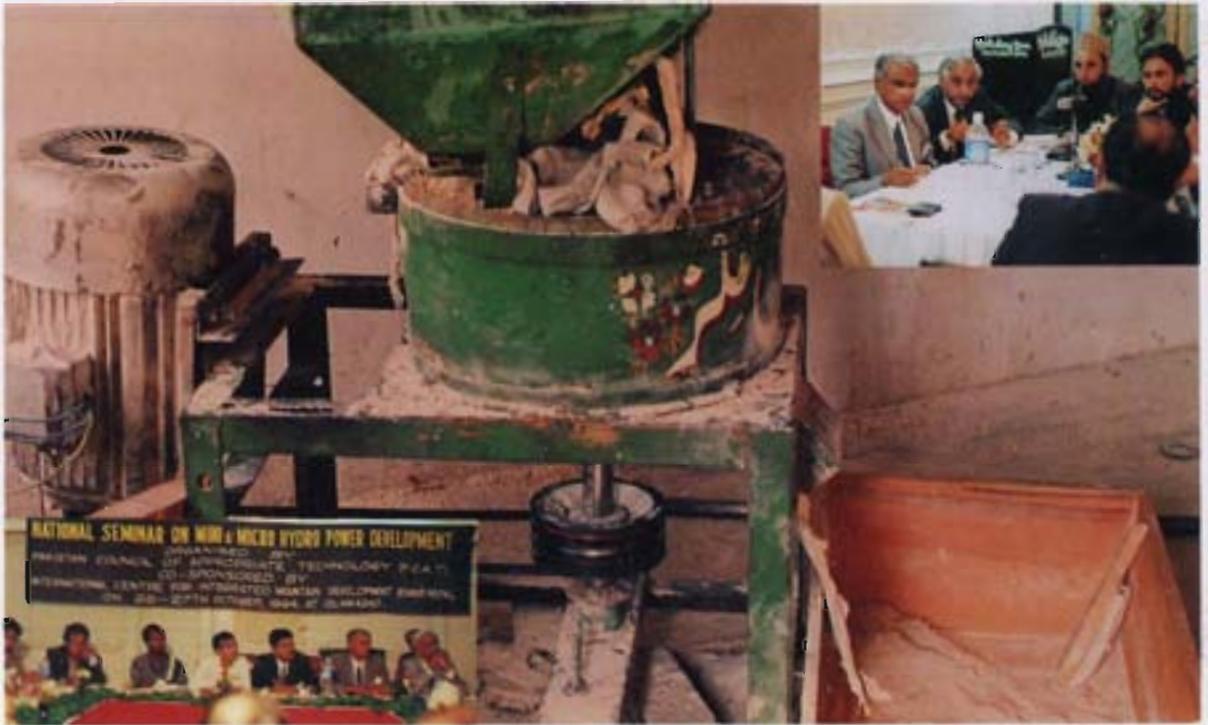




**PROCEEDINGS OF THE
PAKISTAN NATIONAL SEMINAR ON
MINI- AND
MICRO-HYDROPOWER DEVELOPMENT
IN THE
HINDU KUSH-HIMALAYAN REGION**



Edited by Wahaj-us-Siraj

**Organised jointly by
Pakistan Council of Appropriate Technology (PCAT)
Ministry of Science & Technology, Government of Pakistan**

and

**International Centre for Integrated Mountain Development (ICIMOD) Nepal
Islamabad, Pakistan
26-27 October 1994**

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All the important agencies, government as well as non-government, associated with MMHP in Pakistan were represented at the Seminar. Valuable information was presented in the papers and during discussions. The seminar also gave impetus to MMHP promotion and new techniques were learned that could improve specific programme activities.

The seminar was organised in joint collaboration with the Pakistan Council of Appropriate Technology (PCAT) and the Ministry of Science and Technology, Government of Pakistan, who also provided financial support in addition to doing all the groundwork for organising and conducting the Seminar.

Thanks are due to Mr. Zabeer Khan, Chairman PCAT, Mr. G.U. Sarhandi, Secretary PCAT, and a number of other PCAT Staff members. Special thanks go to Mr. Wahaj-uz-Siraj, Assistant Technological Advisor, Ministry of Science and Technology, who worked very hard to make this Seminar a real success. Mr. Siraj also prepared the draft of the Seminar Report.

I hope very much that, with the publication of this report on the Seminar, further initiatives can be undertaken to ensure that locally available hydropower be of direct benefit to economic development and the improved well being of mountain people in remote areas.

Egbert Pelrick
Director General

The Hindu Kush-Himalayas are rich in natural resources, to a large extent still untapped. Most prominent are the water resources and their hydropower potential. While large-and medium-scale hydropower plants have received considerable attention and funding for development at the national level, the remote and inaccessible mountain areas have not benefitted from these developments. A new approach towards decentralised planning and implementation of independent power units is needed, therefore, to make use of the locally available water resources, management skills, and economic opportunities. Throughout the HKH region, mini-and micro-hydropower plants have been established in the past 10-20 years. While in many locations they have met with great success, it has also become clear that many others are facing problems of sustainability. It is also for this reason that in 1993, ICIMOD initiated, with the financial assistance of the Royal Norwegian Government, the project "Design and Testing of a Regional Training Programme on Mini- and Micro-Hydropower Development in the Hindu Kush-Himalayan Region". The project is aimed at strengthening the capacities of the countries of the HKH region in the development of Mini- and Micro-hydropower (MMHP) in order to improve its performance, viability, and impact.

The Pakistan National Seminar on MMHP Development in the HKH Region was organised with the main objective of presenting the information available from the region to a wider audience in a national context, and to discuss ideas and recommend ways of improving local programmes. The seminar also served another important purpose; that of bringing together experts, implementers, decision-makers, planners, entrepreneurs, manufacturers, and others to discuss various issues and establish contacts for mutual future benefit.

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Egbert Pelinck
Director General

LIST OF ABBREVIATIONS

AJK	Azad Jammu & Kashmir
AKRSP	Aga Khan Rural Support Programme
ATDO	Appropriate Technology Development Organisation
CUSEC	Cubic feet per second
D.C.	Direct Current
GTZ	German Agency for Technical Cooperation
HEPO	Hydro Electric Planning Organisation
HKH	Hindu Kush Himalayan Region
HMC	Heavy Mechanical Complex
ICIMOD	International Centre for Integrated Mountain Development
kW	Kilowatt
kWh	Kilowatt-hour
MAF	Million Acre-feet
MHP	Micro - Hydropower
MMHP	Mini/Micro Hydropower
MW	Megawatts
NA-PWD	Northern Areas Public Works Department
NGO	Non-Governmental Organisation
NORAD	Norwegian Agency for Development Cooperation
NWFP	North Western Frontier Province
PAEC	Pakistan Atomic Energy Commission
PARC	Pakistan Agricultural Research Council
PCAT	Pakistan Council of Appropriate Technology
PRs.	Pakistani Rupees (1.00 US\$=30.5 PRs.)
R&D	Research and Development
SHP	Small Hydropower
SHYDO	Sarhadl Hydropower Development Organisation
TWh	Tera watt-hour
VO	Village Organisation
WAPDA	Water and Power Development Authority

As a part of this project, the National Seminar on MMHP Development in Pakistan was jointly organised by the Pakistan Council of Appropriate Technology (PCAT), Ministry of Science and Technology, Government of Pakistan, and ICIMOD. The Seminar was held in Islamabad on the 25th and 27th October, 1994.