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**STATUS AND ROLE OF MOUNTAIN HYDROLOGY
IN THE HINDU KUSH-HIMALAYAN REGION**

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PREFACE

STATUS AND ROLE OF MOUNTAIN HYDROLOGY IN THE HINDU KUSH-HIMALAYAN REGION

The Hindu Kush-Himalayan mountain ranges are the source of some of the major rivers in the world. The mighty Indus River, which flows into the Arabian Sea, and the greater Ganges and Brahmaputra, which flow into the Bay of Bengal, originate in the Himalayas. The Himalayas provide the snow and the glacial meltwater which are the main sources of water for the rivers of the region. The Hindu Kush-Himalayan region is one of the most fragile mountain ranges in the world, and the rapid population growth and the increasing demand for water resources in the region have created a serious threat to the environment. The International Centre for Integrated Mountain Development (ICIMOD) is a unique organization which has been established to promote the sustainable development of the mountain regions of the Hindu Kush-Himalayas. ICIMOD is a joint venture of the Government of Nepal, the Government of India, and the Government of Pakistan. ICIMOD is a member of UNESCO and the International Geosphere and Biosphere Programme (IGBP). ICIMOD is a non-profit organization and its main objective is to promote the sustainable development of the mountain regions of the Hindu Kush-Himalayas. ICIMOD is a member of UNESCO and the International Geosphere and Biosphere Programme (IGBP). ICIMOD is a non-profit organization and its main objective is to promote the sustainable development of the mountain regions of the Hindu Kush-Himalayas.

Although the rivers and the mountains of the Hindu Kush-Himalayas have provided excellent opportunities for the development of water resources, the problems associated with the mountain environment have posed major challenges. The rapid population growth and the increasing demand for water resources in the region have created a serious threat to the environment. The International Centre for Integrated Mountain Development (ICIMOD) is a unique organization which has been established to promote the sustainable development of the mountain regions of the Hindu Kush-Himalayas. ICIMOD is a joint venture of the Government of Nepal, the Government of India, and the Government of Pakistan. ICIMOD is a member of UNESCO and the International Geosphere and Biosphere Programme (IGBP). ICIMOD is a non-profit organization and its main objective is to promote the sustainable development of the mountain regions of the Hindu Kush-Himalayas.

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Furthermore, since the Hindu Kush-Himalayan Range is considered to be one of the most fragile mountain ranges in the world, the other major concern is the deterioration of the mountain environment, studies of the hydrological cycle, water quality, and sedimentation. These are essential for the assessment of any changes and effects.

In order to understand the complex hydrological system in mountain environments, research and development in mountain hydrology is essential. UNESCO and ICIMOD, together with HMG/N, conducted a regional Workshop on the Hydrology of Mountainous Areas from 11-14 December, 1989, in Kathmandu. During the workshop, the keen interest shown by the member countries of the Hindu Kush-Himalayan region was evident.

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PREFACE

The Hindu Kush-Himalayan mountain ranges are the source of some of the major rivers in the world. The mighty Indus River, which flows into the Arabian Sea, and the greater Ganges and Brahmaputra, which flow into the Bay of Bengal, originate in the Himalayas. The Himalayas provide the snow and the glacial-melt waters that keep the rivers perennial throughout the year.

The history of the major civilisations and the economic activities of the Region are closely linked with the waters from these rivers; the most essential resource on earth. As the economies of the countries in this Region are mainly based on agriculture, the management of water resources becomes still more important. Development of the Himalayan rivers is heralded as the key to the economic prosperity of the Region.

Although the rivers and the mountains of the Hindu Kush-Himalayas have provided excellent opportunities for the development of water resources, the problems associated with the mountain environment have posed major challenges; lack of hydrological information and the inability to understand the hydrologic regimes of the river basins being among them.

Furthermore, since the Hindu Kush-Himalayan Range is considered to be one of the most fragile mountain ranges in the world, the other major concern is the deterioration of the mountain environment, studies of the hydrological cycle, water quality, and sedimentation. These are essential for the assessment of any changes and effects.

In order to understand the complex hydrological system in mountain environments, research and development in mountain hydrology is essential. UNESCO and ICIMOD, together with HMG/N, conducted a regional Workshop on the Hydrology of Mountainous Areas from 11-14 December, 1989, in Kathmandu. During the workshop, the keen interest shown by the member countries of the Region for setting up a Regional Working Group has again brought UNESCO and ICIMOD together for the advancement of knowledge in mountain hydrology. This paper is intended to shed light on some important aspects of the understanding and development of mountain hydrology in the Region.

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ABBREVIATIONS

BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
DAP	Development Assistance Programme
DHM	Department of Hydrology & Meteorology, Nepal
ESCAP	Economic and Social Commission for Asia and the Pacific
FREND	Flow Regimes from Experimental and Network Data
GLOF	Glacial Lake Outburst Flood
GEN	Glaciological Expedition of Nepal (Cooperative Research Project between Japan and Nepal)
GTZ	Deutsche Gesellschaft fuer Technische Zusammenarbeit (German Technical Agency)
HMG/N	His Majesty's Government of Nepal
ICIMOD	International Centre for Integrated Mountain Development
IDRC	International Development Research Centre
IH	Institute of Hydrology, Wallingford
IHD	International Hydrological Decade of UNESCO
IHP	International Hydrological Programme of UNESCO
IKP	International Karakoram Project, 1980
IMS	International Mountain Society
LIGG	Lanzhou Institute of Glaciology and Geocryology, China
LRMP	Land Resources' Mapping Project
MAB	Man and Biosphere Programme of UNESCO
NEA	Nepal Electricity Authority
ODA	The Overseas' Development Administration (U.K.)
RWG	Regional Working Group
ROSTSCA	Regional Office of Science and Technology for South Central Asia of UNESCO
SATA	Swiss Association for Technical Assistance
UN	United Nations
UNDP	United Nations' Development Programme
UNEP	United Nations' Environmental Programme
UNESCO	United Nations' Educational, Scientific, and Cultural Organisation
USAID	United States Agency for International Development
WAPDA	Water and Power Development Authority, Pakistan
WECS	Water and Energy Commission Secretariat (Nepal)
WERDP	Water and Energy Resources' Development Project
WISP	WECS/NEA Institutional Support Programme
WMO	World Meteorological Organisation

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