

# Headlines Himalaya

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Editorial team: Birendra Shahi and Rounika Pokharail

For the 625<sup>th</sup> - 626<sup>th</sup> issues of Headlines Himalaya, we reviewed journal articles from seven sources and selected eight researches from five countries. We selected two researches from Nepal and six researches from other Himalayan countries (India, China, Bhutan and Pakistan).

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**ASSESSMENT OF SOIL ORGANIC CARBON IN TROPICAL AGRO FORESTS IN THE CHURIYA RANGE OF  
MAKAWANPUR, NEPAL**

Lilu Kumari Magar, Gandhiv Kafle, and Pradeep Aryal

*International Journal of Forestry Research* 2020: 1-5

This paper reports the findings of a research study conducted in three tropical agroforestry systems in the Makawanpur district of Nepal, to quantify the spatial and vertical distribution of soil organic carbon in 30 cm soil profile depth in agrisilviculture, home garden, and silvopasture. The three agroforestry systems represent tropical agro forests of Nepal. It was found that the soil had 24.91 t/ha soil organic carbon in 30 cm soil profile in 2018, with 2.1% soil organic matter concentration in average. Bulk density was found increasing with an increase in soil depth. The soil organic carbon was not found significantly different across different agroforestry systems. Looking into the values of stocks of soil organic carbon, it is concluded that the tropical agro forests have played a role in global climate change mitigation by storing considerable amounts of soil organic carbon and the storage capacity can further be increased. Involvement of farmers in the management of tropical agro forests cannot be ignored in the process of climate change mitigation.

For further reading: <https://doi.org/10.1155/2020/8816433>

**MULTIPLE FACTORS INFLUENCE LOCAL PERCEPTIONS OF SNOW LEOPARDS AND HIMALAYAN WOLVES IN THE  
CENTRAL HIMALAYAS, NEPAL**

Madhu Chetri, Morten Odden, Olivier Devineau, Thomas McCarthy, and Per Wegge

*PeerJ* 8: e10108

An understanding of local perceptions of carnivores is important for conservation and management planning. In the central Himalayas, Nepal, we interviewed 428 individuals from 85 settlements using a semi-structured questionnaire to quantitatively assess local perceptions and tolerance of snow leopards and wolves. We used generalized linear mixed effect models to assess influential factors, and found that tolerance of snow leopards was much higher than of wolves. Interestingly, having experienced livestock losses had a minor impact on perceptions of the carnivores. Occupation of the respondents had a strong effect on perceptions of snow leopards but not of wolves. Literacy and age had weak impacts on snow leopard perceptions, but the interaction among these terms showed a marked effect, that is, being illiterate had a more marked negative impact among older respondents. Among the various factors affecting perceptions of wolves, numbers of livestock owned and gender were the most important predictors. People with larger livestock herds were more negative towards wolves. In terms of gender, males were more positive to wolves than females, but no such pattern was observed for snow leopards. People's negative perceptions towards wolves were also related to the remoteness of the villages. Factors affecting people's perceptions could not be generalized for the two species, and thus need to be addressed separately. We suggest future conservation projects and programs should prioritize remote settlements.

For further reading: <https://doi.org/10.7717/peerj.10108>

**EVALUATION OF ENVIRONMENTAL FLOW REQUIREMENT USING WETTED PERIMETER METHOD AND GIS APPLICATION FOR IMPACT ASSESSMENT**

C. Prakasam, Saravanan R., and Varinder S Kanwar

*Ecological Indicators* 121: 107019

The environmental flow requirement varies from project to project based on their location, need, and habitat. The Binwa hydropower project is in the Kangra district of the Himachal Pradesh and a small hydropower project of 6 MW capacities. Here an attempt is made to assess the environmental flow requirement using the hydraulic approach, wetted perimeter method, and compared with the currently maintained e-flow. It is one of the old and commonly used methods of assessing the environmental flow based on the hydraulic characteristics such as the depth, width, and perimeter. The discharge is computed for each depth along with the profile and a graph is plotted to obtain the required environmental flow. The assessed minimum flow values are customarily validated using a habitat or holistic approach. Here, to validate the calculated minimal flow value for its sufficiency, the Geographical Information System application is employed as it calculates the vegetation and water indices. The average of the breakpoint discharge has been calculated as  $0.7724 \text{ m}^3/\text{s}$ , the minimal flow maintained in the Binwa basin is  $0.9 \text{ m}^3/\text{s}$  which is within the limit of the existing flow maintenance during the lean period. The Geographical Information System results support the sufficiency of the environmental flow maintained in the downstream side of the dam. The wetted perimeter helped in deriving the environmental flow while the Geographical Information System application assisted in evaluating the sufficiency spatially.

