

# Responding to challenges in the Hindu Kush

**Dr David Molden**, Director General, International Centre for Integrated Mountain Development

## The Hindu Kush Himalayas – an arc of mountains stretching from Afghanistan, through Pakistan, China, India, Nepal,

Bhutan, and Bangladesh, clear to Myanmar – are a gift to Asia, and the world. They are a well-known destination for those seeking adventure, spirituality, recreation, and biological and cultural diversity. However, as the source of ten major Asian rivers, the Hindu Kush Himalayas also act as the water towers of Asia, supplying vital water resources to over 1.3 billion people. These rivers not only provide freshwater to the region, they also feed the demands of a rapidly growing Asian population for energy and food. The plains of these great rivers – the breadbasket of Asia – feed over three billion people. Sustainably tapping the

region's huge hydropower potential as a source of clean energy will also be increasingly important to fuel growing economies.

However, there are disturbing signals coming from the mountains. And given Asia's high dependence on the mountains for water, energy, and food, there is reason for concern.

Melting glaciers are a major signal of climate change in the Himalayas, as in other parts of the world. Mountain glaciers are shrinking, some quite rapidly in recent decades. Air pollution from the plains is finding its way up to the high mountains, leaving soot on white snowfields, causing increased melt in addition to affecting the health of local residents along its path.

Given the importance of water to the region, knowing what will happen to glaciers and water supply is of critical importance.

There are about 56,000 glaciers in the region containing about 6,000km<sup>3</sup> of water stored as ice – enough water to feed global annual irrigation water needs about two times over. The story of these glaciers, which has important implications for future water availability, is beginning to unfold as we collect more data. However, we still have large knowledge gaps to fill. Mountains also play a role in regulating monsoon patterns. With changes in temperature, how will monsoon patterns change, and what does this mean for future food and energy security? And how will people adapt to such changes?

Initial research results suggest that over the next decades the amount of water reaching rivers will increase because of enhanced glacier and snow melt. However, after that the contribution from snow and glaciers will decrease, affecting communities in parts of the region, like the Indus River basin, that are heavily dependent on snow and glacier melt. Climate models also project an increase in annual precipitation and, in balance, the annual amount of flow may not change dramatically in other basins.

In addition to uncertainty about future water availability, mountain communities are also experiencing trends of more intense rains and more drought periods, which may be of greater concern and require more immediate, short-term action than melting glaciers. Floods across Nepal in 2014, the huge event in Uttarakhand, India in 2013, and the mega-flood in Pakistan in 2008, as well as numerous other flood

and landslide events, are wreaking havoc on the livelihoods of people in the mountains and the plains, and every year during monsoon we wonder when and where the next disaster will hit.

The resilience of mountain people, living in incredibly harsh environments, is unmatched, and has been tested over centuries. Yet one wonders whether limits are being reached.

At the International Centre for Integrated Mountain Development, we are working to better understand the impacts of changes in the mountains of the Hindu Kush Himalayas to

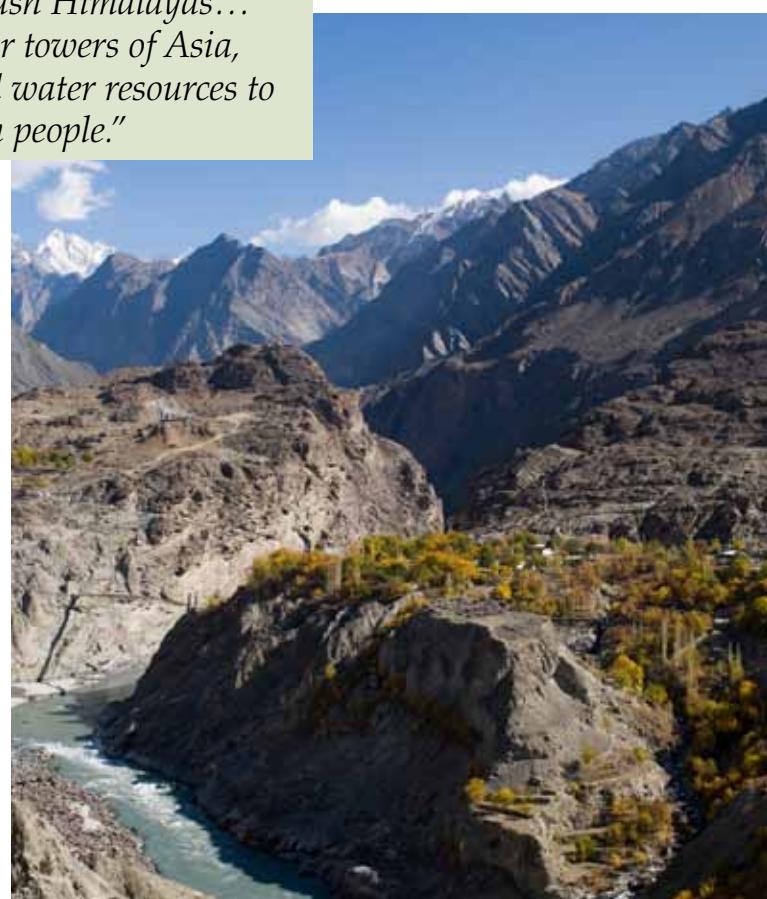
support sustainable mountain development and the resilience of mountain communities. We do this through knowledge generation and sharing and promoting regional co-operation between countries, between people in the region, and with those who share our love of mountains.

We are all drawn closer by globalisation and climate change. Changes in water supply and rainfall patterns in the Hindu Kush Himalayas, and the resulting impact on food production for example, will have global repercussions. Each day we are in a race against time, in the face of rapid change – not only climate change, but also economic and social change. For wise and sustainable use of resources, for peace and prosperity, attention to the mountains will go a long way.

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Nilgiri Himal, Mustang District, Nepal.



Skardu Valley, Pakistan.