Glaciers, Snow melt and Runoff in the Himalayas - Report on the outcomes of a Trans-Himalayan workshop held at ICIMOD in Kathmandu, Nepal, 6-7 Feb 2012

Organised by the EU-FP7 project HighNoon – Supported by the International Centre for Integrated Mountain Development (ICIMOD), the British Department For International Development (DFID), and the Swiss Agency for Development and Cooperation (SDC)

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Introduction

The EU-FP7 project HighNoon, with the support of the International Centre for Integrated Mountain Development (ICIMOD), the British Department for International Development (DFID) and the Swiss Agency for Development and Cooperation (SDC), organised a Trans-Himalayan workshop on "Glacier, Snow Melt and Runoff in the Himalayas" on 6–7 February 2012, at ICIMOD in Kathmandu, Nepal. The two-days workshop aimed at bringing together regional and international researchers, government administration and donor agencies to discuss the current state of cryospheric and glacio-hydrologic research in the wider Hindu Kush – Himalayan region. More specifically, the workshop intended to address the state of current knowledge on the consequences of ongoing climatic changes on glaciers, snow melt and runoff and to identify the most important gaps in knowledge where action will be most needed in the future. The outcomes of the workshop are documented in this status report. In May 2012, ICIMOD will organise an 'International Conference on Cryosphere of the Hindu Kush – Himalayas: State of the Knowledge' and the 'Hindu Kush - Himalayan Cryosphere Data Sharing Policy Workshop' (by invitation) on a five days long event, which takes up the outcomes of the HighNoon workshop to discuss the implementation of plans and to develop strategies for the future.

Day 1 – 6th February 2012

A welcome address by David Molden, Director General of ICIMOD, set the agenda and indicated the importance of continued research and discussion on the Himalayan cryosphere, particularly when considering the potential downstream impacts on water resources. This linkage between these high mountain water towers and human development was re-iterated by Eddy Moors (Wageningen UR, Netherlands), Project Coordinator HighNoon, noting the particular need for research to better understand the impacts of changing water availability and demand in the Ganges basin. Thomas Gass, Ambassador of Switzerland to Nepal, broadened the impacts to consider other more diverse impacts such as agro-biodiversity. These opening remarks clearly highlighted the need for an enhanced understanding of the Himalayan cryosphere and the resulting downstream impacts. In particular, the pressing need to go further than simply addressing the concern over changes in glacier melt, towards rigorously starting to address how we can best develop science to assess the potential impacts upon society and the environment of changing downstream water resources.

Keynote Lectures

Keynote lectures on the key topics of discussion were held to present a state-of-the-art overview of current knowledge. These were divided into two themes: first, assessing what is currently known about the state of Himalayan glaciers, second, the impacts of changes in the cryosphere on downstream runoff.

In the first session Jeff Kargel (GLIMS, US) provided a summary of recent research into the state and fate of Himalayan glaciers. This drew primarily upon the vital importance of good quality inventory data that is based upon remote sensing imagery. Such techniques allow a

remote analysis of change and recent work demonstrates the potential to remotely monitor mass loss in Himalayan glaciers. Glaciers representing various climatic regimes in the Hindu Kush-Himalayan region or with specific characteristics were presented and interpretation of their data discussed. Finally, some recent findings of a review that considers the data from a large number of glaciers were used to demonstrate the need for such data sets to understand the heterogeneous behaviour of glacier change over time across the region. This requirement was further demonstrated by James Miller (Centre for Ecology and Hydrology, UK) in presenting the outcomes of a DFID funded systematic review on the evidence surrounding glacier melt in the Himalayan region. Through application of systematic and transparent protocols for evidence searching and refined data inclusion an objective overview was provided concerning the state of published research. The picture is one of corroborated glacier shrinkage across the Himalayas, but with regional variation in more westerly areas of the Karakoram, where glaciers exhibit a more fluctuating behaviour over time. Mass balance was found to be the most rigorous and representative measure of changes in the glacier meltwater stores, indicting sustained wastage across all glaciers, but a lack of continuous monitoring limits any assessment of decadal changes. This assessment was undertaken using terminus and area change data, however there was no corroborated acceleration in the rate of shrinkage. The outcomes of the review point to a clear requirement for the establishment of more continuous monitoring on representative benchmark glaciers covering the rich diversity of the Himalayan glaciers. The audience clearly noted the strength of such a study and need for such objective synthesis in the IPCC AR5, along with identifying the potential for such a method to be applied on the evidence concerning the region's water resources.

