

### PROPOSAL FOR THE ESTABLISHMENT

## OF

# HKH-FRIEND REGIONAL HYDROLOGICAL DATABASE CENTRE (RHDC)

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## DATABASE GROUP, HKH-FRIEND SEPTEMBER 1998

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## 1. Introduction:

Hindu Kush-Himalayan region, the highest mountain range in the world, extend to 3,500 km and sustains 140 million people and affects the life of more than three times in the plains and river basin below. Politically, it embraces partly or whole of the Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan. Hindu Kush-Himalayan region is not only the highest mountain chains in the world but also most populous and fragile. The increasing imbalance between population and available productive resources is continuously threatening the environment and livelihoods of the people in this region although it has a tremendous water resources potential. The growing population and increasing development activities are exerting considerable pressure on the natural resources of the mountains. The situation is further aggravated due to the fact that, reliable hydrological information of the mountainous areas of this region are lacking mainly due to the poor accessibility, insufficient trained manpower and lack of proper instrumentation.

Obviously, the high water towers and the fresh water reservoir (snow) possess tremendous potential of utilisation and are considered as hopes of future to transform the economics of the region. It is also evident from the fact that Nepal alone has hydropower potential of 83,000 MW where as only 235MW is actually being used. A pre-requisite for this is a better understanding of the hydrological processes in the complex mountain environments of the region and its influence downstream. Regional cooperation in the area of hydrological activities and studies is an essential fact because HKH rivers originating in one country pass through other countries before finally reaching the ocean. An adequate understanding of the hydrological processes of this highly energised and fragile environment under the impact of intense monsoonal precipitation is extremely important and at the same time most demanding in terms of cost and ingenuity. Thus solutions of the problems of this region must come through studies and research works.

On December 11-14, 1989, UNESCO/IHP and ICIMOD along with Department of Hydrology and Meteorology, HMG/Nepal launched its first workshop on Hydrology of Mountainous Areas. Ever since, the consistent effort of UNESCO/IHP and ICIMOD along with regional and international organisations has finally led to the formation of Hindu Kush Himalayan Flow Regimes from International Experimental and Network Data (HKH-FRIEND) in 1996. The members of the HKH-FRIEND are the HKH-Countries and other donor agencies such as German IHP/OHP, GRDC, WMO, Institute of Hydrology, UK, UNESCO/IHP and ICIMOD. The first Meeting of the HKH-FRIEND Steering Committee, which was held at Kathmandu on May 11-12, 1998, has identified five research areas viz., Floods, Low Flow, Rainfall-Runoff, River Water Quality and Snow and Glaciers, and recommended to launch research projects and establish its own Regional Database Centre to be located presently at ICIMOD. Responding to such a need, ICIMOD has agreed in principle to provide facility and help establish such a Regional Database Centre. Emphasising the need for database management, ICIMOD and UNESCO/IHP in collaboration with German IHP/OHP and GRDC has organised a training programme on Database Management for its HKH member countries.

## 2. Objectives

The primary objective of the HKH-FRIEND is to create a common database in the HKH region to facilitate research into the hydrological behavior of representative basins located at different physiographic and climatic zones. Data generated from the different projects such as low flow studies, flood studies, rainfall runoff modeling, etc. will be made accessible to all the participating countries, thereby providing a valuable resource for future hydrological studies, particularly when data from two or more HKH countries are required. Thus bridging the data gap and improving the information availability. In general, the program aims to develop and strengthen national and regional database to facilitate scientists/planner in a more cost-effective means.

Towards these objectives, the immediate activities of the Centre will be:

Initially creating a database by bringing together existing data sets from research and network stations in each of the participating countries.

Create a database for GIS applications from the existing data of Nepal as a model.

To assist HKH Secretariat on organising database related training to HKH-FRIEND member countries.

Efforts also will be made to produce the existing data on CD-ROM with the

technical support from MENRIS/ICIMOD.

## 3. Activities:

#### 3.1 Data Identification

Core data set needed for the hydrometeorological studies will be identified, defined and stored. Data type as well as format will be defined after consultation with HKH-FRIEND projects, HKH-FRIEND Database Group and Steering Committee members. At present monthly and daily, where available, data from Nepal will be stored. The existing data might be Precipitation, Temperature, Humidity, Evaporation, Wind, Discharge, etc.

#### 3.2 Data Collection

In each participating country, a common hydrological database will be assembled comprising river flow data and catchment characteristics for selected gauging stations. The unified database will be assembled in one location in each country to provide the basis for the research projects. Data from each country will also be transferred to the Regional Database Centre. This will only be true after HKK-FRIEND Projects have been formulated. Therefore, to give a start to the database centre, existing data and information from various sources such as Tribhuvan University, Department of Hydrology and Meteorology (DHM, HMG/Nepal), ICIMOD, DPTC, etc. will be collected and stored.

