

Moving a Whole Village as a Last Resort

Diminished snowfall – a prominent example of climate change impacts – can lead to altered hydrological regimes with serious consequences, particularly in catchments that strongly depend on runoff from snow-melt. For several villages in Upper Mustang, Nepal, this is a harsh reality. Rivers are running dry, and the villages may be forced to move as a result.

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Relocation site (lower left part of the picture). Since the plain lies 40–80 m above the main rivers and is delineated by steep slopes, water supplies cannot be accessed by the traditional means of open earthen channels (D. Bernet)

Upper Mustang is a high valley in Nepal, bordering the Tibet Autonomous Region, China, to the north, and shaped by the Kali Gandaki, a tributary of the Ganga River. In the south, the river has carved out the world's deepest gorge between the main Himalayan ranges, featuring mountains over 8 000 m high, such as Annapurna and Dhaulagiri. These ranges serve as a sort of moisture barrier, separating one of Nepal's wettest regions from one of its driest (Table 2.3 and Figure 2.13).

Nothing can be cultivated without irrigation in the desert-like conditions found in Upper Mustang. Aside from practising pastoralism, most of the valley's several thousand inhabitants carve out livelihoods through subsistence cultivation of grains [1]. The villagers depend directly on perennial rivers, which they use to irrigate their fields. While glacier-fed rivers may remain stable water sources, at least for the next few decades, the few villages that depend on snow-fed rivers are already struggling, and the future does not look bright.

Tucked away in a side valley lies Dheye, one of the affected villages. Water supplies in Dheye appear to depend on snowfall. However, the available data are sparse. Predictions rely on global climate change studies, which predict above-average warming in the region. Rising temperatures imply diminished snowfall as well as spatially and temporally reduced snow cover, which would lead to earlier, more erratic runoff [2].





Figure 2.13. Locations of the meteorological stations listed in Table 2.3, in addition to the current location of Dheye and the planned relocation site, Thangchung. The green and blue lines indicate the respective hydrological catchments. Source: Google Earth Pro (accessed on 25 August 2014)

A villager's view of climate change:

"In the past, there were heavy snowfalls and enough water. But things have changed – it now snows less and the precipitation has become erratic."

Pasang Gurung, farmer from Dheye

At present, local villagers try to divert every drop of river water onto their fields. Even so, many fields have already been abandoned. Ten of the 24 local households have already moved to different locations, one going as far as India. Lack of irrigation water is the main concern of the 14 remaining households (Figure 2.14). As a last resort, the remaining villagers of Dheye have decided to move the entire village to a small plain they own in the main valley, at a slight elevation, which overlooks the confluence of three glacier-fed rivers. The catchment area at the relocation site measures about 363 km², and 12 percent of it is still glaciated, promising a reliable water source for the next few decades at least [2].

Station	Station's altitude [m]	Mean annual precipitation [mm]	Incomplete/complete annual records
(1) Lumle	1 740	5 534	0 / 26
(2) Lete	2 384	1 421	3 / 23
(3) Thakmarpha	2 566	403	3 / 23
(4) Jomsom	2 744	268	1 / 25
(5) Ghami	3 465	116	7 / 19
(6) Lo-Manthang	3 705	174	17 / 9

Table 2.3. Annual precipitation sums (average of complete annual records) of the meteorological stations south of Mustang District (1) and in Mustang District (2–6), based on data records from the Department of Hydrology and Meteorology, Nepal, from 1985 to 2010



Although the villagers abstract nearly all the water from the streamlet nearby, it is frequently insufficient to irrigate their fields (D. Bernet)

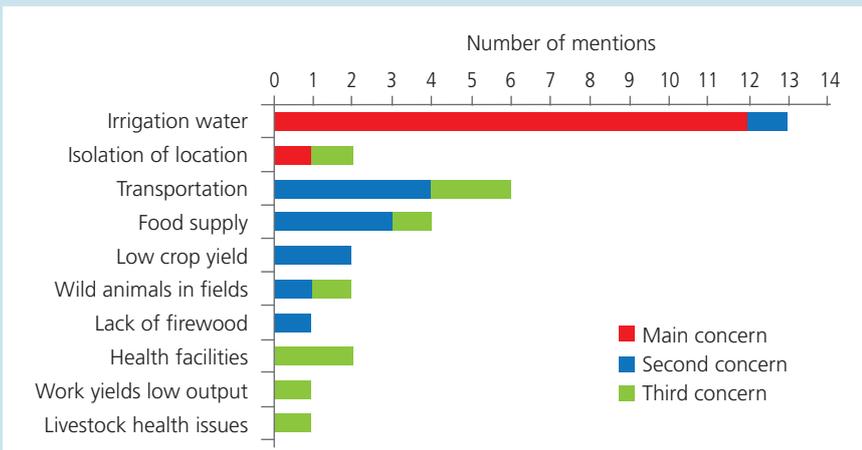


Figure 2.14. The main issues of concern identified by the 14 remaining households in Dheye, and ranked by importance. Note that one household abstained from choosing and three families identified fewer than three main issues

An interdisciplinary team led by the Swiss NGO Kam For Sud sought to assess whether Dheye's inhabitants could use certain measures to sustain their livelihoods at their current location, or if it was better to relocate. After analysing a wide range of factors, the team concluded it was better to move the village [2]. Low-tech external support measures were also proposed to solve irrigation and drinking-water supply issues (at the relocation site) that the villagers could not solve using traditional methods [3].

Lessons learned

- Diminished snowfall due to climate change can have major impacts on hydrological regimes, threatening the livelihoods of people who rely on affected bodies of water.
- The case of the village of Dheye illustrates how the world's poorest communities often suffer the most from the effects of climate change, though they have contributed the least to its causes.