperation. The symposium recommended the following actions in relation to science, policy, and practice:

- **Science:** Identify and prioritize research themes; deepen private sector engagement; and link research to enterprise and patents
- **Policy:** Establish a network of academic institutions; facilitate South-South cooperation with a link to the North; and strengthen the Himalayan University Consortium and encourage inter-university cooperation
- **Practice:** Facilitate the innovative exchange of knowledge and information at various levels. Good practices can be shared lab to land as well as land to lab. Communication mechanisms must be developed to allow two-way feedback between scientists, practitioners, and the end-users of knowledge.

Introduction

Forests in the mountains are fast becoming hot spots of ecological turbulence. Recent events in Uttarakhand and Jammu and Kashmir in India are clear pointers to the emerging challenges in managing mountain ecosystems, should the business-as-usual scenario persist. Mountain forests are otherwise in crisis, as evidenced by the increasing incidence of forest fires, drying springs, the scourge of invasive species, loss of biodiversity, and increasing human-wildlife conflict.

Forests in the HKH interface with numerous ecosystems, sequestering carbon and providing livelihoods, recreation, and timber and non-timber resources to millions of people. Since the 2007 United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties in Bali and the 2008 World Forestry Congress, the paramount role of forests in promoting climate change adaptation and mitigation has found global resonance, particularly in the HKH region. Climatic and land use changes have already affected the health and vitality of forest ecosystems, demanding a reassessment of forest management in the mountains.

To sustain forest services in the context of climate change and other contemporary issues, stakeholders in the HKH must consolidate current assessments of future challenges and opportunities and build a case for sustainable and inclusive forest management that brings together practice, policy, and science. Given the range of issues related to forest governance with upstream-downstream linkages (e.g., the illegal trade of forest products, corridor connectivity, human-wildlife conflict, water management, value chain sustainability), there is a clear need for transboundary cooperation in the development of future mitigation and adaptation strategies.

The two existing paradigms in forest management – the state control of forests and participatory forest management – are juxtaposed in the context of the emerging challenges facing the HKH. As the region has undergone significant socioeconomic transformation, it is time to move to the next generation of forest management approaches – a paradigm that takes into account both the changing nature of mountain ecosystems and the aspirations of mountain people. This paradigm will have to consider the changes taking place and must be adaptive. It must have a short-term perspective to ensure that the benefits of forests accrue to people, as well as a medium to long-term perspective to ensure that the benefits from forests continue to be derived after many generations.

Moreover, holistic and integrated approaches are required that recognize that forests cannot be looked at in isolation. For example, there are interactions between forest and water resources that are critical for communities and people living downstream. The way people use forests also has implications for energy and agriculture downstream, and there is an important role for business. These interactions have to be creatively used to move mountain forestry to another level.

There is a need to assess current management practices in mountain forestry, the direction and quality of science, and key forest sector policies, in particular, to innovate upon current practices to meet the epic challenges facing the Himalayas. The symposium sought to create an interactive knowledge-sharing platform for developing and adopting innovating approaches to make third-generation reforms a reality. There are also a range of transboundary issues related to forests and natural resources management that must be considered. In the context of climate change and the consequent emissions reduction impasse, the symposium drew a set of specific objectives to be deliberated upon from the perspective of making recommendations on the five overarching symposium themes (Table 1).

In line with the objectives and symposium themes, a series of inter-related plenary and parallel sessions were organized to obtain diverse perspectives on various aspects of mountain forestry management in the region. These were complemented by specific brainstorming sessions. A set of leading questions were posed for the panellists to deliberate on in each session. The sections below capture the salient outcomes of these deliberations.

