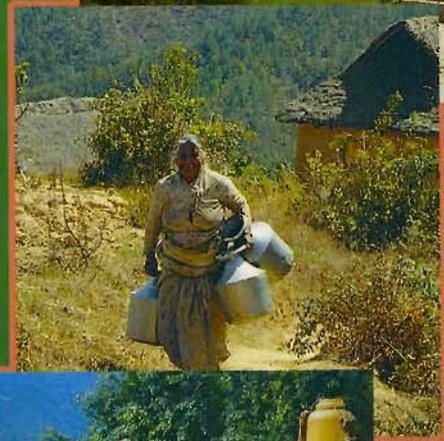


Waters of Life

Perspectives of Water Harvesting in the HKH



Mahesh Banskota
Suresh R. Chalise

Waters of Life

Perspectives of Water Harvesting in the Hindu Kush-Himalayas

Volume II

Proceedings of the Regional Workshop on Local Water Harvesting for Mountain
Households in the Hindu Kush-Himalayas
Kathmandu, March 14-16, 1999

Editors

Mahesh Banskota
Suresh R. Chalise

International Centre for Integrated Mountain Development
Kathmandu, Nepal
2000

Waters of Life

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Cover

- Background* Waterfall close to Khasa near Nepal-China (Tibet) border
Top Right Water brings life to the cold desert, Ladakh, India
Centre An elderly lady walking uphill to fetch water, Bajrapare village,
Kabhrepalanchok, Nepal
Bottom right Little girls with a big burden: children fetching daily water supplies, Tehri
Garhwal, India
Back page Rara Lake, 3,000 masl

Published by

International Centre for Integrated Mountain Development
G. P. O. Box 3226
Kathmandu, Nepal

ISBN 92 9115 104 1

Vol. II 92 9115 121 1

Editorial Team: Greta Mary Rana (Senior Editor)
Dharma R. Maharjan (Technical Support and Layout Design)
Asha K. Thaku (Cartography and Design)

Typesetting at

ICIMOD Publications' Unit

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Foreword

Water is fundamental to the material basis of both life and livelihoods in rural Asia. Water serves a variety of purposes: it is used not only for irrigating the main field crops, but also for domestic needs such as drinking, washing, and bathing and for home gardens, livestock, trees, and other permanent vegetation. Other productive uses include aquaculture, transportation, and small rural enterprises such as brick making. The environmental benefits of water resources include direct uses such as the harvesting of aquatic plants and animals and the immeasurable benefits of biodiversity and maintaining natural ecosystems. Many of the traditional water-harvesting systems have fallen into disuse or have been forgotten, replaced by 'modern' structures and systems that have failed to meet the expectations and demands of growing populations. Water scarcity affects the rural household, economy, and environment in multifarious ways, resulting in hardships such as the necessity of carrying heavy pots of water several kilometres every day to meet household needs; the destitution of farmers and their families who lose their lands, or of the landless who lose their jobs because of lack of water for irrigation; the loss of wetlands and estuaries because of water depletion upstream; and increasing health problems caused by water-borne diseases and pollution. Inequitable access and a distribution system skewed in favour of the urban, rich and powerful further compound the problem of absolute scarcity, especially for the poor and the disadvantaged.

Concomitantly with growing scarcity, competition over water among various uses and users is intensifying, both within and between sectors. Demands for water supplies for agriculture, households, and industry have escalated dramatically in recent decades. Increasingly, wetlands, rivers, and estuaries that support wildlife and vegetation are being threatened by water transfer and shortage. While water for irrigation remains critical for food production and rural incomes, farmers must compete for the resource among themselves and with rapidly growing industrial, domestic, and urban demands for water. In the competition for water, industrial and urban needs typically receive priority over agriculture and irrigation, which in turn are favoured over domestic uses (generally considered the domain of women) or ecosystem needs. 'Environment versus development' dilemmas over water have led to conflicts and struggles related to large dams, industrial pollution, chemical runoff from agriculture, and aquaculture, among other issues. Often, as water resources have fallen under centralized and state control through bureaucracies, policies, and legal instruments, communities have had to struggle to maintain their rights, customary local practices, and livelihoods. With towns and industries making more and more claims on the water currently used in rural areas, the rural poor and marginalised groups have little means to defend their rights to water and are unlikely to even gain a seat at the table in discussions about the best way to manage diminishing water resources.

