An Environmental Research Abstract

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For the 593- 594th issues of Headlines Himalaya, we reviewed journal articles from sevensources and selected seventeen happenings from five countries. We selected three happenings from Nepal and fourteen happenings from other Himalayan countries (India, China, Bhutan and Pakistan).

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EVALUATION OF THE EGG BANK OF TWO SMALL HIMALAYAN LAKES

Roberta Piscia, Sara Bovio, Marina Manca , Andrea Lami, and PieroGuilizzoni

Water 12: 491

High mountain lakes are biodiversity treasures. They host endemic taxa, adapted to live in extreme environments. Among adaptations, production ofdiapason eggsallows for overcoming the cold season. These diapausing eggs can rest in the sediments, providing a biotic reservoir known as an egg bank. Here, we estimated changes in abundance of the egg bank in two lakes in the Khumbu Region of the Himalayas, during the last ca. 1100 and 500 years, respectively, by analyzing two sediment cores. We tested viability of the diapausing eggs extracted from different layers of the sediment cores under laboratory conditions. We found that only diapausing eggs of the Monogont *rotiferHexarthrabulgaricanepalensis*were able to hatch, thus suggesting that a permanent egg bank is lacking for the other taxa of the lakes, not least for the two Daphnia species described from these sites. Our results confirm previous studies suggesting that in high mountain lakes, the production of diapausing is mainly devoted to seasonal recruitment, therefore leading to a nonpermanent egg bank. The different ability of different taxa to leave viable diapausing eggs in the sediments of high mountain lakes therefore poses serious constraints to capability of buffering risk of biodiversity loss in these extremely fragile environments.

For further reading: https://doi.org/10.3390/w12020491

FARMERS' UNDERSTANDING OF CLIMATE CHANGE IN NEPAL HIMALAYAS: IMPORTANT DETERMINANTS AND IMPLICATIONS FOR DEVELOPING ADAPTATION STRATEGIES

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Climatic Change 158: 485–502

Climate change affects the livelihood of farmers in a variety of ways. Farmers' indigenous knowledge influences their perception of climate-related issues. A perception-based, semi-structured questionnaire survey of 530 households was performed to gather information about the awareness of, indicators for, and determinants of climate change. The survey covered three ecological regions of Nepal. The statistical analysis was done with a chi-square (χ^2) test and a binary logistic regression (BLR) model to screen farmers' perception of climate change. This study shows that socio-economic and agricultural characteristics of the farmers directly influence their perception of climate change. Farmers have identified climate change indicators in various forms, e.g., an increase in temperature (99.2% of those surveyed), a decrease in precipitation (98.9%), and an increase in climate-induced diseases and pests (96.8%) for agricultural crops. Observed precipitation (− 16.093 mm/year; p = 0.055) and temperature (0.0539 °C/year; p = 0.007) between 2000 and 2015 are both consistent with farmers' perception. The selected independent variables are significantly correlated with the dependent variables, as confirmed by the BLR model, where χ^2 = 83 with p = 0.002. The BLR shows there is a strong relationship between farmers' perception of climate change and the group of descriptive variables, with a coefficient of determination of 85%. The biophysical characteristics and impact variables were the most important determinants. It is important that organizations and policymakers in Nepal develop adaptation strategies that improve the livelihoods of farmers. These strategies include introducing drought-tolerant crops, developing disease- and pest-tolerant seeds, constructing irrigation systems, and building hospitals.

For further reading:10.1007/s10584-019-02607-2

THE OCCURRENCE OF ANTIBIOTIC RESISTANCE GENES IN AN URBAN RIVER IN NEPAL

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Water 12: 450

Urban rivers affected by anthropogenic activities can act as reservoirs of antibiotic resistance genes (ARGs). This study aimed to describe the occurrence of selected ARGs (*bla*$_{TEM}$, *ermF*, *mecA*, and *tetA*) and a class 1 integron (*intI1*) in an urban river in Nepal. A total of 18 water samples were collected periodically from upstream, midstream, and downstream sites along the Bagmati River over a 1-year period. All ARGs except *mecA* and *intI1* were consistently detected by a quantitative polymerase chain reaction in the midstream and downstream sites, with concentrations ranging from 3.1 to 7.8 log copies/mL. ARG abundance was significantly lower at the upstream site ($p < 0.05$), reflecting the impact of anthropogenic activities on increasing concentrations of ARGs at midstream and downstream sites. Our findings demonstrate the presence of clinically relevant ARGs in the urban river water of Nepal, suggesting a need for mitigating strategies to prevent the spread of antibiotic resistance in the environment.

For further reading:https://doi.org/10.3390/w12020450

India-Himalaya

INFLUENCE OF ANTHROPOGENIC EMISSIONS ON WET DEPOSITION OF POLLUTANTS AND RAINWATER ACIDITY IN GUWAHATI, A UNESCO HERITAGE CITY IN NORTHEAST INDIA

RajyalakshmiGaraga, SupriyoChakraborty, Hongliang Zhang, SharadGokhale, QiaoXue, and SriHarsha Kota