Table 1. **Symposium objectives and themes**

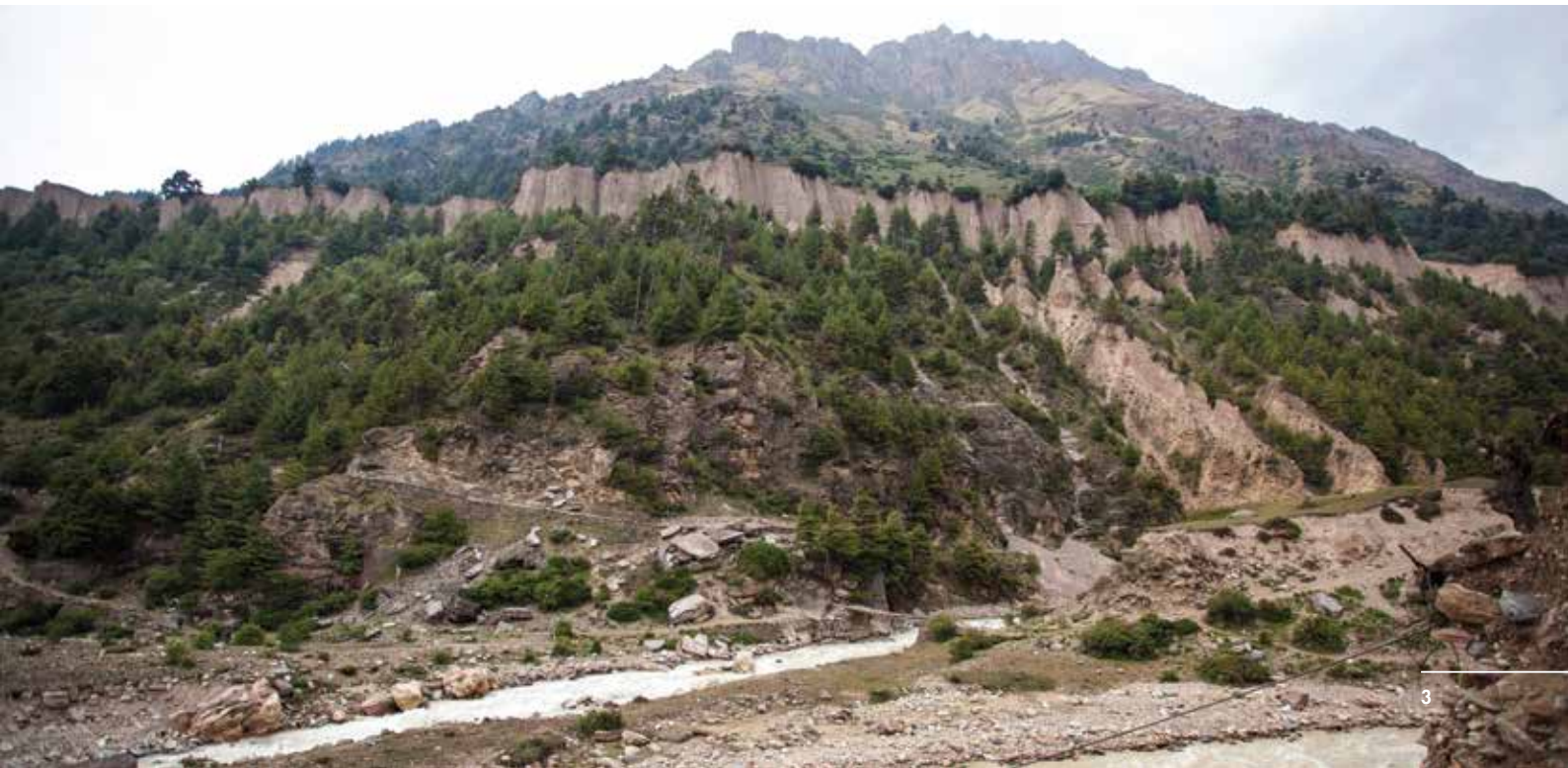
Specific objectives	Symposium themes
• Establish a common understanding of forest ecosystem dynamics and the management of mountain forest ecosystems in the Hindu Kush Himalayas to set the research and development agenda • Share good practices in forest ecosystem adaptation and learn from other regions • Explore options for mainstreaming incentive-based mechanisms (e.g., REDD+, payment for ecosystem services) to promote the sustainable use of forest ecosystem services • Identify policy deficits and propose priority actions to mainstream inclusive forest ecosystem adaptation and forest governance at the transboundary landscape level to address climate change and globalization processes • Promote global, regional, and national knowledge networking, research and development, partnerships, and cooperation to influence policy, science, and practice	**Institutions and governance:** Assessing institutional frameworks and their delivery on good forest governance to shape policy, science, and practice **Forest dynamics and management:** Using the science of forest dynamics to improve the management of mountain forests to sustain services **Linking incentives to stewardship:** Using forest valuation science to create new incentives for the sustained stewardship of mountain forests **From subsistence to regional markets:** Identifying opportunities to link value-added forest goods and services and forest technologies to certified markets and enterprises **Forestry knowledge forums and regional cooperation for policy, practice, and science:** Promoting options for action in transboundary forest ecosystem management by interfacing national and regional policies, practices, research, and knowledge networks

Moving Mountain Forestry into the Future

The Hindu Kush Himalayan region is a treasure trove of natural capital, cultural heritage, and ethnic diversity. The large amount of ecosystem goods and services that the mountains of the region provide needs to be sustained. Addressing deforestation, overharvesting, selective logging, excessive lopping, and heavy grazing has never been more urgent. Intensive afforestation programmes in mountain regions, such as in India and China, are gradually replacing natural forest cover with planted forests, and high-density forest is being converted into medium-canopy density forest. Deforestation in Afghanistan, Bangladesh, Myanmar, and Pakistan continues as it did in the last decade.

An increasing number of development projects are making inroads into the forest landscapes of the HKH, and balance is being sought between conservation and production. Although forest-dependent communities are increasingly being included in forest management to support efforts to arrest deforestation, some argue that the success of participatory forest management is largely at the cost of state-owned forests. Conclusive studies are still not available to show whether existing approaches help or hinder mountain forest ecosystems. An effective strategy is needed to overcome any further degradation and fragmentation of mountain forests.

As degradation and deforestation are multipronged questions, so must their answers be. Achieving multi-functionality of landscapes by maintaining a mixture of both old and new forests can help in soil fertility and retention, and in keeping springs alive. Further, learning and best practices in the region need to be captured and scaled up in neighbouring countries. Of vital importance is the need to balance young and old forests in landscapes to harness their potential for carbon sequestration. Transboundary learning, knowledge and data sharing, and cooperation are critical to achieve a third-generation paradigm shift towards managing the degradation of mountain forests. The existing curtailment of pro-active forest management has added to the complexity of issues, which cannot be solved merely by a ban on green felling (India) or by '4D management' (Nepal) under which only dead, dying, and damaged trees are removed from forest ecosystems.



Status of Forest Ecosystem Services in the HKH

Understanding co-management in mountain forests

According to the panellists at the symposium who discussed the topic 'Understanding Co-management in Mountain Forests', despite its success in India and Nepal, the co-management of forests is fraught with multilayered challenges. The low profitability of social forestry on account of the limited trust in local people as custodians is one of the challenges, whereas malpractices by the office bearers of community forest management committees is another. There are cases where elite capture by a few members of joint forest management committees or forestry user groups has become a hurdle in co-management.