Simultaneously, a better understanding by the public and policy-makers of resource limits and the urgency of taking effective action to meet the challenge is needed. In the face of increasing water scarcity and competitive demands on water, water security will be increasingly linked to poverty eradication, governance, and conflict resolution. In the meantime, rapidly evolving water markets are establishing their own means of rationing water in many parts of Asia. Water is increasingly being treated as a commodity to facilitate mobility between competing demands and purchasing capacities; in short, going to those who have the ability and willingness to pay. But treating water as a commodity may only

further marginalise the weaker sections of society who have minimal purchasing capacity and are unable to defend their prior use of water. Water is imbued with deep cultural significance all over the world, especially in rural Asia. Conflicts over water evoke meanings and images that go beyond the physical attributes of water. After all, denial of access to water is ultimately denial of life itself.

ICIMOD must be commended for bringing out these two volumes on the significance and the diversity of water-harvesting technologies and institutions governing them. Apart from the publication of these volumes, ICIMOD has been instrumental in bringing people and institutions from different countries together to share their experiences of the dynamics of policies and practices revolving around water-harvesting structures and the local economy. In pursuing this interest on a vital resource for livelihoods in the Hindu Kush mountains, we hope that the further research and programme activities of ICIMOD will seek to enhance and sustain the role and voice of local communities in governing these community assets and also continue to identify policies, practices, movements, and institutional capacities that increase disadvantaged people's access and control over water resources.

Ujjwal Pradhan
Ford Foundation
New Delhi

March 2000

ISBN

978-81-16-1011-1

978-81-16-1011-2

978-81-16-1011-3

978-81-16-1011-4

978-81-16-1011-5

978-81-16-1011-6

978-81-16-1011-7

978-81-16-1011-8

978-81-16-1011-9

978-81-16-1011-0

978-81-16-1011-1

978-81-16-1011-2

978-81-16-1011-3

978-81-16-1011-4

Preface

A commonly held notion about mountain areas is that these are all plentifully endowed with water, and mountain communities should not be facing too much difficulty in accessing needed water supplies. These two volumes, discussing efforts by local communities to harness water resources for drinking and agriculture, show clearly that plentiful endowment does not necessarily mean it is readily available. Water for the settlements and fields of mountain households had become increasingly scarce. Tapping more distant sources has many technical, environmental, and socio-institutional implications as the discussions in these two volumes indicate.

ICIMOD's main objective in bringing out two volumes on water harvesting is first to close some of the continuing knowledge gaps about the use of resources by mountain communities. It is hoped that by a better understanding of prevailing practices it will contribute towards the development of sustainable systems in the future. Another important reason is that this is also the year of the World Water Vision and it would be a gross oversight if mountain communities did not have a place in this vision. We hope this small contribution will help in this direction.

ICIMOD is very grateful to the Ford Foundation for supporting the water harvesting programme of the Centre which has made this review work possible. The contributions of all the national and local organisations, including the authors of the various papers and case studies, are also highly appreciated. Dr. M. Banskota, Deputy Director General and Professor S. R. Chalise, Water Resources' Specialist, planned the outline and contents of these documents and ensured that all critical issues were covered. Obviously much more can be said about important topics like water and mountain communities. This is only a small step forward towards improving our understanding about water harvesting at community level in the Hindu Kush-Himalayas. ICIMOD is looking forward to taking the next steps that should include, in particular, capacity building in local planning and management of water-harvesting systems.

