Meeting Minutes

Fourth Steering Committee Meeting of

Hindu Kush – Himalayan Flow Regimes from International Experimental and Network Data (HKH-FRIEND)

ICIMOD, Kathmandu, Nepal
15-16 November, 2007

Organized jointly by:

International Centre for Integrated Mountain Development (ICIMOD)

&
United Nations Educational, Scientific and Cultural Organisation
International Hydrological Programme
(UNESCO/IHP)

Introduction

The Fourth Steering Committee meeting of the Hindu Kush Himalayan - Flow Regimes from International Experimental and Network Data (HKH-FRIEND) was held at the International Centre for Integrated Mountain Development (ICIMOD), Nepal from 15-16th November 2007. The meeting reviewed the past activities, discussed the evaluation report and provided guidance for the way forward. The Steering Committee members, research group members and observers were present during the meeting. The list of participants and the agenda of the meeting is provided in the Annex A and C respectively.

Day 1: 15th November 2007

Opening session

This session was chaired by Dr. Mats Eriksson, the programme manager of Water Hazard and Environmental Management (WHEM), ICIMOD.

- **Dr. Mats Eriksson** welcomed all the participants of the meeting and stressed the importance of addressing river flows in the HKH region in the light of impact from climate change

Welcome speech:

- **Dr. Madhav Karki,** the Deputy Director General of ICIMOD welcomed all the distinguished participants and also thanked UNESCO and Centre for Ecology and Hydrology (CEH) for their generous support. He informed that ICIMOD is proud to host this network. He further emphasised to revisit the scope of the HKH-FRIEND and argued to include climate change related research activities as it has become a global issue now. He hoped that the ICIMOD role is important to the network and reiterated the dedication needed from the network members. Finally, he anticipated that the meeting will review the achievement of this network along with strengths and weaknesses.

Opening address:

- **Prof. Siegfried Demuth**, Chief of Hydrological Processes and Climate Section, UNESCO, thanked ICIMOD for the efforts to make this meeting successful. He expressed that this meeting will give a direction to the HKH-FRIEND. This network has an important role in improving the understanding of the hydrology of the Hindu Kush Himalayan (HKH) region. It is also important to UNESCO/IHP, which is going to the seventh phase. It is important to align the work of this programme to UNESCO itself in this changing context. The communication with potential donors is important and needs to be considered by the research groups.

Objective of the meeting:

- **Ms. Mandira Shrestha**, the Executive Secretary of the HKH-FRIEND, welcomed the Steering Committee members and participants of the meeting. She presented the objectives and expected outcomes of the meeting. With a background of water issues in HKH region, she highlighted the problems of floods in the south Asian region and climate change impacts. The broad objectives of the meeting are to discuss the progress of HKH-FRIEND (2003-07), discuss the evaluation report and provide a way forward. The meeting was expected to revitalize the network with clear roles and responsibilities with consensus on the future direction and come up with an Action Plan for 2008-09. She thanked UNESCO for the financial support to hold the meeting.

Remarks by the Chairperson

- **Dr. Mats Eriksson** thanked all participants and highlighted the importance to assess the impact of climate change on glaciers and permafrost; and the importance of sharing data and information for the benefit of the region. He concluded the opening session by emphasizing the importance of revitalizing the network and think carefully about what the members want to use the network for. He encouraged everyone to bring out their opinions in an informal way.

Group photo and tea break

WORKING SESSION I

This session was chaired by Dr. Madan Lall Shrestha, Chairman, Nepal National UNESCO/IHP Committee.

Agenda: Review of the progress since 2003

Ms. Mandira Shrestha presented the progress report on activities carried out by HKH-FRIEND since the third Steering Committee meeting held in May 2003. The progress made by the Six Research Groups of HKH-FRIEND from 2003-06 was presented.

The summary of the progress is highlighted below.

Database Group

Following activities are carried out by the Database Group:

- Establishment of a Regional Hydrological Data Center (RHDC) to achieve and maintain the hydrological data generated by different research groups
- Design and development of the hydrological web database system
- Development of a strategy
- Memorandum of Understanding (MOU) on sharing hydro-meteorological data with some countries
- Metadata catalogue prepared
- A website <www.hkh-friend.net.np> has been launched
- Regional Training on Application of Geo-Informatics for Water Resource Management, Kathmandu, Nepal (March 2003)
- National Training on Geo-Information for Water Resources Management (GI-WRM), Dhaka, Bangladesh (November 2003)

Flood Group

Following projects were carried out by the Flood Group:

- The Regional cooperation for flood forecasting and information exchange in the HKH (2001-2005 Phase I). The four years of deliberations of the project have resulted in a series of high-level meetings and national consultations
- A study on 'Flood risk and vulnerability mapping using GIS: A case of Ratu River, Nepal' was carried out. This study used GIS and remote sensing data to map flood risk vulnerability and came up with a publication "Preparing for Flood Disaster: Mapping and Assessing Hazard in the Ratu Watershed, Nepal (2007)".

Low Flow Group

Following projects were carried out by the Low Flow group:

- Regional Flow Regimes Estimation for Small-scale Hydropower Assessment (REFRESHA) (1998-2001)
- Application and dissemination of the regional recession model in the Low Flows software to estimate dry season flows in ungauged catchment.

- Low flow studies in the rivers of Bhutan (2005-2006)
- Collaborative research was undertaken with the NE-FRIEND to identify large scale hydro-climatological patterns across Nepal (2006).

River Water Quality Group

Following activities are carried out by the River Water Quality Group:

Trainings:

- A water quality training workshop focusing on physio-chemical monitoring was held in Pakistan (2000)
- A water quality training workshop focusing on bio-indicators was held in Dhulikhel, Nepal (2003)

Project

- Assessment system to evaluate the ecological status of rivers in the Hindu Kush-Himalayan (ASSESS-HKH) from 2005-2008 supported by the European Commission.

Snow and Glaciers Group

Following activities are completed by the Snow and Glaciers Group:

- A training on Glacier Mass Balance (2002) and a publication entitled "A manual for monitoring the mass balance of mountain glaciers with particular attention to low latitude characteristics (2004).
- A Workshop on the Hydrology of glacierized basins, 4-5 March 2004, India – participation by the member countries in the workshop
- A scientific research on the Langtang glacier as part of the Snow and glacier aspects of water resources management in the Himalayas (SAGARMATHA) (2004). Scenarios for hydrological regime change under climate change scenarios in Ganges, Narayani and Brahmaputra basins.

Rainfall Runoff Group

Not much progress has been made by this group.