Co-management, as an equitable, bottom-up approach to forest management, has been used for almost three decades in the HKH to increase local stakeholder participation in planning, research, development, management, and policy making. The approach has attempted to enable local people to find suitable solutions to unique social, political, and ecological problems. However, experiences with the application of this approach in the region are mixed. For example, although community-based forest management has contributed to forest conservation, limited access to forest resources and skewed sharing of benefits have not enabled the maximization of livelihood gains.

One possibility for correcting the situation is to integrate forest-based enterprises, ecotourism, and other income-generating options into community forestry programmes, with greater private sector participation, and to provide gainful engagement to youth who, in search of greater opportunities are migrating out of the mountains. Another suggestion has been to amend provisions in forest conservation laws to allow for the diversion of forest land to genuine development activities, as community participation is difficult to achieve in degraded open forests because of the lack of income that can be generated from such land.

The flow of ecosystem services and incentive mechanisms

Mountain forests are key ecosystems, providing various goods and services to communities living in the surrounding areas. More importantly, mountain forest ecosystems provide additional services, water in particular, to downstream communities. The continuing degradation of these important ecosystems, as the result of many drivers of change, decreases the flow of ecosystem services, which are important for human beings. Global markets and climate change are negatively impacting these ecosystems, causing deforestation to continue.

Forest ecosystems are a capital asset that helps in fodder production, slope stabilization, pollination, flood prevention, and water storage, among other things. The crucial issue is that valuation of the services provided by forest ecosystems, is, by nature, both qualitative and quantitative; often it is the qualitative value that accrues to the local population. Bans on green felling have reduced the incentives for local communities and discouraged local people from taking part in conservation. The disparity in how economic output is shared is critical to sustaining the flow of ecosystem services.

There is an urgent need for broader discussion on the economic valuation of ecosystem services. Local communities need to be involved and better incentives needs to be provided at the community level. Some of the barriers that curtail valuation and the equitable sharing of incentives include the difficulties involved in making a cost-benefit analysis, insufficient communication, lack of access to and rights over forests, and lack of accountability. These need to be addressed in order to put a value on the ecosystem services provided by mountain forests. To realize the true gains from payment for ecosystem services (PES), intangible services must be given as much significance as tangible services in such valuations.

Brainstorming Session 1

Need for conducive forest policies

Given that forest resources are the same across the region, should the countries of the HKH not develop conducive (and consistent) forest policies? It has been recognized that the lack of mountain-specific forest policies has impacted the integrity of mountain ecosystems and the livelihood security of mountain communities, as the greater HKH region is not only among the most populated regions in the world, but its rate of population growth is higher than in other mountain regions.

Bhutan is the only country in the region that has policies oriented towards mountains; its constitution mandates at least 60% forest cover, but in reality forest cover in the country is over 70%. While the Forest Department manages forests scientifically through forest management units, the Natural Resource Development Corporation undertakes the harvesting and restocking of forests. By embracing community forest management, local communities not only maintain internal demand, but are also able to manage the sale of surplus.

The countries in the region can learn lessons from each other, as the forest policies of the governments of most member countries are not tailored specifically to mountains. Mountain states need to interpret the goal of attaining 66% forest cover in the respective geographic specificity. For instance, the mountainous state of Himachal Pradesh has over 42% of the land above the tree line and only 35% of the land can realistically be forested.

The Afghan Ministry of Agriculture, Irrigation and Livestock has learned lessons from Nepal in promoting community forestry. The gains of such transboundary exchanges have influenced national policies and led to a reduction in encroachment and the poaching of wildlife. There is a diversity of experiences across the forests in the region, which can be exchanged between member countries toward evolving policies conducive to the restoration and conservation of natural resources, with poverty alleviation being the prime focus. The illegal trade in biodiversity and forest products is a key issue among HKH countries and also within countries. However, apart from improving good forest governance through better forest policies, the countries of the HKH also need to look at other national policies that prevent good implementation (e.g., cross-border trade policies and the capacity of security and custom authorities to counter illegal trade). In all contexts, the inclusion of local communities in planning, implementation, and monitoring has become inevitable.

Taming Human-Wildlife Conflicts

Human-wildlife conflict is a growing challenge in the Hindu Kush Himalayas. Despite the presence of pro-conservation policies since the 1980s intended to protect and save threatened species, the fragmentation of natural forest cover, infrastructure development, and intensified agriculture have disturbed the natural habitat of several wildlife species. This situation is further complicated by the fact that protected areas are increasingly becoming isolated pockets, whereas the illegal wildlife trade is as alive as ever. However, wildlife poaching is delicately poised against the significant loss of human life and livestock (e.g., by leopards) and massive damage to crops reported by mountain farmers (e.g., by monkeys, wild boars, and antelopes).

Several policy and practice responses have been applied, both from the ground-up by farmers, and from the top-down by policy makers. However, human-wildlife tensions are easier to prevent than solve. Merely capturing and relocating animals has not solved the problem. Science-based population estimates, the monitoring and management of problem animals, and changing behaviours are important for people and wildlife to co-exist. Across the HKH region, the emphasis needs to shift toward a mix of short-term prevention and long-term mitigation strategies.