Abstract **edgements**

The Hindu Kush-Himalayas (HKH) are the largest storehouse of the fresh water in the lower latitudes and as such are important water towers for nearly 500 million people. They are the source of major river systems: the Indus, the Ganges, the Yarlung-Tsangpo, the Brahmaputra, the Nu-Salween, the Yangtze, and the Mekong. Also called the 'Third Pole' they contain the largest mass of ice and snow outside the earth's polar regions. Located at the highest elevations on earth, with the permanent snowline at about 5,000 m, the mountain peaks of the HKH extend close to 9,000 m. These peaks contain many glaciers, including some of the longest outside the polar regions. Availability of water at such great heights has also made human life possible at higher elevations than elsewhere, with human settlements beyond even 4,000 m and temporary and seasonal settlements with unique cultures and traditions even close to 6,000 m. The extreme variability of climate and precipitation and patterns, as well as extremely inadequate knowledge on the hydrology of the HKH rivers and streams and the complex interrelationships between ecology and hydrology in the region impose serious scientific and technical limitations on the development of HKH waters. This two-volume document discusses the methods of harvesting water throughout the HKH mountains amongst a wide variety of human groups, focussing on the efforts being made by local communities for harvesting water. Many of the older systems are breaking down while newer ones supported by government and development organisations are limited. A concerted effort is needed to improve existing systems through community participation while at the same time expanding new systems.

Acknowledgements

The editors wish to thank all the contributors to this volume. Dr. Prachanda Pradhan, Institution Specialist, Kathmandu, and Mr. Saleem A. Sial, Assistant Coordinator, Water Harvesting Project, ICIMOD, were responsible for reviewing the papers and we are extremely grateful to both of them. Thanks are also due to several other colleagues in ICIMOD who have helped us during review of the first drafts of the reports.

This publication would not have been possible without the support of our colleagues from the Information, Communication and Outreach Division (ICOD) of ICIMOD. Special thanks are due to Ms Greta Rana, Senior Editor, ICOD, for copy editing. The editors are also thankful to Mr Dharma R. Maharjan and Mr A. K. Thaku, both of ICOD, for their layout and design and cartographic and art work respectively. Ms Sarita Joshi, Secretary MNR Division, ICIMOD, also deserves special thanks for her patience and secretarial support.

This publication would not have been possible without the continuous support of the Ford Foundation which also provided financial support for the Water Harvesting Project of ICIMOD and for printing this volume. We are particularly thankful to Dr. Ujwal Pradhan, Programme Officer, Ford Foundation, New Delhi Office, for his encouragement.

DWSSCC	District Water Supply Coordination Committee
DWSS	Department of Water Supply and Sanitation
Suresh R. Chalise	
Mahesh Banskota	
FINNIDA	Finnish International Development Agency
FMIS	Former Managed Irrigation System
FRIEND	Flow Regimes from International Experimental and Network Data
FYP	Five Year Plan
HLYV	High Yielding Variety
GIS	Geographic Information Systems
GLCF	Glacial Lake Outburst Flood
HDPE	High density polyethane
Hh	Household
UKH	Hindu Kush-Himalayas
UKH-FRIEND	Hindu Kush-Himalayan Flow Regimes from International Experimental and Network Data
HMG/N	His Majesty's Government of Nepal
HVV	High Yielding Variety
IARDA	International Centre for Agricultural Research in Dry Areas
ICIMOD	International Centre for Integrated Mountain Development
IUE	International University for Environmental Studies
IHP	International Hydrological Programme
IIDS	Institute for Integrated Development Studies
ILO	International Labour Organisation
INGO	International Non-Governmental Organisation