The second session involved state-of-the-art overviews on the impacts of a changing cryosphere on the downstream water resources that are fed by seasonal snow and glacier melt. Walter Immerzeel (Future Water, Netherlands) presented an overview of the impacts of climate change on these Asian water towers. This considered the need to address both the uncertainty in climate change projections and the varying suitability of hydrological models when applied at various scales in assessing future changes in predicted runoff. Decreases in meltwater availability from glacier and snow cover as a result of rising temperatures are shown to reduce upstream runoff despite potential increases in annual precipitation, however there is much uncertainty surrounding regional climate change. More localised studies illustrate the significant differences in potential change in glacier volume that can occur. Overall the relative importance of meltwater varies between the major basins, while making any future prediction of change is beset by a cascade of uncertainty that should be acknowledged and significant scientific challenges that are still to be more fully addressed. In the second presentation, Christian Siderius (Wageningen UR, Netherlands) further illustrated the challenges that exist in attempting to model the complex glacio-hydrology of the Himalayan region using large-scale models. Both the high altitudinal variability and lack of spatial data on ground based physical parameters limit how physically representative any grid-based model can ever be, while there is uncertainty even regarding the actual snowmelt contribution to runoff from existing studies. Results from a suite of four hydrological models were presented, indicating some general agreement in predicted discharge against available data at a monthly time-step resolution. However the variable contributions from snow or

glacier melt respectively are not well represented. The major limitations in modelling such glacio-hydrological systems are: i) topographic variation, ii) a lack of observed climate and river flow data for calibration and validation, iii) lack of terrestrial data used in the modelling process. In summary, models can oversimplify the real processes that exist and are inherently limited by the data available – thus the resulting uncertainty should be considered, with multi-model assessments potentially providing an indication of the variability that can occur.

Addressing the burning issues – where do we stand, what do we miss?

The afternoon saw a range of presentations on more focused topics that address the burning issues surrounding glacier melt and runoff in the region. The aim was to identify the current state of knowledge and to identify knowledge gaps. The presentation topics and key messages are outlined briefly below;

- Climate modelling – Andy Wiltshire (Met Office, UK): Himalayas (>2000 masl) set to undergo greater temperature increase under climate change than lower elevations. Mapping of ELA changes undertaken at high resolution indicates a significant ELA rise in the east and less rapid to the west.

- Effect of debris cover on glaciers – Masayoshi Nakawo (National Institutes of the Humanities, Japan): Ablation under a debris layer can be reasonably estimated from surface temperature and is almost equivalent to melt at the surface, mainly due to melting at superficial ponds and ice cliffs.

- Mass balance analyses – Alagappan Ramanathan (Jawaharlal Nehru University, India): Records for Himalayan glaciers show negative mass balance with some year-to-year variation, and recent monitoring at Chhota Shigri indicates that despite evidence of some recent yearly positive mass balance the general trend over the last 20 years has been a significant cumulative loss. The complex role of climate on forcing the glacier responses observed remains uncertain.

- Karakoram Anomaly – Jack Shroder (University of Nebraska, USA): Glaciers in the Karakoram have been advancing and surging more than in other glacierized regions and special geo-morphometric characterization offers new insights. Cryospheric water resources are a critical supply to the Hindu-Kush and in need of research.

- Glacial and snowmelt contribution to streamflow - Renoj Thayyen (National Institute of Hydrology, India): Addresses the need for policy to better represent scientific statements of change concerning the Himalayan cryosphere and water resources. Also the need to appreciate the variability of glacio-hydrological regimes across the region. Winter mass balance is a critical element when considering water resource planning, with some key fundamentals still not fully understood – limiting our predictive ability to assess future changes.

- Glacier Hazards – Raphael Worni (University of Geneva, Switzerland): Certain attributes of glacier lakes indicate consequences – with formula being developed to

assess likelihood of a glacier lake outburst flood using the concept of the 'steep lookdown formula'. This can be used to model the flood wave breach and downstream propagation. A risk assessment matrix that considers hazard, exposure and vulnerability can then be applied.

- Black Carbon – Ramesh Singh (Chapman University, USA): High and rising black carbon has been measured within the atmosphere above the Ganges basin area, a result of increased population and poorly regulated emissions. Raised the question whether black carbon and dust is driving tropospheric warming in the Himalayan region leading to accelerated glacier melt? The need to better understand the physical process by which black carbon arrives and rests upon Himalayan glaciers identified by workshop as key research area.