The symposium stressed the need for proper land use planning and the monitoring of populations of problem species, alongside short-term preventive measures, such as barriers and the removal of vegetation, better vigilance, alternate cropping, and the capture of problem animals. On the other hand, it was found that the population biology of several key wild animals that are increasingly engaging in human-wildlife conflict has not been sufficiently studied. Such research is essential to move toward a scientific culling of such animals that ensures their conservation, while minimizing the risk to human populations and their productive assets.

Linking Science and Practice

Mountain forests and climate change

Climate is one of the most important determinants of forest patterns, distribution, and ecology, particularly in the mountains. Several studies confirm the links between climate regimes and forest types; therefore, it is logical to assume that any change in climate would directly impact forests (Dale et al 2001, Flannigan et al. 2000, Sturrock et al. 2011). A recent report by the International Union of Forest Research Organizations (IUFRO) paints a rather gloomy picture of the future of the world's forests in a changed climate (Seppala et al. 2009). It suggests that in a warmer world the current carbon regulating services of forests (as carbon sinks) may be entirely lost.

Adaptive forest management for carbon mitigation is critical, as managed forests can mitigate more carbon than unmanaged forests. Additionally, forests have a strong interface with agriculture and highland pastures in mountain ecosystems where people rely directly on the goods and services that forests provide. In such cases, together with climate change, anthropogenic impacts also pose a great challenge to these ecosystems. Understanding the impacts of climatic, as well as anthropogenic, changes on forests is important to address the concerns of mountain people, particularly in relation to their livelihoods.

Mountain forests and biodiversity

Managing forests for biodiversity conservation in the HKH region is a challenging task, as a large section of society still subsists heavily on forest resources for their daily needs. As much as conservation agencies in the region would like to implement an ecosystem approach to management and ensure the sustained flow of goods and services from forests, there are wide gaps between policy and practice. One reason has been the confusion created by the misclassification of Himalayan forests as temperate forests according to latitudinal divisions. Such classification does not consider the day length or other factors particular to mountain forests, which are not similar to temperate and tropic zones. There is an urgent need to standardize the criteria for the classification and harmonization of vegetation classes across the region. An improved forest type classification must have practical utility as its basic premise.

The three pillars of the Convention on Biological Diversity – conservation, sustainable use, and equitable sharing – hold the key to sustaining biodiversity in mountain regions. Developing species inventories, in situ and ex situ conservation, and the integration of traditional knowledge are crosscutting areas that merit attention. Impacts of land use change from infrastructure development and the spread of invasive species on loss of biodiversity in the mountains need to be better understood. The introduction of many exotic species in Himalayan forests, including protected areas, is diminishing the capacity of natural ecosystems (Naeem et al. 2012). In order to obtain biological insurance, greater emphasis should be given to rare species conservation in the Himalayas. It is scientifically proven that the extinction of native species in temperate ecosystems causes a cascade of other extinctions, accelerating the rate of community change (Jain et al. 2014). Diversity of indigenous species may decrease the probability of invasions of non-native species, many of which have had substantial economic, conservation, and societal consequences (Naeem et al. 2012). There is also a need to develop an in-depth understanding of the structure and functioning of forest ecosystems and their responses to disturbances caused by humans and climate change. Biologically diverse ecsystems, on average, store more carbon and do so more reliably (Bunker et al. 2005). A concerted effort is required to address existing knowledge gaps.

Brainstorming Session 2

Harmonization of Himalayan vegetation

Owing to a similarity in socioeconomic and ecological conditions, the countries in the HKH region are increasingly realizing the need for stronger scientific collaboration, the sharing of information, and effective communication to address emerging environmental and development challenges. Despite this realization, there has not been any significant attempt to bring ecologists, forestry professionals, and conservation agencies together in a common platform to harmonize the terminology used, especially when it comes to various classes of vegetation.

In the absence of a standard and common classification of Himalayan vegetation types, ecologists and foresters are using ad hoc names, resulting in confusion and miscommunication. For example, several official documents follow latitudinal divisions such as 'temperate' and 'tropical' to classify forests in the region, without considering that the day length is not similar to the tropics. This is one of the several scientific lacunae in the existing nomenclature of mountain vegetation.

A forest in the lower latitudes of the HKH region does not qualify to be referred to as temperate forest simply because of its altitude and the fact that it has mean annual temperatures similar to those in temperate latitudes. There is evidence to indicate marked differences in these forests. The classification and harmonization of vegetation classes needs to be standardized across the region. As forest management requires a more ecosystem-based approach, Himalayan forests need to be characterized by their ecosystem level attributes in a hierarchic manner from biome to physiognomic and by local floristic types.

It was suggested that a regional workshop involving key partners currently engaged in the Kailash Sacred Landscape Conservation and Development Initiative under the aegis of ICIMOD be organized to refine and harmonize the vegetation types in the mountains of the HKH.

Mountain forests and NTFP-based enterprise development

Diverse forest products classified as non-timber forest products (NTFPs) are an integral part of livelihoods in higher mountains. Rural households in the HKH derive 20–40% of their income from NTFPs, and millions depend on NTFPs for their livelihoods in tropical regions. Reports indicate that the global value of goods derived from non-timber enterprises is USD 130 billion each year. Surprisingly, NTFPs have overcome economic blues by registering a growth rate of 3–20% across mountain regions.

However, private sector participation and the commercialization of NTFPs alone may not contribute to poverty reduction if other factors, such as conservation and sustainable harvesting, are not in place. Despite the enormous economic potential of NTFPs in the Himalayas, the member countries need to address the ecological, structural, operational, and institutional challenges that act as impediments to the growth of NTFP enterprises. The need for certified forest management and balanced value chain governance was stressed for better results.

