

be sought for any evaluation process³, and software may even be developed to make such information available along with the presently available list of citing papers. Support should follow accordingly to ensure that the pattern of our nation's funding supports 'highly novel' or at least, 'moderately novel' research;

rather than the current scenario where it is being mainly diverted towards 'supportive' or 'confirmatory' research.

1. Chaddah, P., *Curr. Sci.*, 2014, **106**, 1337–1338.
2. Stephan, P., Veugelers, R. and Wang, J., *Nature*, 2017, **544**, 411–412.

3. Chaddah, P., *Curr. Sci.*, 2013, **104**, 405.

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Vulnerability to climate change: differential perception amongst the livestock dependents of coastal and alpine region

Climate change has a negative impact across the globe, as highlighted by the Intergovernmental Panel on Climate Change (IPCC) in several reports. Further, it is well-recognized by the scientific fraternity that the mountain and coastal ecosystems will be severely affected due to climate change. Our coastal and alpine regions are no exception to the negative impact of climate change. Not only the Himalayan glaciers, but flora, fauna and people who depend on the Himalaya will also be adversely affected. A unique fauna of the Himalaya, i.e. the yak (*Poephagus grunniens* L.), happens to be the source of livelihood for thousands of highlanders living at 3000 m amsl and above, where crop farming is virtually non-existent. I had an opportunity to meet the yak herders, who are transhumance pastoralists of Arunachal Pradesh and Sikkim. During our informal discussions, issues related to climate change were raised. I was astonished to learn about their perceived observations on climate change. Pastoralists were satisfied with the present changing climatic scenario, as they felt that they were getting better remuneration from livestock rearing, due to extension of the production period by 1–2 months because of availability of flush green grass as a result of shorter and warmer winters, less snowfall and hard ice. They also mentioned that mid altitude (between 2000 and 3000 m amsl) was too low for yak and too high for cattle. Therefore, they were utilizing the mid altitude pastures for rearing *Dzomo* (female yak–cattle hybrid).

People from the coastal regions are affected by frequent tropical cyclones,

floods, and extremely heavy rainfall each year. They are also affected by the continuous decrease in production and productivity of their milch animals due to non-availability of forage grass, as forage lands are inundated by brackish water due to the tropical cyclones.

Thus transhumance pastoralists of the alpine region perceive the changing climatic scenario as a 'boon', whereas their counterparts from the coastal regions perceive it as a 'bane'. This differential perception prompted me to determine the societal vulnerability of a representative sample of 720 livestock-dependent communities from both the regions using the principle of IPCC. [IPCC defines vulnerability (V) as a function of adaptive capacity (AC), exposure (E) and sensitivity (S): $V = AC - (E + S)$]. The average vulnerability score of the transhumance pastoralists was positive, while it was negative in case of coastal livestock-dependent communities. Negative score indicates that adaptive capacity is suppressed by the combined effect of exposure and sensitivity. This is an alarming situation. However, positive score does not indicate that transhumance pastoralists are not vulnerable; they are comparatively less vulnerable than the coastal livestock-dependent communities. The latter possessed comparatively higher adaptive capacity than transhumant pastoralists, but they were more vulnerable due to greater exposure to extreme climatic events. Also, transhumance pastoralists were comparatively less vulnerable due to their big herd size, high ratio of productive animals in their herd, strong farmer-to-farmer extension, high proportion of income from livestock, and mak-

ing and selling of milk products instead milk per se. On the other hand, coastal livestock dependents were more vulnerable. Major reasons behind higher vulnerability of coastal livestock dependents were long distance to purchase critical inputs, weak community cohesiveness, number of years having moderate meteorological draught, number of days having extremely heavy rainfall and reduced milk production.

In order to cope up with the changing climatic scenario, livestock-dependents from the coastal region showed greater interest on locally available breeds. For example, people from the Sunderban region are now more interested in rearing the local *Black Bengal* goat and *Garole* sheep in order to minimize the effect of harsh climatic conditions. This trend explained the people's interest was shifting to small ruminants from larger ones to minimize the risk due to animal deaths during extreme climatic events, and get relief from feed and fodder scarcity. For example, Department of Fisheries and Animal Resources Development, Government of Odisha estimated that due to tropical cyclone Phailin during October 2013, the number of livestock deaths included 1835 large animals (cow/buffalo), 4809 small animals (goat/sheep) and about 172,874 poultry. They were also rearing yak–cattle hybrids to utilize the mid-altitude region. However, proliferation of such hybrids may threaten yak species in the future.

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