Poster presentations

Following posters have been presented during the poster presentation session:

Poster Number 1: High resolution multi model climate change scenario over India including first uncertainty assessment, by Pankaj Kumar*, Andy Wiltshire, Shakeel Asharaf, Bodo Ahrens, Philippe Lucas-Picher, Jens H. Christensen, Andreas Gobiet, Fahad Saeed, Stefan Hageman and Daniela Jacob; *Max Planck Institute for Meteorology, Bundesstrasse 53, 20146 Hamburg, Germany

Poster Number 2: Characterization of subglacial pathways draining two tributary meltwater streams through the lower ablation zone of Gangotri Glacier, Garhwal Himalaya, India, by Jose George Pottakkal and Alagappan Ramanathan; School of Environmental Sciences, Jawaharlal Nehru University, New Delhi, India

Poster Number 3: Hydrological behavior and suspended sediment delivery from a high altitude Himalayan Glacier (Thelu glacier), India, by Kireet Kumar*, V. Adhikari*, S. Joshi*, K. Upreti*, J. Pande* and V. Joshi; *G. B. Pant Institute of Himalayan Environment, Kosi Katarmal, Almora (Uttarakhand) 262 643, India

Poster Number 4: Changes Observed in the Glaciers of Uttrakhand Himalaya, India, by Rajesh Kumar and Shruti Singh; School of Engineering and Technology, Sharda University, Greater Noida #112, India

Poster Number 5: Climate change impacts on water resources in the Amu Darya and Syr Darya river basins, by Arthur Lutz, Walter Immerzeel and Peter Droogers; FutureWater, Wageningen, Costerweg 1V, 6702 AA Wageningen, the Netherlands

Poster Number 6: Glacial lakes in the Indian Himalayas: From glacier lake inventories to assessments of lake outburst risks, by Raphael Worni, Markus Stoffel, and Christian Huggel; University of Geneva, Institute for Environmental Sciences, 7 route de Drize, 1227, Switzerland

Poster Number 7: Assessing water availability and allocation patterns in the Indus Basin using WEAP Model, by Dr. Asad Sarwar Qureshi; IWMI–Pakistan, 12km, Multan Road, Chowk Thokar Niaz Baig, Lahore 53700

Poster Number 8: High-Resolution Simulations of Snowfall over Colorado and Climate Impacts, by Roy Rasmussen, Changhai Liu, Kyoko Ikeda, David Gochis, Martyn Clark, David Yates, Fei Chen, Mukul Tewari, Michael Barlage, Jimy Dudhia, Greg Thompson, Ethan Gutmann and Vanda Grubisic; National Center for Atmospheric Research, Research Applications Laboratory, PO Box 3000, Boulder, United States

Poster Number 9: Cryosphere Monitoring Project (CMP) in the Nepalese Himalayas, by IWHM, ICIMOD

Poster Number 11: Glaciers Mapping and Inventory of Nepal using Remote Sensing Tools and Techniques, by MENRIS, ICIMOD

Poster Number 12: Decadal Glacier Change in Bhutan Himalaya, by MENRIS, ICIMOD

Poster Number 13: Mapping and Monitoring of Snow Cover, by MENRIS, ICIMOD

Poster Number 14: Evaluation of Glaciers in Pakistan and In-country Capacity Building for USAID: Problems and Possibilities, by Prof. Jack F. Shroder[*], M.P. Bishop[*], A. Butgett[*], Ali Ghazanfar; [*]Department of Geography and Geology, University of Nebraska at Ohama, NE68182

Day 2 – 7th February 2012

The first day set the state of knowledge and identified many of the key areas where knowledge gaps limit our understanding of how the Himalayan cryosphere and water resources are changing. Day two set out to state the ongoing and planned initiatives within the region, followed by a series of 'breakout' groups that would discuss a range of key topics and provide some summary discussion points with which to move forward the research agenda.

Ongoing and planned initiatives in the Hindu-Kush-Himalayas

A range of speakers from international institutions presented their current and planned approaches to supporting continued research of changes in the Hindu-Kush-Himalayan cryosphere and the potential impacts upon water resources and human communities.