Acronyms

ADB/N	:	Asian Development Bank, Nepal
ARWSP	:	Accelerated Rural Water Supply Programme
AZRI	:	Arid Zone Research Institute
BOARD	:	Rural Water Supply and Sanitation Fund Development Board
BWMP	:	Bagmati Watershed Management Project
CAPART	:	Council for Advancement of People's Action and Rural Technology
CBO	:	Community Based Organisation
CDO	:	Chief District Officer
CGI	:	Corrugated Galvanized Iron
CIDA	:	Canadian International Development Agency
CSWCRTI	:	Central Soil and Water Conservation Research and Training Institute
DDC	:	District Development Committee
DPAP	:	Drought Prone Area Programme
DSCWM	:	Department of Soil Conservation and Watershed Management
DWRC	:	District Water Resources Committee
DWSCC	:	District Water Supply Coordination Committee
DWSS	:	Department of Water Supply and Sanitation
FIFO	:	first-in-first-out
FINNIDA	:	Finnish International Development Agency
FMIS	:	Farmer Managed Irrigation System
FRIEND	:	Flow Regimes from International Experimental and Network Data
FYP	:	Five Year Plan
HYV	:	High Yielding Variety
GIS	:	Geographic Information Systems
GLOF	:	Glacial Lake Outburst Flood
HDPE	:	High density polyethylene
HH	:	Household
HKH	:	Hindu Kush-Himalayas
HKH-FRIEND	:	Hindu Kush-Himalayan Flow Regimes from International Experimental and Network Data
HMG/N	:	His Majesty's Government of Nepal
HYV	:	High Yielding Variety
ICARDA	:	International Centre for Agricultural Research in Dry Areas
ICIMOD	:	International Centre for Integrated Mountain Development
IDE	:	International Development Enterprise
IHP	:	International Hydrological Programme
IIDS	:	Institute for Integrated Development Studies
ILO	:	International Labour Organisation
INGO	:	International Non-Governmental Organisation

INSAN	:	Institute for Sustainable Agriculture
IRDP	:	Integrated Rural Watershed Development Programme
IP	:	Irrigation Policy
IPCC	:	Intergovernmental Panel on Climate Change
IWDP	:	Integrated Watershed Development Programme
JRY	:	Jawahar Rojgar Yojna - A centrally-sponsored rural employment generating scheme
LDPE	:	Low Density Poly Ethylene
lps	:	litres per second
LWHS	:	Local Water Harvesting Systems
MLD	:	Ministry of Local Development
MOWR/DOI	:	Ministry of Water Resources/Department of Irrigation
NGO	:	Non-Governmental Organisation
NWDPR	:	National Watershed Development Programme for Rainfed Agriculture
NWFP	:	North West Frontier Province
NWSC	:	Nepal Water Supply and Sanitation Corporation
O and M	:	Operation and Maintenance
PARAG	:	A Cooperative Dairy Development Organization
PARK	:	Pakistan Agricultural Research Council
PCRWR	:	Pakistan Council of Research in Water Resources
PIM	:	Participatory Irrigation Management
R and D	:	Research and Development
REFRESHA	:	Regional Flow Regime Estimation for Small Hydropower Agreement
RWHU	:	Rain water Harvesting and Utilisation
RWSSP/F	:	Rural Water Supply and Sanitation Project/FINNIDA,
SAARC	:	South Asian Association for Regional Cooperation
SAPPROS	:	Support Activities for the Poor Producers of Nepal
SAPROS	:	An NGO based in Kathmandu
SC	:	Scheduled Castes
SLR	:	Standard lactometer reading
ST	:	Scheduled Tribes
SWC	:	Social Welfare Council
UDLE	:	Urban Development through Local Efforts
UG	:	User Groups
UNESCO	:	United Nations Educational Scientific and Cultural Organisation
VDC	:	Village Development Committee
WARM	:	Water Resources' Management
WECS	:	Water and Energy Commission Secretariat
WHS	:	Water-harvesting Systems

- WHO** : World Health Organization
- WMO** : World Meteorology Organisation
- WUA** : Water Users' Association
- WUC** : Water Users' Committee

	: A system in which farmers take turns to graze cattle
	: sloping terraces
	: Market commercial centre
	: sharing of labour
	: People of Tibetan origin
	: Low voltage cookers
	: ephemeral lower order streams
	: manure from the latrine
	: traditional dry latrine
<i>tsamchen</i>	: A Buddhist festival
<i>chirigam</i>	: village irrigation overcast
<i>tsong</i>	: A small reservoir or tank
<i>tsongpa</i>	: The title of a person who assists the gampo in the traditional irrigation organization
<i>tsongpa</i>	: water
<i>chamuk</i>	: spring
<i>chyantra</i>	: A kind of mountain goat
<i>chucur</i>	: measure of water for sharing
<i>cropping intensity</i>	: percentage of gross cropped area to net cropped area in a year
<i>dhar</i>	: ridge line
<i>dhara</i>	: a spring of freely falling water
<i>diggi</i>	: local potential water course
<i>dalchu</i>	: the irrigation of a field when seedling have transplanted
<i>dao</i>	: large cross terraces with small ones