- Individual research as part of an academic program on rainfall-runoff analyses of Dudh Koshi, Babai, West Rapti and Tamur River Basins of Nepal as a part of M.Sc. projects have been completed.
- A project for estimating volumes of runoff for Simly catchment in Pakistan by using HEC-1 model was done

A discussion followed by Ms. Shrestha's presentation

- The Steering Committee members thanked ICIMOD and Ms. Mandira Shrestha over the period that was reported.
- **Mr. Jalaluddin**, Chief Engineer of Bangladesh Water Development Board informed that the feed back page of the web site does not work, and he emphasized on the regular update of the website. He also suggested putting few lines about each institution on the page of 'partners' to be viewed when the cursor is on the name in addition to having the details by clicking links to another pages.
- **Prof. Siegfried Demuth** suggested including the contribution of HKH-FRIEND in the FRIEND conference in Havana and the report 'FRIEND a global perspective' that was produced in three languages.

Presentation by research groups

Flood group:

Dr. Narendra Raj Khanal, Tribhuvan University, Nepal, presented the key methodological approaches and findings of the study entitled 'Preparing for Flood Disaster: Mapping and Assessing Hazard in the Ratu Watershed, Nepal'. The study was carried out by the Flood Group by using geo-morphological and hydrological approaches. The study concludes that flood hazard, risk and vulnerability mapping and zoning using GIS/RS are economic and a useful tool which provides basis for developing land use guidelines, early warning system and identification of safe area for evacuation routes and shelter of the community. Dr. Khanal mentioned that the social hazard map and the hazard map prepared based on modeling gave very similar results.

A Discussion followed Dr. Khanal's presentation

- **Dr. Subodh Sharma,** Kathmandu University put his queries regarding the need for regional cooperation to reduce the negative impacts of floods between India and Nepal. He also emphasized the need for improved bilateral cooperation, regional networking and data sharing to reduce such conflicts.
- **Mr. Jalaluddin** suggested looking into the horizontal dimensions by considering river bank erosion also in addition to the vertical dimension of floods. For the longer lead time, climate modeling needs to be taken into account. The basin management approach such as, land use management should be considered during flood management. In addition, he recommended attaching the details of modelling such as cross section, model schematization, calibration and validation to the publication.

River water quality group:

Prof. M.F. Bari, Bangladesh University of Engineering and Technology, Bangladesh and a group coordinator of river water quality, made presentation on "Assessment of the Ecological Status of Rivers in the HKH Region (ASSESS-HKH)". This three-year research project was initiated in April 2005 with financial support of the European Union under Sixth Framework Program. The aim of the project is to develop tools for river quality assessment using biological indicators. This project has been jointly carried out by a multidisciplinary group of scientists from ten universities and institutions of eight countries in Asia and Europe. The research outcome has been envisaged as a data management tool (ECODAT), water quality maps and a sustainable management strategy. He emphasized that this tool is useful for water resources managers and decision makers involved in sustainable management and utilization of river resources in the region.

A Discussion followed Prof. M.F. Bari's presentation

Dr. Arun Kumar, from Indian Institute of Technology, Roorkee informed that India is trying to implement the bio-monitoring approach in the whole country.

Mr. Jalaluddin suggested for consulting recent Water Quality studies carried out by Dhaka Water Supply and Sewerage Authority (DWASA) and Institute of Water Modelling (IWM) for enriching groups work.

Snow and Glaciers Group:

Dr. Gwyn Rees, Principal Hydrologist from Centre for Ecology and Hydrology, presented "Snow and Glacier aspects of Water Resources Management in the Himalayan (SAGARMATHA)". The main objective of the project was to assess the long-term water resources in snow and glacier fed rivers originating in the Himalayan region, and to determine strategies for coping with impacts of deglaciation on the livelihood of people in the region. The findings of the project highlighted that the water shortages as forecasted by some experts are unlikely to happen for many decades in many areas of this region. However, certain areas (e.g. Upper Indus) may experience a significant reduction in water availability over the coming decades. Various scenarios of temperature increase were considered to assess the impact on availability of water.

A Discussion followed Dr. Rees presentation

Dr. K. P. Sharma from Department of Hydrology and Meteorology, Nepal raised a question on how seasonal variation would impact climate change in Nepal. Rees responded that seasonal variation would increase flows during monsoon season.
Dr. Arun Kumar stressed that it is now critical time to raise voices on climate change as it will have severe impact on water resources.
Dr. Madan Lall Shrestha stressed the need of down scaling the global climate scenarios to regional and national scales.

Data Base Group:

Mr. Basanta Shrestha, the group co-ordinator of Database group, presented the report on the Regional Hydrological Data Centre (RHDC). He informed that RHDC is a web based platform for data user and provider. He further informed that there are focal nodes in each country. He emphasized the need of data from higher elevation as there are very few stations. The data can be requested through online submission from the HKH-FRIEND web page. There are only few visitors of the web site till date with sporadic data request. Data are not transferred to third parties in any form without the written consent of RHDC according to Data policy. He said that the stringent data policies within member countries makes data sharing still a challenge. Given the geopolitical sensitivity in the region he highlighted the importance of meta-data. He stressed the need to revitalize the data centre and urged the floor to come up with ideas on how to make the data centre more meaningful.

A Discussion followed Mr. Shrestha's presentation

The discussion mostly focused on the data sharing and enriching the HKH-FRIEND website for the data sharing purposes. He provided emphasize on meta data and an inventory on data holding by each organization.
Dr. Arun Kumar shared his view that sharing data should not be a problem. He also ensured that his institution can make available data to this network.
Mr Jalaluddin suggested about developing Metadata and website links to different data source and institutes in the FRIEND countries.

At last, the chair summarized the presentations and highlighted the issues of climate change, snow and glaciers. He shared that these issues were also raised during the last IPCC meeting.

Working Session 2:

The session was chaired by Mr. Jalaluddin, Chief Engineer, Bangladesh Water Development Board.

Agenda: HKH-FRIEND Evaluation Report

Dr. Bhanu Neupane, the team leader of the Science Sector and Regional Programme Specialist (SC/HYD) presented the evaluation report of the HKH-FRIEND. He informed that HKH-FRIEND has made significant contribution to improving the understanding of the hydrology of this region. Database group, low flow groups and flood groups are very active. River water quality group also lately started activities in the region and rainfall runoff group has not started from the beginning. However, no country has shared data with the data base group except Nepal. The HKH-FRIEND has suffered from the poor communication at all levels. There is a lack of ownership and a crisis of loyalty between parent institutions and HKH-FRIEND among its members and coordinators at all levels. He noted too much demand on the Executive Secretary, who has also a full time and highly demanding job at ICIMOD. He reflected on the relevance of HKH-FRIEND and said that it is as relevant as it was ten years ago. For the better performance of this network, he emphasized on the consultation, closer communication and dialogue between UNESCO/IHP and ICIMOD for the reactivation

of HKH-FRIEND. Among other things, he focused to prepare a long term vision and a medium term action plan, review and revise the terms of reference of key positions, reorganize the thematic research groups, improve communication at all levels and mobilize national and external support.

