On the geopolitics of managing glacial hazards

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The physical processes involved in mountain hazards can be studied scientifically. The determination of vulnerability arising from hazards posed is more complex; while it involves mapping what lies within a potential flood area, which is relatively straight forward, it also requires an estimation of the flood characteristics – breach mechanism, rise to peak flood, peak volume(s), flood duration, flood characteristics (as indicated in a flood hydrograph, for instance). Modelling of Glacial Lake Outburst Floods has hitherto been a very hit and miss exercise, and mostly hugely misleading. Two reasons why GLOF modelling has been so unsuccessful in the past has been the lack of knowledge of the breach mechanism (and the specific events leading to moraine failure) and the inappropriateness of the flood model algorithms. However, significant advances have been made recently in GLOF modelling.

Subjective and emotive warnings of imminent GLOFs, where no GLOF has ensued, have led to an increasing anger and scepticism within local communities downstream of glacial lakes perceived to be 'hazardous'. Furthermore, there is also a risk of legal blight, where property values fall as a consequence of warnings of potential inundation from a GLOF. There is a great challenge, therefore, for the scientific community to be responsible in making announcements to the public and to consider possible unintended consequences.

The perception of unacceptable risk also affects major investors considering funding major infrastructure projects such as hydropower schemes. Where errant and irresponsible claims are made, potential investors may be dissuaded from considering projects, which can have a significant impact not just on a single hydropower project and on the communities that could benefit from such investment but also on national governments. The impacts can be scaled upwards from local considerations, through to national and international considerations.

It is therefore essential that there is far greater integration between the objective assessment of glacial hazards and considerations of the management of those hazards. There are important socio-economic, humanitarian and political considerations to be made. There must be a far greater debate about the geopolitical management of mountain risks (not just glacial hazards) between physical and social scientists, local communities, local and national government, iNGOs, and international agencies (such as those within the United Nations) and international development banks. Failure to hold such dialogue will result in vital but limited resources being squandered on projects that are perceived erroneously to be the highest priority or potential major investment being lost. Focus may also be diverted away from where the real priorities lie. There is already significant evidence of this having happened in Bhutan and Nepal, for example. Ultimately, if action is not undertaken in the cases where glacial lakes pose a demonstrable and significant hazard, potentially lives will be lost, there will be major impact on downstream communities and infrastructure with possible international consequences.