For further reading: <https://doi.org/10.1016/j.ecolind.2020.107019>

**DIVERSITY AND SESSIONAL VARIATION OF MESOSTIGMATID MITES IN THREE TEA GARDENS OF ASSAM (INDIA) WITH DIFFERENT AGRO-PRACTICES**

Ranjida Ahamad, Salil Kumar Gupta, Somnath Roy, and Dipsikha Bora

*Proceeding of Entomological Society of Washington* 122: 750-756

In soil, Mites (Acari) are the most abundant and diverse arthropods. They play an important Ecological role in maintaining soil health. Among acarines Mesostigmatids are the most abundant group occurring in soil. The present study was undertaken in order to explore the diversity and sessional occurrence of Mesostigmatids mites in three tea gardens maintaining the different Agro-practices (Viz., conventional, organic and Bio rational) in Assam India. The survey was done over 2 years (August 2016- July 2018). Mesostigmatids were extracted by using heat desiccation method in Tullgren funnel. The study revealed the occurrences of 41 species of Mesostigmatid mites belonging to 17 families and 31 genera in three tea gardens. Population of Mesostigmatids mites exhibited a fluctuating trend being higher in monsoon (Jun- September), slightly declining in post monsoon period (October-November), Moderate in winter (December-February) and noticeably reduced in summer (March- May). Shannon-diversity index ( $H'$ ) was found to be highest in the organic tea garden (3.01), followed by bio rational tea garden (2.76), and conventional tea garden (2.41).

For further reading: <https://doi.org/10.4289/0013-8797.122.4.750>

### **ANALYSIS OF MICROPLASTICS IN A REMOTE REGION OF THE TIBETAN PLATEAU: IMPLICATIONS FOR NATURAL ENVIRONMENTAL RESPONSE TO HUMAN ACTIVITIES**

Sasan Feng, Hongwei Lu, Peipei Tian, Yuxuan Xue, Jingzhao Lu, Meng Tang, and Wei feng

*Science of the Total Environment* 739: 140087

Microplastics are one of the most valuable indicators reflecting the effects of human activities on natural environment. This study was conducted in a representative remote region of Tibetan Plateau in China, simultaneously analyzing the abundance, compositions and fate of MPs both in water and soil media. MPs were detected in surface water, sediment and soil with abundances ranging from 66.6 to 7333 number/m<sup>3</sup>, 20 to 160 items/kg, and 20 to 110 items/kg, respectively. Fibers were the most frequently observed shape in the surface water and sediment, while the dominant shape in the soil was film. The major polymers of MPs in water and soil samples were polypropylene (PP) and polyethylene (PE). Small MPs were the main components with the <500µm fraction accounting for 94.74%, 88.37% and 88.34% of total MP particles in surface water, sediment and soil, respectively. Correlation analysis was further conducted to identify the sources of MPs from different human activities. The night light index was innovatively used to represent population rather than local residents, considering the large number of tourists in this region. It was found that tourism was the main source of MPs in water bodies, while facility agriculture and previous secondary industry are major contributors to soil MPs. A simplified equation set for MP abundance prediction was also formulated related to different industrial features. This study provides an evidence of noticeable MPs associated with human activities even at remote regions, and advances a feasible tool for MPs prediction according to local economic development.

For further reading: <https://doi.org/10.1016/j.scitotenv.2020.140087>

### **EXCESSIVE PLANT COMPENSATORY GROWTH: A POTENTIAL ENDOGENOUS DRIVER OF MEADOW DEGRADATION ON THE QINGHAI-TIBETAN PLATEAU**

