

Climate change and development in the mountains of Nepal



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Chapters 1 – 4

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Preface

This is a free access publication. It is an introduction to climate change in the Himalayas focussing upon Nepal, a country where millions of hill farmers are faced with a rapidly changing climate that is already impacting upon their well being. Climate change is already affecting many countries at lower latitudes. Many parts of the Himalayas have the additional problems that warming appears to be increasing with altitude. When I started to study these intractable and complex problems, there appeared to be no general background from which more detailed study could be developed. Reports issued by intergovernmental organisations frequently seemed to have a predetermined agenda which failed to take account of the wider picture. The late arrival in 2010 of Nepal's National Adaptation Programme of Action to Climate Change (NAPA) called for the integration of climate change policy in every step of development.

The Glacier Trust is a non-governmental organisation (NGO) dedicated to promoting adaptation strategies to climate change in Nepal, very much sharing the NAPA objectives. Yet unless the underlying problems are better understood, interventions will invariably have the potential to make matters worse as 'climate change' becomes the new mantra of development. There is a strong need for the subject to be developed within Nepali university curricula, so that post graduate students can work effectively in government and in NGOs.

Therefore the necessity of producing background information in an easily accessible form for those with or without a scientific background seemed both obvious and urgent. Initially, the process involved reading and digesting some hundreds of peer reviewed papers and reports from international and governmental organisations besides those issued by NGOs. But such a literature-based approach carries an inherent danger of building the wrong picture from the available pieces of mosaic. Furthermore, it should be remembered that in Nepal's Himalayas, the majority of scientific research has been carried out in the more easily accessible (predominantly central and eastern) parts, which means that the remoter (predominantly western and north-western) parts of the country are generally under-represented in academic papers. Criticisms and suggestions are always welcome and may be sent to enquiries@theglaciertrust.org where they will be carefully considered for inclusion in periodic updates.

No attempt is made here to describe the wider debate about the causes and potential global effects of atmospheric warming. The (United States) National Academy of Sciences published an accessible summary of these issues, 'Climate Change Science: an analysis of some key questions' in 2001 for a White House briefing. This is available at http://www.nap.edu/catalog.php?record_id=10139 which can be downloaded free as a PDF. The briefing is unreferenced and only discusses climate change in terms of greenhouse gasses and does not consider the effects of climate change in global terms. Nevertheless it seems to have been taken on board by President Clinton and may be regarded as helpful background reading for those new to the subject. A more scientific view of the subject can be gained from Andrew Dessler's *Introduction to modern climate change*, Cambridge, 2012.

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Acronyms, abbreviations & measurements

ABC	Atmospheric brown cloud
ADW	Altitude dependent warming
AOD	Aerial optical density
asl	Above sea level
BS (or VS)	= Bikram Sambat (sambat = calendar); subtract 56.7 years to equate to CE/BCE
CCN	Cloud condensation nuclei
DHM	[Nepal's] Department of Hydrology and Meteorology
DTR	Diurnal temperature range
EHP	Enhanced heat pump <i>or</i> Enhanced heat pump
ENSO	El Niño southern oscillation
FAO	[United Nations] Food and Agriculture Organisation
FECOFUN	Federation of Community Forest Users, Nepal
FUG	Forest user group
FYC	Farm yard compost
GDP	Gross domestic product
GHG	Green house gass
GLOF	Glacier lake outburst flood
HKH	Hindu Kush-Himalayas
ICIMOD	International Centre for Integrated Mountain Development
ICTZ	Inter tropical convergence zone
IGP	Indo-Gangetic plain
IOD	Indian Ocean diapole

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IPCC	Intergovernmental Panel on Climate Change
ISCT	Improved soil conservation technology
ISO	Intra seasonal oscillation
ISV	Intra seasonal variability
UIB	Upper Indus Basin
LRMP	[Canadian sponsored] Land Resources Mapping Project
MAT	Mean annual temperature
NAPA	National Adaptation Programme of Action to Climate Change
NGO	Non governmental organisation
NPK	Nitrogen phosphorous potassium
OECD	Organisation of Economic Cooperation and Development
pH	potenz Hydrogen: a log scale for measuring acidity/alkalinity of soils where 7 is neutral, < 7 acidic, >7 alkaline
Ropani	=1/8 acre or 508.72m ² (usually given as 500m ²) or 1/20 ha
SST	Sea surface temperature
TEK	Traditional ecological knowledge
Tmax	Mean of maximum temperatures
Tmin	Mean of minimum temperatures
TP	Tibetan Plateau
UV	Ultra violet
VDC	Village development committee
VS	See BS
WD	Westerly disturbances