- Pradeep Mool (ICIMOD): Glacier lake monitoring has allowed a risk based assessment to be developed for GLOF with help of a glacial lake inventory. The 'Cryosphere Monitoring Project' with an integrative research approach has been presented, as well as the new glacier inventory for the Hindu Kush-Himalaya region and a snow mapping study. A range of other initiatives were presented that provide valuable research platforms for a better understanding of regional changes. The initiatives include e.g. SERVIR Himalaya, HICAP, HIMALA, HKH-HYCOS,

Kailash Sacred Landscape Conservation Initiative and a planned programme on reducing the impacts of black carbon.

- Guy Howard (DFID, UK): Despite a wide variety of climate impacts programmes within the region there exist clear research gaps that do not facilitate policy decisions and require health warnings on the uncertainty. There is a need for more coordinated community that fosters partnerships between organisations and where policy communicates with science. This is compounded by a lack of inter-disciplinary work. Four key questions exist for DFID: i) What is a representative network of sites? ii) Who are the primary institutions? iii) Where should research be targeted? iv) What are key topics with knowledge gaps?

- Gerolf Weigel (SDC, Switzerland): The approach of SDC is not to create new institutions or projects but to i) facilitate knowledge sharing between states and state level processes, ii) build science capacity in these states, iii) strengthen the resilience of human communities to cryospheric and associated climate change impacts.

- Richard Marston (U.S Department of State): US has identified water security as priority area of concern, particularly concerned where there are trans-boundary water issues, such as in the HKH region. Keen to coordinate activities with other international organisations rather than duplicate efforts.

- Katherine Himes (USAID): Working at the science-policy interface facilitates sound government advice on science policy and drives forward regional programmes in institutions such as ICIMOD. Sees engagement with local communities as key element in ensuring sustainable programmes and providing local historical knowledge.

- Prathiba Mistry (World Bank): The World Bank is currently funding a status report on hydro-glaciological monitoring programmes in the HKH Himalaya. The aim is to assist in defining what is known and where in order to assess what a truly representative network should look like and how will it will be managed.

Breakout sessions

A range of breakout sessions on a diverse array of topics were undertaken to provide round-table discussion between experts on the pressing issues affecting that research area. For each topic four questions were raised and the outcomes of the discussions were subsequently presented to the entire workshop. The key outcomes from the questions raised in each breakout group are contained within table 1, detailing breakout session topics and question outcomes.

Web link for summaries of the discussions (presentations):
http://www.eu-highnoon.org/workshopkathmandu2012/presentations

Plenary discussion

After the presentation of the results from the breakout session, a plenary discussion was held where following points were raised:

- An inventory on available data would be useful, and additionally, a wish list for needed data and knowledge for which the priorities are indicated. A framework paper with terms of references would be helpful to plan future work.

- Various interest groups should be involved in project planning and/or implementation of projects:

    - donor agencies (bring them on round table and coordinate involvements based on guide lines)
    - national funding institutes (institutes such as in India contribute with significant efforts)
    - regional scientists
    - students
    - stakeholders
    - end users
- Communication is essential for any big project: addressed to public and policy makers. However, great care must be taken not to cross the line to exaggerated results. Communication must be more effective.

- Focus on problems resulting from changes in the cryosphere and runoff, as well as best use should be made of the resulting benefits. Focus should not only be on water but also related issues.

- Research needs:

    - Need consistent overview and understanding of entire systems, and downstream process chains and related issues (e.g. runoff, sediment transport, dams)
    - Transboundary research approaches are crucial.
    - Variety of methods used: direct in-situ measurements, remote sensing, GIS, modelling
    - Good monitoring systems are needed for high and remote areas, with indication about accuracy and uncertainties.
    - Permafrost research needs: gain knowledge about distribution, processes in high mountainous areas, as water storage
    - Black carbon has effect on atmosphere and glacier melt, and society has influence on its emission. Therefore, processes need to be better understood and mitigation efforts must be made. ICIMOD started a black carbon research project addressing such issues.