Bracing for Transboundary Cooperation

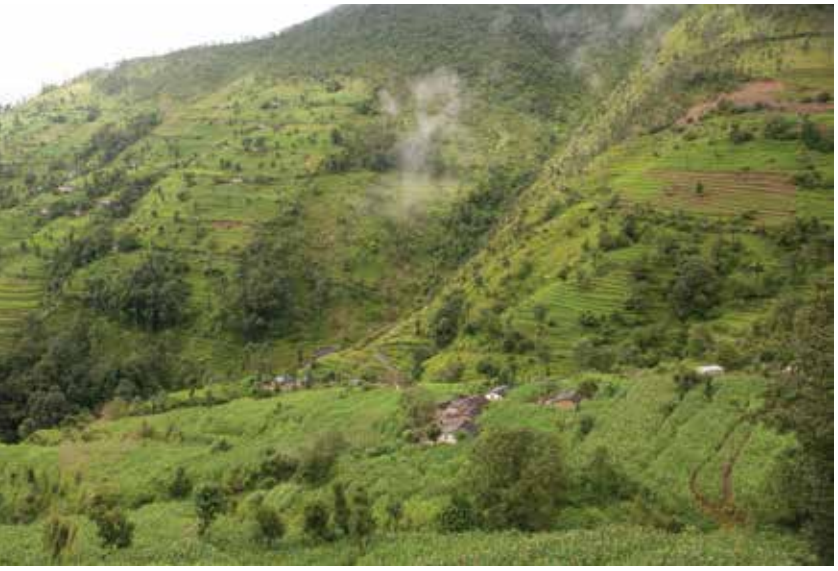
Ecosystems do not recognize political boundaries. The rise of potentially devastating global problems, including climate change, water shortages, biodiversity loss, and the illegal trade of forest products, as well as the interface of forest ecosystems with other ecosystems, mean that transboundary cooperation in landscape and ecosystem management has become imperative.

Disaster risk reduction is a critical area of cooperation for countries in the HKH region. These countries could also cooperate in the domains of water, food, and energy, mainly through trade, and sharing information to check the cross-border illegal trade in biodiversity and forest products. Countries could also come together to promote ecotourism, address human-wildlife conflict, manage forest fires, and check the spread of diseases and invasive species. Transboundary landscape management often implies the use of an integrated approach to managing extended landscapes in which both the conservation and sustainable use of the components of biological diversity are considered.

Nations in Latin America, Africa, and Asia are increasingly working together to establish new transboundary conservation areas. There are now dozens of examples of transboundary conservation initiatives in tropical forests covering more than 50 million hectares. On the other hand, there have been strategic changes in policy and national development strategies that signify the need for bilateral and multilateral cooperation.

Harmonizing Mountain Forest Management

Mountain forests are characterized by steep ecological gradients, which constrain silviculture and logging techniques. At high altitudes, harsh environmental conditions limit productivity and slow down regeneration processes, making mountain forests sensitive to management interventions. Interest in intensified biomass utilization for energy production and the supply of wood-based industries may increase pressure on mountain forest ecosystems. At the same time, the share of mountain forests being managed as common property is increasing in the Himalayas.