A discussion followed Dr. Bhanu Neupane's presentation

Main highlight of the Dr Neupane's presentation is ownership and funding strategy which is an urgent need for the HKH-FRIEND. **Dr. Mats Eriksson** suggested assessing the expectation with the HKH-FRIEND. He suggested for brainstorming on what this group wants to use HKH-FRIEND for?

- **Dr. K.P. Sharma** highlighted ownership, research and capacity building during the revitalization.
- **Dr. Alan Gustard**, Research Fellow of CEH, reminded the meeting of the historical relationship between UNESCO and ICIMOD and proposed that links to the FRIEND project were added to the web site. He drew attention to the following summary of the establishment of ICIMOD which highlighted the importance of UNESCO in it's formation. "The idea of creating an institution to promote the ecologically sound development of mountainous regions was first discussed at the International Workshop on the Development of Mountain Environment in December 1974 in Munich, Germany, but it was only five years later in 1979 during a United Nations Educational, Scientific and Cultural Organisation (UNESCO) Regional Meeting in Kathmandu, under the framework of the Man and the Biosphere Programme, that concrete commitments were made to establish the Centre. The Government of Nepal offered to host the new institution, and the Governments of Switzerland and the Federal Republic of Germany and UNESCO agreed to act as the founding sponsors. Government of Nepal and UNESCO signed the agreement that provided the legal basis for establishing the Centre in September 1981 in Paris. The Centre was finally established and inaugurated in December 1983 with its headquarters in Kathmandu, Nepal, and legitimised through an Act of Parliament in Nepal in the same year.
- **Dr. Gwyn Rees,** showed his satisfaction with the outputs of the HKH-FRIEND (articles and research activities) and highlighted the importance of facilitation. He mentioned the role of the executive secretary and argued to transfer responsibilities of chairperson to executive secretary.
- **Dr. Arun Kumar** put his views indicating that HKH-FRIEND means involvement of government. This network has built up several opportunities of small funding as some projects are going on at national level. Data sharing is an important issue but unfortunately its not being practiced much. Data sharing is difficult by government and expressed that it will take many more years for such sharing. He opined that ICIMOD is a neutral organization to host this network to all member countries.
- **Prof. Siegfried Demuth** asked how steering committee works? The role of Steering Committee, and how Steering Committee communicates with different research group? He gave an example from South Africa where a member of Steering Committee is a member of government. Here most of the Steering Committee members are not the member of Government.
- **Dr. Huang Yan**, China shared her experiences that a member of HKH-FRIEND is a member of UNESCO IHP China. She particularly showed her interest to identify issues and priorities of member countries.

The chair concluded the session by highlighting the need of motivation required for the research group.

Agenda: Discussion to review (Group Work)

Three groups were formed to discuss and review, among other things, ownership, funding and sustainability of the network. The name of participants of the group work is attached in the Annex B. The group discussed on these issues for the rest of the day.

Day 2: 16th November 2007

This session was chaired by **Dr. Arun Kumar** Head, Alternate Hydro Energy Centre, IIT Roorkee, India.

The second day started with the presentation of the outcome of the group work. All groups presented their outcomes which are summarized below.

Group 1

- For funding, HKH-FRIEND research groups participants should be encouraged to coordinate/develop initiatives as projects (on-going or proposed) within other national or international programmes. The host organization has a pivotal role in a strategically important project. The group emphasized that the secretariat should be adequately resourced from institutional overhead levied on projects.
- Regarding ownership, national organizations' Steering Committee members should forge closer links with IHP-National Committees and report FRIEND activities regularly to NC. A regular contact is needed between Steering Committee and Secretariat and vice versa.
- It is vital that group coordinators are; actively involved in science, proactive/self-motivated and can motivate others to participate and maintain regular communication with group members.
- The group pointed out to re-visit list of members and encouraged more proactive involvement and also new members to join.

Group 2

- Funding is necessary based on resolution on ownership issue and definition of objectives.
- HKH-FRIEND is feasible if it supports the interest of all participating countries by redefining objectives and revitalizing the system.
- Needs dialogue between UNESCO and ICIMOD for the promotion of the network.
- SWOT needs to be analysed to build on strengths and opportunities and addressing weaknesses and threats.

Group 3

- The ownership lies with all participating members individually and jointly own HKH-FRIEND.
- The following five areas are identified for funding:
    - Coordination (secretariat): UNESCO+ICIMOD
    - Project proposal development: Seed money (UNESCO+ICIMOD)
    - Communication (external and internal)
    - Data group (RHDC)
    - All should work for internal networking

A discussion followed by the group discussion:

- **Mr. Jalaluddin** highlighted the main point on ownership. He suggested using research undertaking of different organization and conglomerates in the region to look for potential source for funding FRIEND research. He asserted that ownership should be vested with members. If this floor decides new Steering Committee, it should show ownership. There must be a regular communication between research groups. Data sharing is difficult but metadata is easy and it should not be a problem. Most importantly, this network should include young people as they can find and harness benefits from new opportunities the best.