Yong Zhang, Hasbagan Ganjurjav, Shikui Dong, and Qingzhu Gao

*Ecosystem Health and Sustainability* 6: 1-9

Degradation of meadow ecosystems in the largest alpine region of the world, i.e., the Qinghai-Tibetan Plateau (QTP), is a crucial ecological issue that has ardently discussed in recent years. Many factors, such as livestock overgrazing, climate change and overpopulation of small mammals are treated as important factors that cause the degradation of meadow ecosystems in the QTP. However, there is few hypotheses focus on the potential role of plant compensatory growth on meadow degradation. We proposed a compensatory growth-related hypothesis to understand the potential degradation process of meadow ecosystems in the QTP. We discussed that there are two stages of meadow degradation, i.e. the beginning stage of meadow degradation that is triggered by high-strength overcompensation; and the intensification stage of meadow degradation, which are driven by external factors such as climate warming, small mammals and thawing of permafrost. The mechanism of meadow degradation driven by plant compensatory growth is the asynchronism of plant consumption and the availability of soil nutrients. Our hypothesis that plant compensatory growth drives meadow degradation under the overgrazing condition requires

re-examination and modification by testing the balance between soil nutrient cycling rates and the strength of plant compensatory growth in alpine regions.

For further reading: <https://doi.org/10.1080/20964129.2020.1816500>

## Bhutan-Himalaya

### **VULNERABILITY OF MAMMAL COMMUNITIES TO THE COMBINED IMPACTS OF ANTHROPIC LAND-USE AND CLIMATE CHANGE IN THE HIMALAYAN CONSERVATION LANDSCAPE OF BHUTAN**

Ugyen Penjor, Sonam Wangdi, Tandin Tandin, and David W. Macdonald

*Ecological Indicators* 121: 107085

Human land-use and climate change drive biodiversity loss, precipitating the extinction crisis. The fragility of the Himalayas makes species in this landscape vulnerable to land-use and climate change. We aim to quantify the response of terrestrial mammal community to land-use and climate scenarios in the Bhutan Himalaya. Using large-scale camera-trap dataset, we examine the effects of anthropic land-use and climate variables on the terrestrial mammal assemblage using Bayesian multi-species occupancy model. Most of the terrestrial mammals in our sample displayed a strong negative relationship with anthropic land-use variables (agriculture, roads and settlement). Further, the occurrence of most species decreased with likely projections for climate variables, illustrating threats to conservation if the current trend in global warming continues. Notably, we found that biodiversity conservation in this landscape can be achieved by protecting extensive forest cover. Our findings emphasize the importance of reconciling land-use management and mammal conservation in the face of climate change and provide vital information which can be used to optimize future conservation and development plans.

For further reading: <https://doi.org/10.1016/j.ecolind.2020.107085>

## Pakistan-Himalaya

### **A LOCAL SCALE FOOD VULNERABILITY ASSESSMENT IN THE FOOD-PRONE AREA OF KHYBER PAKHTUNKHWA, PAKISTAN**

Muhammad Nazeer and Hans-Rudolf Bork

*Natural Hazards* 105: 755-781

The central part of Khyber Pakhtunkhwa, Pakistan is a highly food-prone area of the province. The lives and assets of local communities are deeply vulnerable, attributed to the recurrence of seasonal floods. This concern has motivated decision-makers and the research community to develop and adopt best management practices to address food vulnerability issues. One of the commonly used methods for evaluating food vulnerability is empirical investigation using composite indicators. However, there are several issues with the available food vulnerability literature, using composite indicators in the study area. The objectives of the current study are therefore twofold. On the one hand, it demonstrated in a comprehensive step-by-step approach to develop food vulnerability composite indicator taking into account the broad range of stakeholders and the reliability of research. On the other hand, the food vulnerability profile of the selected communities is being developed. Households' survey was

conducted in the selected communities using random sampling. The composite indicators of food vulnerability were developed as the relative measure of food vulnerability across the selected communities. A robustness check was also carried out using convenient techniques to address the problem of uncertainty. For such a purpose, the composite indicators of food vulnerability were developed through various data rescaling, weighting, and aggregation schemes. The relative levels of food vulnerability are identified across the selected communities, and the findings are illustrated by colored matrices. Different factors were identified for being responsible for the relative vulnerability of various communities. Jurisdiction-wise assessment of food vulnerability reveals that communities located in Charsadda district are more vulnerable to flooding compared to those in Nowshera district. The study can facilitate a wide range of stakeholders and decision-makers not only to develop composite indicators for food vulnerability but also to scientifically justify it as a management tool for food risk reduction.

For further reading: <https://doi.org/10.1007/s11069-020-04336-7>