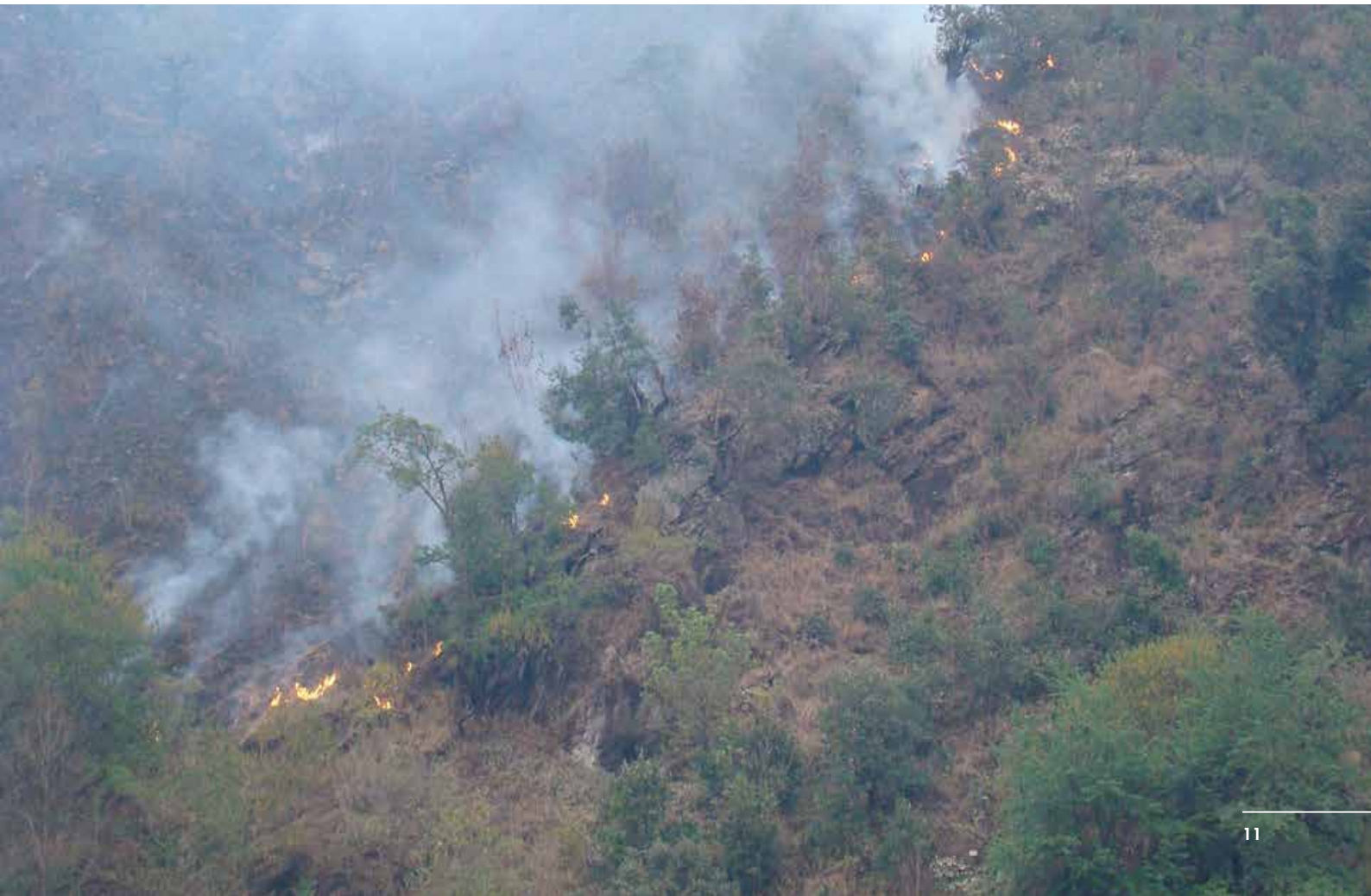
Coherent policies and legal frameworks for sustainable land use are essential for forging cooperation across transboundary landscapes. The need to integrate community science with applied science is imperative, alongside exploring and strengthening common cultural threads among communities living across borders to highlight the need for cooperation. It is important to mainstream learning from projects into bilateral and multilateral processes and agreements. Without doubt, the science is clear and the economics of transboundary cooperation are compelling.

It was suggested that ICIMOD is strategically positioned to universalize learning from transboundary landscape projects into the policy planning processes in its regional member countries. There is also a need to secure forest boundaries to revive and rejuvenate degraded forests in the region. Understanding the harmony between diverse landscapes is key to harmonizing forest management in the region. Unless the colonial forestry mindset is brought to an end, the transformation of mountain forestry will remain a dream in the region. Further, the need to capture and negotiate the external factors influencing mountain forests is no less important.

Forest Fires and Mountain Forest Management Solutions

A common framework of forestry policy that reflects the ground realities of the member countries is important if the problem of forest fires is to be addressed jointly in the HKH. The region is plagued by indiscriminate forest fires each year and fire management has remained a major challenge for countries in the region. Experts argue that controlling and managing forest fires must be looked at in relation to the larger issues of climate change and desertification.

United Nations Secretary General Ban Ki-Moon has shown serious concern about wildfire hazards in the high mountain forests of Nepal (Ban Ki-Moon speech at International Wildland Fire Conference, 2011). In India, a study by the Forest Survey of India showed that 2.31% of forest cover is damaged by fires every year, with the loss of biodiversity a compelling concern (FSI 1995). Further, transboundary fires and smoke pollution during hot summer months are issues that must be regionally addressed. Customized forest fire risk maps need to be developed and shared for the assessment of fire-prone zones in the HKH. There is clearly a need for knowledge sharing and cooperation in controlling and mitigating forest fires in the region. Data on the overall damage to ecosystem services due to forest fires are largely missing, including on how much biodiversity is lost, the quantum of greenhouse gas emissions added to the atmosphere annually, and the impact on upper soil degradation and resultant changes in vegetation.



Mountain Forest Management and Ecosystem Services

Payment for forest ecosystem services

The use of the term 'ecosystem services' is somewhat contentious, as money rarely changes hands for such services. Water and biodiversity are important ecosystem services from forests, but only carbon sequestration gets valued, with communities rarely being paid for it. Perhaps ecotourism is the only service through which local communities have a share in the benefits of ecosystems, although this service is grossly undervalued and unregulated at present.

Despite a score of cases across the Himalayas where payments for ecosystem services flow between upstream and downstream communities, the challenge is to find a mechanism for accounting for non-monetized ecosystem services, because payment need not always be in the form of cash. There is also a need to prioritize key ecosystem services and identify other areas that can be included.

Valuation of forest ecosystem services and payment mechanisms

The science of forests with respect to water flows and ecosystem services may seem fuzzy, but the valuation and payment for these services has emerged as an engaging area for development practitioners. At the local level, payment mechanisms for services between upstream and downstream communities, although on a limited scale, have worked.

PES valuations help to identify areas that need priority attention for conservation. They also spell out the need to step-up research on environment economics, so that valuations can be made part of the policy planning process. There is a strong case for making 'gross environment product' (GEP) the new indicator for valuing ecosystem services. Forests, even if making only 1.5% of GDP (Gundimeda et al. 2007), increase manifold in value when GEP is considered.

Transboundary forest ecosystem management: Experiences from around the globe

The symposium deliberations concluded that best approaches, practices, and technologies have yet to be adequately documented and replicated. Lessons can be drawn from projects along international borders and that cross into other countries, as these hold relevance in the transboundary context.