Table 1 Topic	What is the current status of knowledge? Regional differences?	What are the gaps? What are the key research questions?	What are the needs to answer these research questions? Priorities?	What is the way forward?
Runoff	We have the tools and lots of scattered knowledge that have identified regional differences and clarified the role of glaciers on a (annual) basin scale	i) Precipitation data does not have uniform spatial coverage, especially at high elevations, and westerlies are less known. ii) Few snow experts available. iii) Permafrost and debris-cover melt less understood. iv) Cryospheric processes not well implemented at medium scales. v) Flow data highly limited or inaccessible.	i) Benchmark glaciers and basins. ii) Better integration between glaciology and hydrology. iii) More focus on seasonality and inter-annual variability required iv) Need to improve the link between scientific community and industry v) Require regional institute.	Collaboration required to: i) Initiate integration ii) Establish and maintain long-tem obs iii) Improve regional and international cooperation iv) Integrate models and obs v) Share data!
Glacier inventories	Inventories of Himalayan glaciers are available from ICIMOD, GLIMS, WGMS,GSI, GlobGlacier, and Chinese Inventory. ICIMOD most complete regional coverage for HKH region.	i) What are the measurements uncertainties? ii) What are the temporal and spatial changes? iii) What are the glacier volume changes? iv) How static values linked to climate parameters? v) How are glacier dynamic (change) parametric values linked to dynamic climate parameters?	i) Conduct a Glacier Analysis Comparison Experiment ii) Verify accuracy of prior database values iii) Utilize multitemporal DEM databases iv) Climate model output needs to be made available publicly	i) Future workshop activity to cconduct standardized assessment of glacier boundaries of benchmark glaciers ii) Include ELA iii) DEM training iv) Workshop on interlinkages between glacier parameters and climate
Mass Balance	Long-term data limits regional assessments and trend analysis. Data available shows negative trend across region. Mass balance dependant on climate regimes.	i) Continuous observed data on accumulation and ablation of Himalayan glaciers ii) How mass balance dependant on climate iii) Lack of benchmark glacier monitoring in certain regions (Karakoram, Hindu-Kush) iv) How to monitor the mass balance of the large / high-altitude glaciers v) Role of monsoon / westerly's/ snow-fall on net mass balance across region.	i) Sustainable funding for maintaining existing mass balance programs ii) Ensure continuous training and availability of 'local' technical expertise to undertake the research iii) Establish research on representative glaciers according to the needs – for both water resource management or climate change impacts iv) Develop integrated strategy for larger glaciers – focus on remote sensing with in-situ measurements	i) Enhance density and network of hydro-meteorological network along with mass balance data on benchmark glaciers ii) GPS surveys on larger glaciers iii) Ensure sustainable continued monitoring on existing mass balance measurements iv) Institutional mechanism to train and support future technical experts in Himalayan region.
Debris Covered Glaciers	Thickness vs. melt rate relation from experimental studies shows surface lowering rate comparable to debris-free glacier Discrepancy explainable Regional differences exist.	i) Why debris covered? ii) How to ponds and cliffs develop? iii) Climate vs. Velocity iv) Glacier lake formation and expansion v) Avalanche accumulation processes vi) How best to estimate thickness?	i) Remote sensing data provides clear regional overviews but there are needs to enhance reliability of delineation of terminus and area ii) More detailed research	i) Examine regional differences through more remote sensing ii) Glaciological, meteorological and hydrological observations for a few selected large glaciers iii) Integration of in-situ, remote sensing
Snow Cover	Spatial distribution and trend of snow cover well known Regional differences exist between countries, east/west	i) How does the spatial distribution of snow influence snow melt? ii) How much is contribution from snow to river discharge? iii) What would be the fate of rivers due to change in snow (parameters) in the context of climate change?	i) Integrated (RS and ground based) method to measure snowpack parameters ii) Good ground based information to supplement RS approach iii) Review of available snowmelt model and select appropriate one for implementation	i) Take a representative basin as a pilot case study where: snow stations are installed, snow pack parameters/snow storage is studied, river discharge available. ii) Promote data sharing
Glacial Hazards	Regional differences exist and GLOF have been mapped across the HKH region.	i) Glacier surge effects and risk? ii) Permafrost hazards? iii) Earthquakes trigger effects?	i) Standardization of the assessment methods ii) Process model development iii) Awareness building iv) Involve local communities	i) Assess critical lakes ii) Ensure mitigation measures iii) Improve process tools iv) Include new areas
Black Carbon	An emerging topic with limited data on science, monitoring, modelling or impact.	Early stage research lacking monitoring data to assess pathways or potential impact. Key questions relate to potential impacts on regional climate and glaciers.	i) Long term monitoring ii) Source-receptor studies iii) Impacts on glaciers?	i) Regional collaboration to achieve funding and research programmes ii) Assess mitigation measures

- Capacity building is essential for the Hindu Kush-Himalaya region, such as training provided by ICIMOD on glacier mass balance measurements, remote sensing and GIS techniques. Short training could also be given during conferences and workshops; however, it must be assured that the potential beneficiaries are invited to such meetings.