- **Dr. Arun Kumar** focused on two issues. National IHP is owned by the respective governments. If national research is already going on, ownership to the extend is to be linked with IHP.
- **Prof. Siegfried Demuth** highlighted the communication of research work. The research work should be communicated with National IHP and they forward it to UNESCO. UNESCO in turn communicates with government council.
- **Prof. M.F. Bari** shared his experiences on communication with National IHP from Bangladesh and informed that they have established good communication with IHP right from the development of proposals, group mobilization and also during nomination of National IHP.
- **Mr. Adarsha Pokhrel** shared his experience of Nepal and informed that Ministry of Education and Sports controls National IHP and there is poor communication and consultation while making any changes with organizational structures. The function of National IHP is very slow and it has to be revised. Most of the things are done in a fragmented basis.
- **Mr. Karma Chhophel** informed that Bhutan is new to this network and is planning a series of programmes.
- **Ms. Mandira Shrestha** informed that the linkages of HKH-FRIEND and National IHP need to be strengthened. She asked clarity about the mechanism of funding projects at the request of national IHP committees and what the role of HKH-FRIEND would be.
- **Dr. Arun Kumar** gave an example of ASSESS HKH where it is almost three years but no endorsement.
- **Dr. Bhanu Neupane (UNESCO)** informed that some countries have relationship between National IHP and HKH-FRIEND, for example, in Bhutan, Mr. Karma Chhophel is the chairperson of the National IHP committee. He informed that quality of report is considered very seriously in UNESCO during evaluation process. UNESCO does not fund for project rather facilitates the process of getting fund with other donors. He cleared the matter that UNESCO Delhi can not fund for secretariat. UNESCO Delhi is willing to pay for seed funding for a proposal, nonetheless, someone has to write a proposal. He argued to relocate the thematic groups, as snow and glaciers are not working well. He suggested including the issues of groundwater and climate change during re-organization of research groups. He stressed the role of international networking that could lead to wider exposure. To improve communication he suggested developing newsletters. Further, he suggested to maintain the website and develop a flyer as soon as possible.
- **Dr. Arun Kumar** argued to search for funding from major sources rather not from permanent like UN, UNESCO which are normally recognized for small funding.
- Upon the question from **Dr. Gwyn Rees** on contradiction on funding by UNESCO regional office, **Dr. Bhanu Neupane** cleared that earlier UNESCO Delhi was regional, now they fund only for Bhutan and India. He informed that allocating money for secretariat should come from UNESCO headquarter, not from Delhi.
- **Prof. Siegfried Demuth** cleared that UNESCO has a policy of decentralization where money goes to regional office for allocation. He mentioned the IHP is preparing a brochure for all the FRIENDs. Possibility of separate pull-out pages in the brochure of each FRIEND was discussed.
- **Dr. Mats Eriksson** recommended that this forum should assess how HKH-FRIEND could best be set up for the future. What do the member countries want? Is it a uniform wish that ICIMOD continues to host the secretariat? It is important that a demand driven approach is encouraged. Overall, he highlighted the three points.
    - Information sharing between countries is important and needs to be encouraged.
    - Bilateral communication can be developed in order to link supply with demand of data.
    - Project ideas should preferably come from member countries but not be developed for members which will create a more passive role.
- **Dr. Huang Yan** suggested to review the working groups.
- **Dr Alan Gustard** suggested to find out the priority for countries for 2008-09.

Agenda: Key decisions

This session was chaired by **Prof. M.F. Bari**.

Each participant reviewed and reconfirmed the need of HKH-FRIEND. Each participant was requested to put their views on network strategy, fund mobilization and management of HKH-FRIEND.

Mr. Adarsha Pokhrel

- Water management is a critical issue between Nepal and India and it has become a political issue as well
- The progress of HKH-FRIEND (useful work, value) has to be revisited.
- Main problem of funding has to be sorted out (also referred to Bhanu's statement that seed money can be paid by UNESCO.
- ICIMOD is expressing problems to host HKH-FRIEND and would like to see a revitalized set up.

Dr. Huang Yan

- For China, Himalaya is very important from water resources point of view, maybe be not for flooding. We are certain to support to HKH-FRIEND as it is useful and important.

Prof. Igor Vasilievich Severskiy

- Climate change and global change is a problem and that should fall under the scope of this network.

Mr. Karma Chhophel

- ICIMOD role is crucial in terms of facilitation within member countries, however it requires funds.

Mr. Tashi Dorji

- A research based network is required in the region so HKH-FRIEND is very important. This kind of network is very important to share data for research in the ground of global climate change. HKH-FRIEND is the right platform for data sharing.

Mr. Jalaluddin

- New persons should be included in the different research groups of HKH-FRIEND
- Highly recommend that HKH-FRIEND should continue, however better to modify the title "HKH-FRIEND" as the title does not give general kind of expectation to public.
- knowledge processing is necessary
- In terms of research groups, it is better to state 'hydrological modeling' than the existing 'rainfall runoff modeling'
- He enquired about the resolution of FRIEND.

Prof. Siegfried Demuth

- FRIEND has drafted a resolution.
- IHP is an intergovernmental body. IHP should work with the framework and there is a resolution which was signed by governments.
- A Steering Committee has just been set up; and documents and minutes are on volunteer basis. Steering Committee reconstitutes on their own. The respective country can send to Steering Committee.
- Other regional FRIEND groups are working differently and they should decide themselves what is the role of Steering Committee, influencing research group and what kind of research they want.

- For the seventh phase of UNESCO, intergovernmental committee/panel has decided to have FRIEND as a cross cutting point, all IHP national committee are asked to formulate for the seventh phase

Dr. Alan Gustard

- Informed that there is a project document of HKH-FRIEND with the background information. He suggested posting it on the website.
- Agreed on the point to update hydrological modeling
- HKH-FRIEND network should work on what we would like to do in next five years

Dr. Arun Kumar

- Informed that projects are still going on in India.
- River quality and quantity is an important issue and snow and glaciers are yet a political issue
- Database is still very difficult to be involved for sharing and it may take more time

Agenda: Presentations

Prof. Igor Severskiy, from Institute of Geography, Kazakhstan made a presentation on 'Water resources change perspectives in Central Asia as consequence of global warming and glaciers degradations'. The main aspect of the presentation was in close connection with the problem of climate change. He pointed out the two main reasons which are responsible for deviations of climate characteristics from natural fields; change in natural landscapes and change in situation around meteorological stations.

- He highlighted that during the 40 years; Tuyuksu glacier has receded 1 km and had lost 41 million m^3 of ice. Total reduction of thickness of ice at the end of the tongue of the glacier has exceeded 45 m. In most part of the glacier the loss of thickness of ice was from 5 up to 15 m.
- In spite of considerable reduction in glacier resources, the runoff of the main rivers of Central Asia has not changed during the last decades which is evidence of a certain compensating mechanism. Such a mechanism could be related to the water inflow from melting permafrost.

Dr. Yan Huang from Bureau of Hydrology, Changjiang Water Resources Commission (CWRC) presented on 'Decision Support System for Changjiang River Flood Management'. She highlighted the flood defense aspects of CWRC. The flood management component of CWRC includes data acquisition, Information, Flood forecasting, option analysis and decision making. The operation of the Three Gorge Reservoir creates new challenge for flood defense for mid-down stream of Changjiang River. Climate situation is becoming more and more extreme, occurring of floods and draught is a matter of probability. Dr Yan presented a Map and dataset of the basin to the Executive Secretary of FRIEND.

Agenda: Putting agreement into action

The members discussed on respective country priorities to be addressed by HKH-FRIEND as indicated in the table 1.