To share experiences across countries and continents, decisions on transboundary cooperation should be made more transparent and inclusive. Regional bodies, such as the South Asian Association for Regional Cooperation (SAARC), need to rise to the occasion to give meaningful expression to transboundary institutions in transcontinental knowledge networks. The idea of a World Mountain Congress was mooted as a forum for periodically deliberating on mountain issues and their resolutions.

Mountain Forestry: Policy, governance, and institutions

Governance and working with communities

How can contiguous mountain forests across national boundaries in the HKH be governed by various governments? What is the incentive for governments to cooperate? These were the leading questions that the session on 'Governance and Working with the Communities' sought to address. Although national policies may not be compatible with transboundary frameworks, community-level exchanges already exist in the form of informal trade and the exchange of ideas. The symposium observed that it is important to understand that the forestry sector cannot work alone – it needs to be integrated with other sectors.

Examples of forestry networks, such as the Asia Pacific Network for Forest Conservation and Rehabilitation (APFNet), already exist and should be built upon as learning platforms. There is also an international policy instrument on access and benefit sharing (ABS) of bioresources enshrined in the Convention on Biological Diversity agenda. Shared policies and common protocols on data collection for data sharing would go a long way in developing transboundary governance mechanisms. In the mountain context, women need to be an integral part of all conservation and development initiatives.

Research and knowledge sharing

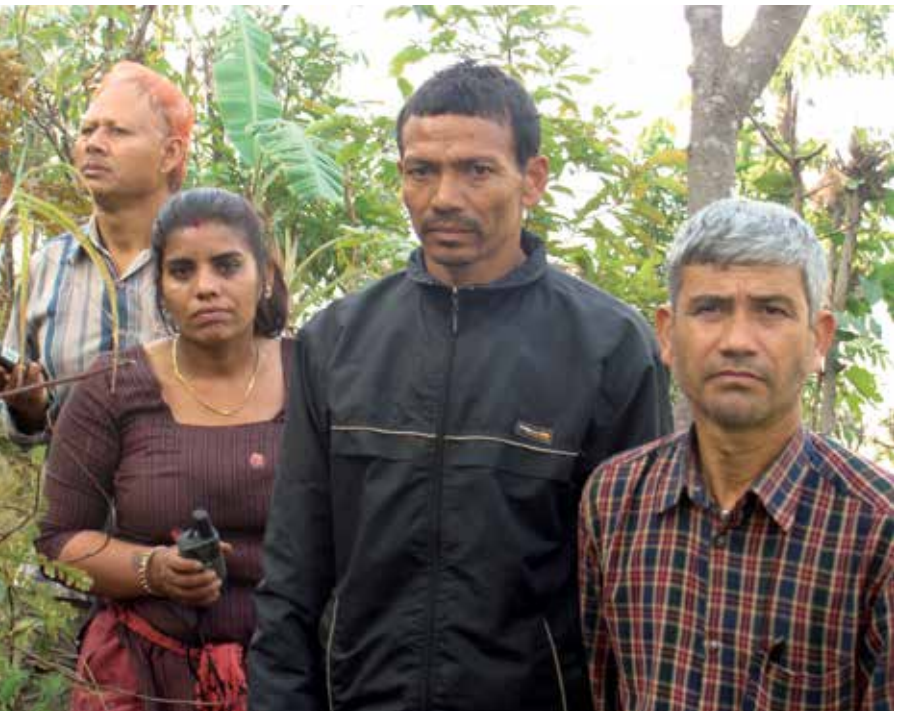
For transboundary cooperation among member countries, the exchange of scientists, students, and practitioners was stressed at the symposium. Easy access to knowledge in the context of finding solutions to forestry problems is the need of the hour. Member countries in the region need easy access to knowledge as an important tool for building research portfolios that can contribute to enlarging the knowledge pool on experiences in the HKH.

The transfer of knowledge among practitioners is no less important for the region. Only better-informed practitioners can transfer knowledge for the conservation of natural resources at the local level. Institutionalizing knowledge generation and sharing through the creation of 'knowledge hubs' can be achieved through proper budgetary allocation by member countries. As a backward linkage, such hubs can fill the knowledge gap through detailed scientific studies on the HKH.

REDD+ in the Himalayas: Linking forest carbon to conservation and development

REDD+ (Reducing Emissions from Deforestation and Forest Degradation) is an international climate policy instrument under the aegis of the United Nations Framework Convention on Climate Change (UNFCCC), which is expected to tap the large mitigation potential of conserving and better managing the world's forests through financial flows from developed to developing countries. The REDD+ instrument links economic incentives with the conservation and management of forest resources and is based on the principle of performance-based payment.

However, implementing REDD+ in a transboundary context is fraught with challenges, including in terms of the time and economics needed for its assessment. There is a need to build political support for laying out procedures for implementing performance-based REDD+ mechanisms. If suitably implemented, the five core elements of REDD+ (reducing deforestation and forest degradation, role of conservation, sustainable management of forests, and enhancement of forest carbon stocks) can generate numerous co-benefits, including livelihood support, biodiversity conservation, and improvement of the resilience capacity of forest ecosystems.