#### 3.3 Data Entry and Automation

The overall purpose of the database system is to maintain central control over a large volume of data required for many users. This lead to higher efficiency in work and to better query results for stored data. The information is stored only once and at only one location. Trained staff does the updating and the administration of the data. At present, dBASE software will be used to store the available data. Later, when HKH-FRIEND Projects will start generating its own data, software such as ORACLE will be opted. It may be mentioned here that ORACLE has been used in the European FRIEND Projects and HYDATA in the South Africa FRIEND Project.

#### GIS Database

Centre will develop capacity to establish comprehensive GIS database of hydrologically relevant information of the selected catchments: These include catchment boundaries, hydrometric zones, soils, climate statistics, vegetation and geology. This database, consistent across the FRIEND region, will contribute essential information about the characteristics of catchments above gauging stations. As ARC/INFO was adopted as the common GIS platform in European FRIEND, the Centre will opt for the same.

#### 3.4 Capacity Building

One of the key features of the HKH-FRIEND is to provide short-duration training course to its member countries in order to build the capacity in HKH region. It has been felt that development of hydrological research activities has been limited due to lack of expertise in this field. Training on hydrological database management, flood studies, low flow studies, rainfall runoff modeling and snow and glacier studies has been identified. The centre will organise training on database management and resources for the same will be sought from donor agencies. It would be worthwhile to mention here that HKH Secretariat has already organised training on Database Management as a part of its activity.

#### Publication

HKH-FRIEND project data will be published in order to facilitate the research and scientist. The voluminous data also will be produced in CD-ROM in DOS/ASCII format. The entire existing FRIEND projects have freely exchanged hydrological data between countries within each FRIEND programme, with data release outside of the programme administered by a protocol set by each country.

#### 4. Organisation

At present, the facility for HKH-FRIEND Database Centre will be located at ICIMOD. MENRIS/ICIMOD will assist in its establishment, after which HKH Secretariat will manage the facility as its regular activity focusing on capacity building for sound hydrological research and development.

Initially, the centre will be equipped with a latest PC with necessary softwares and a Database Manager who has in depth knowledge on

computer programming, database management and hydrological analyses. In second year, it further will be consolidated with more PC's, ORACLE database and ARC/INFO for GIS database and a person. The CD-ROM production and GIS database short-term consultant will be hired.

Proposal: A separate proposal regarding the development of database for HKH-FRIEND according to the needs required during the project implementation period will also be prepared. The proposal will assess the potentials for developing a more detailed database taking into account the different project activities.

Expenditure	Year I	Year II	Remarks
Inception Meeting	10,000	-	
Staff	18,000	30,000	
Hardware/Software	5,000	10,000	
Communication	2,000	2,000	
Travel	5,000	5,000	
Printing/Publish/Dis	5,000	10,000	(CD-ROM)
seminate			
	2 000	2 000	
Adm.Logistic	2,000	2,000	
Support			Contribution
Workshop/Training		12,000	
workshop/framing	-	12,000	
Contingency 10%	5 000	7 000	
Contingency 10%	5,000	7,000	
TOTAL	52,000	78,000	

#### 5. Finance:

Over a period of two years, the Centre requires a total budget of US\$ 130,000. Administrative logistic support of 4,000 will be contributed by ICIMOD, therefore a total budget of US\$ 126,000 is proposed.

Before the Establishment of the Centre, an inception meeting of the HKH-FRIEND Database Group will be organised to discuss the modus of Operandi. Two day meeting with full board and lodging will cost about US\$ 10,000.

Staff salary for the first year at the rate of 1,500 per month comes to 18,000. About 1,500 needed for data entry will be deducted from the Database Manager's salary. Additional US\$ 12,000 in the second year is for one additional staff and consultant.

Hardware and software includes computers, printers, digitizers and dBASE, ARC/INFO, ORACLE, etc. In first year US\$ 5,000 is spent on hardware and software.

In order to fulfill the capacity building, it is necessary to visit other Database Centres like GRDC to study their archiving systems. Each year about US\$ 5,000 is spent on travel including visits to project site for data collection and verification.

Based upon the protocol set by HKH-FRIEND Steering Committee, data collected at the centre will be disseminated to the scientists. Cost for this in the initial year will be about US\$ 5,000 and US\$ 10,000 for the second year as voluminous data will be produced in CR-ROM.

At the end of second year, a workshop cum training program is held to disseminate the knowledge and information to HKH-FRIEND's different project users. For five-day programme with one each from the HKH countries, the cost will be approximately US\$ 12,000.