Table 1: Priorities for member countries

Topic	AF	BH	BN	CN	IN	MN	NP	PK
Floods		☺	☺		☺		☺	☺
Low flows		☺	☺	☺	☺		☺	
Water resources availability			☺		☺			
Climate change impacts and adaptations			☺	☺				

Ground water					☺			☺
Hydrological Processes		☺	☺					
Modelling			☺					☺
Mass balance studies							☺	
Climate change impacts and adaptations				☺			☺	
S&I Modelling							☺	
Environmental Flows			☺		☺			
River erosion & sedimentation			☺					☺
Water quality					☺			
RHDC	☺	☺	☺	☺	☺?	☺	☺	☺
Monitoring technologies (hydro-metry)							☺	
Website & dissemination								
Capacity building & knowledge transfer		☺	☺	☺				

Note: **AF**: Afghanistan, **BH**: Bhutan, **BN**: Bangladesh, **CN**: China, **IN**: India, **MN**: Myanmar, **NP**: Nepal, **PK**: Pakistan

Agenda: Expansion of HKH-FRIEND – include Central Asia

The expansion of HKH-FRIEND was discussed. The countries of Central Asian had formally contacted UNESCO-IHP for forming Central Asian FRIEND. This proposal was discussed during the FIGCC meeting in Havana where it was suggested that Central Asia be included under HKH-FRIEND. This proposal was made to the Steering Committee members.

Discussions:

- **Dr. Madhav Karki** suggested that in the light of review of more ownership, Steering Committee should give guidance and direction and should meet more often. Further, for new members from Kazakhstan, Kyrgyzstan and others, they may ask for the official membership and Steering Committee will decide later.
- **Mr. Adarsha Pokhrel** shared that inclusion of central Asian countries will be an asset to HKH-FRIEND.
- **Dr. K.P. Sharma** suggested to define the scope for entry to new country.
- **Dr. Madhav Karki** emphasized that including new members mean new resources that would help to expand the HKH-FRIEND networks. Following to the point raised by Dr. K.P. Sharma, Dr. Karki also added that if the process for entry is clear, it would be easy to include other new members in future. He further made clear about the role of ICIMOD that is facilitation and the key element is coordination. ICIMOD is glad to host this network but at the same time like to hear from other members what they feel about it. ICIMOD also likes to have input from the meeting to make this network more fruitful from ICIMOD side. ICIMOD will continue hosting the member secretary of HKH FRIEND, however, will nominate the person later.
- **Mr. Karma Chhophel** suggested to have nomination of Steering Committee through National IHP which would give better sense, does not necessarily to be from academician.
- **Dr. Mats Eriksson** suggested that chairperson should be very active.
- **Dr. Alan Gustard** added that chairperson would have a very big role in the network to give a new direction.
- **Prof. Siegfried Demuth** added that roles and responsibilities of chair and member secretary should be very clear. The coordinator should have flexible roles and responsibilities. S/He should come up with 15 page plan/summary report.
- **Dr. Alan Gustard** suggested initiating discussion groups/forums on the website. He emphasized to have coordination with other programmes to ask fund with UNESCO. He shared few examples of coordination like, PhD studentship (Annex E), partnership in conferences and programmes (for example, International Sedimentation Initiatives).

- **Dr. Bhanu Neupane** informed that many activities will be happening in the region in 2008-09. In January 2008, a seminar on glaciers and remote sensing will be organized. The HKH-FRIEND will have excellent showcase opportunities during these events. First, we need to develop a brochure/flier and can invite people to join this group. UNESCO will cover the cost for flyer.
- **Ms. Mandira Shrestha** informed that a flyer had been prepared by ICIMOD in 2004. This could be updated.

Dr. Bhanu Neupane shared the 22 points outputs of the fourth steering committee meeting of HKH FRIEND. He appreciated the tasks carried out by **Ms. Mandira Shrestha**.

Ms Mandira Shrestha thanked the Steering Committee members for making themselves available for this meeting and making it fruitful. She also thanked them for their support during the period as the Executive Secretary. She congratulated the new chairman and coordinator and wished HKH-FRIEND a successful next term.

DECISIONS FROM THE MEETING

A discussion to re-organize the existing research groups was held where all participants put their views. After a rigorous discussion, the new research groups were formed. The coordinator of each respective groups were also selected as shown in the table 2. A suggestion to include climate change and adaptation as a new research group was discussed as participants suggested that climate change is a cross cutting issue and can be dealt in each proposed new research groups.

The four new research groups after discussions are fixed as:

Table 2: New research groups with coordinators

New Research Groups	Co-ordinators	Country
Floods & Low Flows,	KB Thapa*	Nepal
Snow & Glaciers,	Adarsha Pokhrel	Nepal
Water Quality	MF Bari	Bangladesh
Information management	ICIMOD	Nepal

* if Prof. KB Thapa declines, Mr. Jalaluddin volunteered to be the co-ordinator of the group

Nominations

The forum agreed on:

- **Member Secretary** will lie with ICIMOD. (The Steering Committee members agreed to rename the post of Executive Secretary as Member Secretary); ICIMOD will nominate a focal person later.
- **Mr. Karma Chhophel (Bhutan)** will lead the network as a chairperson. The Chairperson will be on the alphabetical basis of the country names. Chairperson will chair the steering committee meetings.

The organisational structure of HKH-FRIEND was discussed. The experience of NE-FRIEND was shared where the group is lead by a coordinator. It was suggested that a similar approach should be tried for HKH-FRIEND. To keep the position of the coordinator, a volunteer from the Steering Committee was requested. The coordinator would take active role in running the network and thus reducing the workload of the Member Secretary.

- **Dr. Huang Yan** from China volunteered to be the coordinator of HKH-FRIEND.

The Steering Committee approved the nominations. **Dr. Bhanu Neupane** welcomed the new chair and coordinator.

The proposed organisational structure for HKH-FRIEND has been agreed by the participants.