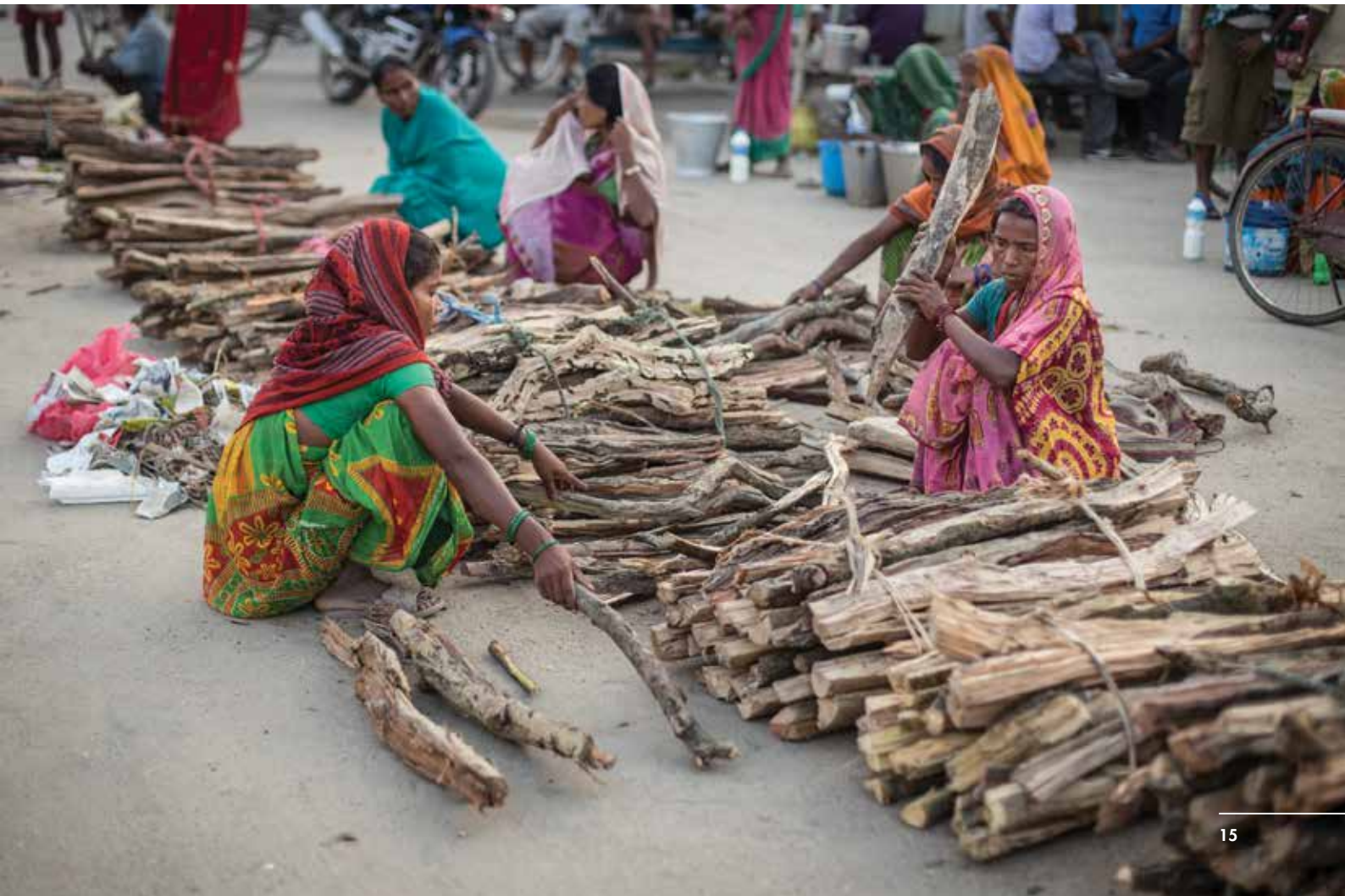
Although the principles of REDD+ are clear, on the ground very little has actually been initiated for a number of reasons. The challenge remains to make local communities co-beneficiaries of the economic benefits accruing from REDD+. However, long-term partnerships and collaboration between the member countries of the region are critical for setting standards for the effective management of forest resources.

Making Business with Forests

The role of the private sector is crucial in forest management for sustaining the livelihoods of local communities through the creation of markets for niche products. There is an urgent need to connect rural producers with the business sector, allowing forest-based businesses to be inclusive. The concept of the 'reverse supply chain' to help replace the middleman with a service provider for an effective backward-forward linkage is being piloted in some areas with promising results. Similarly, the idea of a producer company has gained currency, but working capital remains one of the main constraints.

The critical challenge for promoting forest-based businesses rests on the identification of marketable high-value products; the sustained supply of raw materials; common facility centres in local areas; and appropriate market linkages. The symposium argued in favour of 'forest certification' as one way of addressing the supply-side constraints, as it not only ensures the sustainable supply of forest products, but also helps in controlling illegal logging and deforestation. The recently established Forest Certification Council of India (FCCI), a multiple-stakeholder third-party evaluation initiative, aims to stretch its reach across the HKH region to generate demand for certified products from the mountains. However, regulatory governance holds the key to protecting the rights of communities in remote mountain regions.

The role of the private sector, although crucial, is far from adequate enough to make good business sense in the mountains. There is a need to ensure community access to markets by making communities an integral part of business. For this, more work needs to be done to develop sustainable business models based on forest products. Regional policies also need to be made conducive to cross-border trade in forest products.



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International Centre for Integrated Mountain Development
GPO Box 3226, Kathmandu, Nepal
Tel +977 1 5003222 **Fax** +977 1 5003299
Email info@icimod.org **Web** www.icimod.org

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