Glossary of Local Terms Used in This Case Study

<i>bares</i>	:	A system in which families take turns to graze cattle.
<i>bari</i>	:	sloping terraces
<i>bazar</i>	:	Market, commercial centre
<i>bes</i>	:	sharing of labour
<i>Bhotia-Gurung</i>	:	People of Tibetan origin
<i>bijuli dekchi</i>	:	Low wattage cookers
<i>bolla/rolla/gadni</i>	:	ephemeral lower order streams
<i>chakluth</i>	:	manure from the latrine
<i>chaksa</i>	:	traditional dry latrine
<i>chartung</i>	:	A Buddhist festival
<i>chhrupon</i>	:	village irrigation overseer
<i>ching</i>	:	A small reservoir or tank
<i>chowa</i>	:	The title of a person who assists the <i>gempa</i> in the traditional village organization
<i>chu</i>	:	water
<i>chumik</i>	:	spring
<i>chyangra</i>	:	A kind of mountain goat
<i>chyure</i>	:	measure of water for sharing
<i>cropping intensity</i>	:	percentage of gross cropped area to net cropped area in a year
<i>dhar</i>	:	ridge line
<i>dhara</i>	:	a spring of freely falling water
<i>diggi</i>	:	tank plastered with cement
<i>dolchu</i>	:	first irrigation of a field when seedlings have appeared.
<i>dzo</i>	:	male cross between a yak and a cow
<i>dzopa/dzo</i>	:	cross-breed between yak and local lulu cow
<i>gad</i>	:	higher order perennial streams
<i>gempa</i>	:	Chairperson
<i>Gram Sabha</i>	:	Village assembly
<i>guhl</i>	:	small water channel
<i>hauzi/hauz</i>	:	water storage tank
<i>Jhuma</i>	:	Buddhist nun
<i>ka (rka)</i>	:	sluice, a gap in the yura
<i>ka-do (rka-do)</i>	:	boulder to open/close the sluice
<i>Khampa</i>	:	Tibetan refugee, followers of the Dalai Lama from the province of Kham in Tibet
<i>kharif</i>	:	rainy season
<i>kharka</i>	:	Alpine pasture
<i>khet</i>	:	irrigated level terrace land
<i>khola</i>	:	stream

<i>la</i>	:	a pass on a mountain or road
<i>lah</i>	:	deity
<i>lah-lchang</i>	:	tree dedicated to lah
<i>lang-de</i>	:	sharing of dzo for ploughing
<i>la-tho</i>	:	structure in which a lah is believed to reside
<i>lekh</i>	:	high altitude area (cliff)
<i>lorapa</i>	:	village official who prevents animals from damaging crops
<i>Losar</i>	:	New Year
<i>Lo-shar</i>	:	Tibetan Buddhist New Year festival, celebrated also in this area
<i>lu</i>	:	serpent, nag
<i>lu-bang</i>	:	structure in which a lu is believed to reside
<i>lulu</i>	:	local breed of cow
<i>masyang</i>	:	a kind of local bean
<i>naula</i>	:	Shallow subterranean water source
<i>pakho</i>	:	(rainfed slope lands).
<i>Panchayat (village)</i>	:	Assembly of elected rural representatives
<i>Pani Panchayat</i>	:	Water users' society
<i>para</i>	:	A dice marked from one to six
<i>pathi</i>	:	A measure of volume
<i>Pradhan (Village)</i>	:	Head of village assembly
<i>rabi</i>	:	winter season
<i>satwara</i>	:	mutual exchange of land
<i>soyam</i>	:	forest land with open access resources, it is no-one's property.
<i>Swajal Yojna</i>	:	drinking water and sanitation scheme
<i>thok</i>	:	joint ancestral landholdings.
<i>yura</i>	:	water channel
<i>Yuwak Mangal Dal</i>	:	Village youth welfare group
<i>zamindari</i>	:	feudal landlord system

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