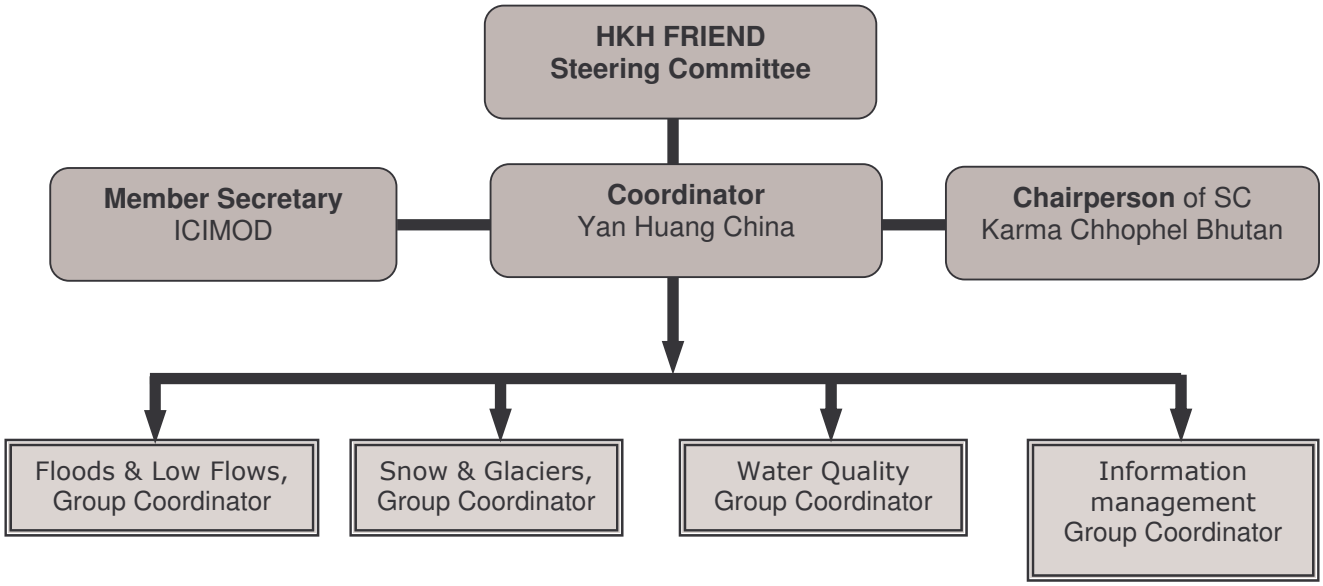

Fig. 1. New organisational arrangements of HKH-FRIEND from Fourth Steering Committee Meeting

Outcome of the 4th Steering Committee Meeting by Dr. Bhanu Neupane

1. The meeting reviewed the progress of the HKH FRIEND activities in the past 4 years (2003-2006). The evaluation report of HKH FRIEND was presented. Although mixed conclusion was drawn, the steering committee agreed that HKH FRIEND is still as relevant as it was during the time of its inception.
2. Identified the key problem and discussed
    - Ownership
    - Finances
    - SWOT
3. Appreciated the fact that ownership rests with the members, however, there is a need for introspection and realize individual strengths
4. Identified areas where finances are required
    - Coordination/secretariat
    - Development of project proposals
    - Communication between and amongst the member countries and beyond the member states
    - International networking
5. Agreed to continue on the areas of interest and develop project proposal to garner/raise more resources.
6. Internalized the SWOT undertaken during the evaluation and decided to maximize on strengths and opportunities to offset weaknesses and threats.
7. Agreed to invite Central Asian (CA) countries to be a part of the network and decided to send formal invitation to CA countries to be part of the network.
8. Identified the topics of interest and reworked on the thematic areas to make them more focused. The earlier six thematic groups were worked out to be four groups – 1) Floods and Low Flow 2) Water Quality 3) Snow and Glaciers 4) Information Management.
9. Identified coordinators of various thematic groups and decided that the membership of these Thematic Groups would be floated among other countries to request for members
10. Requested the group coordinators to develop the project proposals on the identified focal areas by January.2008.
11. Noted the November 2008 Conference on "Hydrology and climate change in the Mountainous Areas" being organized by the Society of Hydrologist and Meteorologist of Nepal (SOHAM). The steering committee decided to allocate an additional day during the conference to discuss scientific actions.
12. Noted that low flow training would be held in Bhutan -------. UNESCO assured financial support to hold the training (Annex D).
13. Decided to capitalize on the UNESCO's participation program (action point for the Regional Hydrologist to provided detail outline and sample project proposals)
14. Reaffirmed commitments of the respective countries to work more proactively
15. Discussed secretariat issue and resolved that secretariat should continue to operate from ICIMOD. ICIMOD will play the role of Member Secretary. A person in particular was not assigned to take the role during the meeting. ICIMOD will internally decide on the name of the person who will assume the role.
16. Discussed the position of Chair and coordinator. China volunteered to act as the coordinator of the HKH FRIEND. While alphabetically, Bhutan will act as the Chair of the Steering Committee.
17. Agreed to revamp the governance of HKH FRIEND. Steering committee will be the main body which will be supported by a coordinator (China) and Member secretary (ICIMOD). These bodies will oversee the functioning of the groups.

18. Requested the Chair, Coordinator and Member Secretary would work together to elaborate on the new governance.
19. Noted the cross cutting nature of FRIEND and decided to request UNESCO to make backward and forward linkages between HKH FRIEND and other programs of UNESCO.
20. Noted the need for piggy-backing on the ongoing activities on the region and develop linkages.
21. Welcomed UNESCO's in-principle commitment to bring synergy into its various programs.
22. Requested UNESCO offices to coordinate between and amongst each other to deliver and support HKH FRIEND actions in a more coordinated manner.

Concluding remarks:

The relevance of HKH-FRIEND is still important and should continue with collective efforts of all members under new leadership. The ownership rests with members but there is a need for introspection and realize individual strengths. The new membership from Central Asian countries will also add value to the importance of this network. It is hoped that the new governance of the HKH-FRIEND, mainly the appointment of coordinator, will give a dynamic momentum to the network. There is a need of communication amongst the members, research groups and donors.

Annex

Annex A

Name of the participants of the Fourth Steering Committee Meeting of HKH-FRIEND November 15-16, 2007 ICIMOD, Kathmandu

List of Participants

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Nepal

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9. Dr. Narendra Raj Khanal
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Annex B

Name of the participants of group work

Group 1

- Dr. Madan Lall Shrestha (Nepal)
- Dr. Narendra Man Shakya (Nepal)
- Dr. Subodh Sharma (Nepal)
- Dr. Yan Huang (China)
- Dr. Gwyn Rees (UK)
- Ms. Mandira Shrestha (ICIMOD)
- Prof. Igor Severskiy (Kazakhstan)
- Prof. Siegfried Demuth (UNESCO)

Group 2

- Dr. Arun B. Shrestha (ICIMOD)
- Dr. Keshav P. Sharma (Nepal)
- Dr. Narendra Khanal (Nepal)
- Mr. Karma Chhophel (Bhutan)
- Mr. Pradeep Mool (ICIMOD)
- Mr. Santosh Nepal (ICIMOD)

Group 3

- Dr. Alan Gustard (UK)
- Dr. Arun Kumar (India)
- Dr. Bhanu R. Neupane (UNESCO)
- Dr. Mats Eriksson (ICIMOD)
- Dr. Muhammad Fazul Bari (Bangladesh)
- Mr. Adarsha Pokhrel (Nepal)
- Mr. Jalal Uddin Md. Abdul Hye (Bangaldesh)
- Mr. Tashi Dorji (Bhutan)

Annex C

Agenda of the meeting

Venue : ICIMOD Conference Hall

DAY 1

Thursday, 15 November, 2007

09:00 – 09:30 : Registration

1. Opening Session

Chairperson : Dr. Mats Eriksson, Programme Manager, WHEM
09:30 Welcome Speech : Dr. Madhav B. Karki, Acting Director General, ICIMOD
09:40 Opening Address : Prof. Dr. Siegfried Demuth, UNESCO/IHP
09:50 Objectives of the meeting : Ms. Mandira Shrestha, Executive Secretary, HKH-FRIEND