- There are various initiatives that promote collaboration of various institutes, such as PEER (Partnerships for Enhanced Engagements in Research) by USAID (next call for proposals expected in mid 2012), New Indigo (Initiative for the Development and Integration of Indian and European Research) by European and Indian S&T organisations, SAWI by The World Bank and others, funding opportunities through EU-FP7 (see HighNoon website) and in 2013 through the EU-FP8 etc.

Discussion of workshop outcomes and next steps

Markus Stoffel (HighNoon) – The workshop on "Glaciers, Snow melt and Runoff in the Hindu Kush – Himalayas" (HKH) was a very fine demonstration on how much progress has been made in cryospheric and hydrologic research since the publication of the erronous IPCC AR4 report. An increasingly large body of evidence now exists that the shrinking of ice in the HKH is widespread, with regional differences and a few anomalies, but in many instances comparable to that in other regions of the World, but the assessment is still based on a relatively small number of glaciers. In addition, based on the outcomes of the breakout sessions, it was also shown quite clearly that we are still missing substantial knowledge on glacier dynamics, their evolution and related downstream processes for many regions of the HKH region. There is therfore considerable need for more and more comprehensive studies on HKH glaciers and for joint research initiatives aiming at longer-term observations of cryospheric changes and runoff. Discussions between the donor agencies present at the workshop and their intention to improve coordination of activities in the future are promising and an important step forward. The realisation and implementation of long-term, transboundary observation networks on climate, glaciers and hydrology in the Third Pole appear key for a better understanding of change and will need coordinated efforts between donors, researchers and governmental agencies. The active participation of these groups and the fruitful discussions are very encouraging and give raise to hope that such networks will be realized in the future.

James Miller (CEH) - The science surrounding Hindu-Kush-Himalayan glaciers and runoff has advanced significantly since the publication of poorly sourced evidence in the IPCC AR4. Glaciers across the region are generally shrinking but regional and temporal variation exists, and there is little to corroborate statements pertaining to accelerated rates of melt. This workshop has clearly drawn a defining line under such statements and set the research objective towards better understanding the processes driving this melt, how climate forces change, and the potential impacts of reduced meltwater from glaciers and

snow on future water resources under climate change scenarios. It has perhaps also enabled those planning future initiatives within the region to consider more coordinated funding and activities that could answer the following research questions and priorities;

- Data has been continually raised as a limiting factor: for climate, glaciers, snow, permafrost, runoff, modelling. How then to achieve the goal of data sharing or simply better data coverage?
- The data available is biased towards certain locations and lacks long-term observations. What is a representative network of benchmark glaciers and how can it be managed in sustainable way?
- The Karakoram and Hindu-Kush regions have a relative lack of any data or modelling studies yet the consequences of continued glacier melt and reduced meltwater contribution is higher than other regions. How can we address this critical area?
- Seasonality and inter-annual variability is poorly understood, how can this be improved?
- Ensuring sustainable monitoring programmes is vital and requires significant support to maintain technical capacity.

Dorothea Stumm (ICIMOD) - At the workshop, regional and international researchers and institutions presented review studies, inventories and ongoing research concerning the cryosphere and runoff in the Hindu Kush-Himalaya region. The research institutes and funding agencies expressed the need to gain a more *comprehensive* overview of the state of knowledge on the cryosphere and runoff in the Hindu Kush-Himalayan region. Additionally it was emphasised that research efforts need to be orchestrated and integrative research approaches applied. Following the HighNoon workshop, it is planned to write a report on the current state of knowledge, document key research questions, data gaps and related issues, and suggesting a way forward for a coordinated research strategy. From 14–16 May 2012, ICIMOD organises an international conference on 'The Cryosphere of the Hindu Kush – Himalayas: State of the Knowledge' in Kathmandu, which builds on the outcomes of the HighNoon workshop. The conference will promote further knowledge exchange of research conducted in the region, and the coordination of regional cryosphere programmes. International organisations will be invited to present their data requirements (content and format) for international monitoring strategies. The conference will host scientists, policymakers and practitioners interested or working in cryospheric sciences. Additionally the 'Hindu Kush - Himalayan Cryosphere Data Sharing Policy Workshop' will be held (by invitation), where the implementation of a data sharing policy is discussed. The above mentioned report will incorporate the findings and conclusions from the meetings in May, and provide guidelines for the next steps for a coordinated, comprehensive and integrative research strategy for the Hindu Kush Himalaya region.