Remarks by the Chairperson
10:00 Introduction of Participants

10:00 Tea Break and Group Photo

2. Working Session I

Chairperson: Dr. Madan Lall Shrestha
Rapporteurs: Ms. Mandira Shrestha/ Dr. Bhanu Neupane

10:30 Adoption of Agenda

10:40 Review of the progress since 2003

- Progress Report: Mrs. Mandira Shrestha, Executive Secretary
- Presentations by Research Groups

  - "Vulnerability and Risk Mapping: A case of Ratu": - Dr. Narendra Khanal
  - "Assessment of the Ecological Status of Rivers in the HKH region" – Prof. M.F. Bari
  - Snow and Glacier aspects of Water Resources management in the Himalayas (SAGARMATHA) – Dr. Gwyn Rees
  - Regional Hydrological Data Centre – Mr. Basanta Shrestha

12:30 Lunch Break
13:30 Discussion (to review executive secretary's report, inter alia, questions) - Moderated by Dr. Bhanu Neupane

- Was the progress satisfactory?
- Did we achieve what we wanted to achieve?
- Did the HKH clientele benefited as envisaged?
- What were the "project-specific pit falls"
- Constraints to plan and implement a follow up project
- Relevance and linkages to the policy?

15:00 Tea Break

3. Working Session II

Chairperson: Dr. Alan Gustard
Rapporteurs: Ms. Mandira Shrestha/Dr. Mats Eriksson

15:30 HKH-FRIEND Evaluation report presentation – Dr. Bhanu Neupane

16:00 – 17:00 Discussion on the review (Group Work)

- Can the network sustain itself without external funding?
- If it can how?
- If it can't why not?
- Is it feasible to expand the cluster, amidst uncertain future and dwindling interest?
- What is the ideal role of promoter (UNESCO, ICIMOD?), or the context of promoter is wrongly defined and described??
- Who owns the NETWORK?
- SWOT analysis
- Discussions on the tabled proposal during the 5th FRIEND conference in Havana in December 2006 about CA participation in HKH-FRIEND group

17:05 End of Day One

18:30 Dinner at Bhojan Griha

DAY 2

Friday, 16 November, 2007

Chairperson: Dr. Arun Kumar
Rapporteurs: Ms. Mandira Shrestha/Dr. Bhanu Neupane

09:00: Group presentations

09:20: Key decisions (should cover, inter alia, points like):

- Reestablishment of the relevance
- Geographical coverage
- Consolidation of theme
- Presentations from SA+CA on future theme for implementation (presentations to be determined)

12:30 -13:30 Lunch

Chairperson : Dr. Siegfried Demuth
13:30 - 15:30 : Key decisions (should cover, inter alia, points like):

- Network Strategy, Fund Mobilization and Management (How, where and what)
  - Coordination mechanism
  - Secretariat
  - Chairpersonship
  - Communication strategy
  - Project preparation
  - Monitoring
  - Reporting

15:15 Tea Break

15:30- 17:00 Putting agreement into action

- Key Actions to operationalize network strategy
  - Priority Projects for 2008-2009
  - Future Plan of Action (2008-2009)
  - FRIEND Conference in 2010

  - Liaison with other programmes and initiatives such as HELP, IFI and ISI
- Agreement on the new management
  - Changes in the membership of the Steering Committee
  - Election of New Chairperson
  - Election of New Executive Secretary
  - Review of Executive Secretary's Terms of Office
  - Changes in the Research Groups
- Role of UNESCO (HQ/Field office) and ICIMOD, other partners

17:00 Concluding Session

Address by Chairperson-Elect, HKH-FRIEND (vision and direction)
Address by Executive Secretary - Elect, HKH-FRIEND (coordination, collaboration, strategy)
Agreement on the way ahead (note on Commitments)

- Regional Country Representative
- UNESCO (headquarter and regional offices)
- Centre for Ecology and Hydrology
- ICIMOD

Adoption of the plan of action

Annex D

Proposed low flow course in Bhutan

A Low Flow training Course was initially planned to be held in Bhutan in 2006. This initiative has been led by Mandira Shrestha, (ICIMOD), Karma Chhophel (Bhutan) and Lena M. Tallaksen (Norway). Prior to the HKH Steering committee meeting Alan Gustard (AG) received confirmation that course presenters from Europe (Norway, Netherlands and UK) continued to be enthusiastic to run the course and anticipated being able to secure their own funding for their participation. AG had also been in discussion with WMO regarding possible financial support and Wolfgang Grabbs (email 7.11.2007) from WMO stated "If the course is later in 2008 or even 2009, then, Alan, you could convey the interest of WMO to support a few regional participants. At this point however, this cannot be a full commitment." This would be discussed at the CHy AWG meeting to be held in Geneva in February 2008.

The proposed leader (Prof K.B. Thapa) of the HKH FRIEND Flood and Low Flow Group did not attend the HKH Steering Committee meeting and thus it was not possible to discus the details of the course with him . However Mr K Chhopel (Bhutan) reaffirmed his interest in running the course in Bhutan and proposed September 2008 as a possible date and Dr. Neupane (UNESCO Delhi) agreed to provide financial support for participants from the region to attend the course. He also offered to provide advice regarding selection of suitable candidates to attend the course. In addition the meeting agreed that if an active low flow research component was developed in HKH FRIEND then the training course could usefully be extended by two days to develop research proposals. This could usefully include participants from Europe. The following actions were proposed:

1. Dr Neupane will discuss the course with the new coordinator of the flood and low flow group (when appointed) and with Mr. K Chhopel - note that the course objectives and programme have been finalized by Lena Tallaksen and Mandira Shrestha. Possible dates in 2008 and 2009 could then be forwarded to Lena Tallaksen and she could liaise with European participants to select an appropriate date.

2. Dr Neupane in discussion with Professor Demuth could determine whether the possible offer of WMO financial support is required. An alternative option is that WMO fund a second course in another region. Copies of correspondence should be forwarded to Dr Huang Yan (China) the new co-coordinator of HKH FRIEND and Lena Tallaksen who led the European contribution to the course.

Alan Gustard

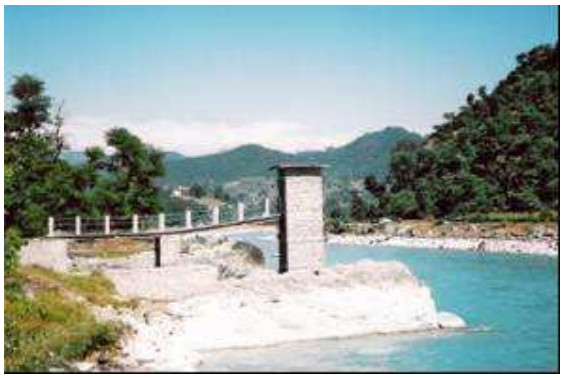
Annex E

Seasonal Prediction of River Flows for Himalayan Basins of Nepal

SCHOOL OF GEOGRAPHY, EARTH AND ENVIRONMENTAL SCIENCES
THE UNIVERSITY OF BIRMINGHAM

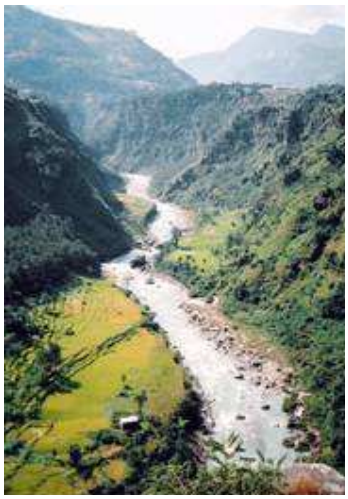
Supervisors: Dr David M. Hannah
in collaboration with the Society of Hydrologists and Meteorologist of Nepal

Description of Research Project:
Water research in the Nepalese Himalaya is hindered due to the extreme terrain and monsoon climate that make data collection problematic and limit the transferability of research conducted in Europe and North America to this region. Consequently, there is a general lack of critical knowledge about water resource distribution, variability and generation. Hydrological knowledge has a clear practical role in developing irrigation and hydropower and protecting life and property from floods and droughts. In particular, there is a need to understand seasonal to inter-annual river flow behaviour, as it is this temporal variability that has greatest impact upon water resource utilisation across the Himalaya. Prediction of river flows at seasonal or multi-seasonal time-scales is necessary to increase human preparedness and, thus, to improve management of water supply and water-related hazards in Nepal.



Researchers working elsewhere have found slowly varying components of the climate system to be useful predictors of seasonal hydrological response, with the El Niño-Southern Oscillation receiving most attention. The inertia of such climate forcing mechanisms coupled with the 'memory' of river basin water stores offers the potential to forecast river flow with seasonal lead times and also to identify anomalous climate system conditions that may lead to river flow extremes several months later. For summer monsoon rainfall, Shrestha (2000) found associations between to the Southern Oscillation Index (SOI) and the percentage departure of Nepal Monsoon Rainfall from its long-term mean. Similar research upon river flows across Nepal has not been published.

Hence, this studentship aims to assess the predictability of river flows for Himalayan basins of Nepal by quantifying the relationships between slowly varying components of the climate system (i.e. the SOI and other large-scale climate diagnostics) and the seasonal to inter-annual variability of river flows. The aim will be met through the attainment of the following specific objectives: **(1)** to assess the influence of climate system components upon intra-seasonal to inter-annual river flows; **(2)** to identify the regions of the Nepalese Himalaya and the time periods (months and seasons) of greatest and least predictability in terms of river flows; **(3)** to establish the influence of river basin characteristics upon flow predictability within the regions; **(4)** to construct and validate models to forecast monthly and seasonal river flows for basins within the regions that show significant climate system controls and **(5)** to compare the skill of these climate forcing models with those based upon the persistence of river flows. This work will build upon research undertaken within the School on the large-scale hydroclimatology of the Nepalese Himalaya (see references). Long-term (1975-present) river flow time-series will be supplied from the Department of Hydrology and Meteorology, Kathmandu. By employing continuous, freely-available and derived climate system diagnostic indices, this studentship will help bridge the gap between research in the atmospheric and water resource sciences.



Research results will not only be of pure scientific interest but they will have practical implications for the assessment and prediction of water resources across the Nepalese Himalaya (above).

Research Studentship Training:

The research programme will provide the student with training in hydrology; climatology; desk-based research methods; and the processing, analysis and modelling of environmental data. The student will also benefit from working in a multidisciplinary research team and participating in a large and active graduate research community within the School of Geography, Earth and Environmental Sciences. This research will be in collaboration with the Society of Hydrologists and Meteorologist of Nepal with whom the University of Birmingham has recently signed a Memorandum of Understanding.

Reference and Relevant Papers by Supervisors:

Hannah D.M., Kansakar S.R. and Gerrard A.J (2005), Identifying potential hydrological impacts of climatic variability and change for Himalayan basins of Nepal, in *Regional Hydrological Impacts of Climate Change - Impact Assessment and Decision Making*, Proceedings of Symposium S6 during the VIIth IAHS Assembly at Foz do Iguaçu, Brazil, IAHS publication 295, 120-130

Hannah D.M., Kansakar S.R., Gerrard A.J. and Rees G. (2004), Linking river flow and precipitation regimes for Himalayan basins of Nepal: Assessing hydroclimatological variability and implications of climate change, in *Hydrology: Science and Practice for the 21st Century*, Proceedings of the British Hydrological Society International Symposium, London, Volume **I**, 38-45

Hannah D.M., Kansakar S.R., Gerrard A.J. and Rees G. (2005), Flow regimes of Himalayan rivers of Nepal: Their nature and spatial patterns, *Journal of Hydrology*, **308**, 18-32

Kansakar S.R., Hannah D.M, Gerrard J. and Rees G. (2002), Flow regime characteristics of Himalayan river basins in Nepal, *FRIEND2002 - Regional Hydrology: Bridging the Gap between Research and Practice* (Proceedings of the fourth International Conference on FRIEND, Cape Town) IAHS publication **274**, 425-432

Kansakar S.R., Hannah D.M., Gerrard A.J. and Rees G. (2004), Spatial pattern in the precipitation regimes of Nepal, *International Journal of Climatology*, **24**, 1645-1659

Shrestha M.L. (2000), Interannual variation of summer monsoon rainfall over Nepal and its relation to Southern Oscillation Index, *Meteorology and Atmospheric Physics*, **75**, 21-28

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Enquires: Dr David M. Hannah. Email: d.m.hannah@bham.ac.uk

Acronyms

ASSESS-HKH	Assessment system to evaluate the ecological status of rivers in the Hindu Kush-Himalayan
CEH	Centre for Ecology & Hydrology
DHM	Department of Hydrology and Meteorology
ES	Executive Summary
FRIEND	Flow Regimes from International Experimental and Network Data
HKH	Hindu Kush Himalayan
HKH-FRIEND	Hindu Kush - Himalayan Flow Regimes from International Experimental and Network Data
ICIMOD	International Centre for Integrated Mountain Development
MS	Member Secretary
RHDC	Regional Hydrological Data Center
SAGARMATHA	Snow and glacier aspects of water resources management in the Himalayas
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNESCO/IHP	United Nations Educational, Scientific and Cultural Organisation International Hydrological Programme
WHEM	Water Hazard and Environmental Management