*Atmospheric Research*232: 104683

Guwahati, the largest urban corridor of Northeast India, is one of the United Nations Educational, Scientific and Cultural Organization (UNESCO) world heritage sites and one of the 200 eco-regions in the world. The present study investigates the characterization of chemical components and sources of precipitation samples collected in Guwahati during June 2016–June 2017. Acidic rain events occurred throughout the year, with a frequency of 64% and 87% during monsoon and non-monsoon seasons, respectively. Higher contributions of the acidic species (SO_4^{2-} and NO_3^-) coinciding with poor neutralizing capacity of crustal species (Ca^{2+}, K^+ and Mg^{2+}) led to acid rain in this region. Isotope analysis ($\delta^{18}O$ and δD) indicated that monsoonal and non-monsoonal rains were of marine and non-marine origins, respectively. This is further supported by the back trajectory analysis as majority of the individual rain events during d-excess<10‰ i.e. monsoon, indicated their maximum contribution from ocean while, during d-excess>10‰ i.e. non-monsoon, the trajectories originated from water-inland. The enrichment factors (EF) for Pb, Zn, Co and Cu were >5, indicating the dominance of anthropogenic sources in this region. The Positive Matrix Factorization (PMF) along with isotope analysis identified marine (40%) as the major source in monsoon and industrial emissions (28%) in non-monsoon, indicating rainwater evaporation is more of ocean and continental origin during monsoon and non-monsoons, respectively. This study suggests the need of further studies and implementation of stringent anthropogenic regulations not only in local but also at regional and global scale, in this acid rain prone region.

For further reading:https://doi.org/10.1016/j.atmosres.2019.104683

INDIGENEOUS PEOPLE'S ATTACHMENT TO SHIFTING CULTIVATION IN THE EASTERN HIMALAYAS, INDIA: A CROSS SECTIONAL EVIDENCE

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*Forest Policy and Economics*111: 102046

Shifting cultivation (SC), or swidden, continues to be a predominant agricultural practice in some parts of North-East India despite efforts by the state to discourage that practice. The indigenous people persist in practising SC because it is part of their culture and traditions, because SC means much more to them than a means of livelihood, and also because of the lack of any worthwhile alternative. Empirical analysis revealed that such attachment or bonding takes three forms, namely nature-bonding (attachment to the natural landscape), social bonding (attachment to the local community and traditions), and economic bonding (attachment to the form of livelihood and to the place). In descending order of importance, the reasons were social bonding, lack of alternative livelihoods, economic bonding, and nature-bonding. The study – based on a survey of 500 respondents drawn from 52 villages, representing six states of North-East India –showed that SC is not merely an alternative method of farming but a form of landscape management that has not only evolved over centuries of experimentation but is also inseparable from the culture and the way of life of those who continue to practise SC. Even more important, contrary to the popular notion held by state officials and other agencies, SC provides a sustainable means of livelihood and food security to the indigenous people.

For further reading:Link Address: https://doi.org/10.1016/j.forpol.2019.102046

MAPPING SOCIO-ENVIRONMENTAL VULNERABILITY TO CLIMATE CHANGE IN DIFFERENT ALTITUDE ZONES IN THE INDIAN HIMALAYAS

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*Ecological Indicators*109: 105787

Socio-environmental vulnerability to climate change in mountain landscapes depends upon multiple factors that can vary across altitude zones. However, there is limited knowledge on specific indicators suitable for assessing socio-environmental vulnerability that address altitude-related variations. This study systematically analysed important components of vulnerability and mapped them by weight for four altitude zones in the Indian Himalayas. Indices focusing on components of the three different dimensions of vulnerability (adaptive capacity, exposure, sensitivity) were identified based on the literature. Data on these different indices were then collected through a pre-tested questionnaire-based survey of 403 randomly selected households in the four altitude zones (<1000 (low), 1000–1500 (middle), 1500–2000 (high), >2000 m a.s.l. (very high)) in the Garhwal Himalaya, India. Components of vulnerability dimensions were assessed and significantly contributing components were identified by Principal Component Analysis (PCA). An entropy method was used to weight the dimensions of vulnerability for the different altitude zones. Vulnerability was estimated based on the Manush approach of human development index. The data were used to produce a spatial map based on a proposed Spatial Social Vulnerability Index (SSEVI). SSEVI was proposed based on social and environmental indicators of vulnerability with a mix of spatial indicators to generate spatially bound vulnerability. The results indicated that communities in the middle and high altitude zones (1000–2000 m a.s.l.) were more vulnerable (score 0.32 and 0.31, respectively) than those in the low and very high zones (score 0.29 and 0.30, respectively). Greater vulnerability was mainly due to high exposure to extreme events and less adaptive capacity, which can affect agricultural production negatively, in combination with high population density in middle-altitude communities. There was lower pressure on natural resources and better connectivity in the low altitude zone (<1000 m a.s.l.), reducing vulnerability. The spatial SSVI map clearly revealed vulnerable hotspots, suggesting that government supported adaptation measures should not be similar across the altitude gradient in the Indian Himalayas, but should be based on available resources, pressure and livelihood options for achieving sustainability under climate change.

For further reading:https://doi.org/10.1016/j.ecolind.2019.105787

POTENTIAL IMPACTS OF NON-NATIVE FISH ON THE THREATENED MAHSEER (Tor) SPECIES OF THE INDIAN HIMALAYAN BIODIVERSITY HOT SPOT

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*Aquatic Conservation: Marine and Freshwater Ecosystems*30: 394-401

Mahseer (*Tor*) fish species are critical components of locally adapted freshwater food webs across the Indian Himalayan biodiversity hotspot; however, multiple human stressors compounded by climate change have significantly depleted their populations over recent decades.Mahseer species are now considered locally vulnerable or endangered in many regions. Hydropower projects in particular have fragmented populations, impairing genetic exchange, obstructing migratory paths, and changing the structure and functioning of riverine habitats, especially of formerly fast-flowing rivers.Worryingly, a literature survey and group discussions reveal that the increasing spread of non-native fish species further compounds threats to mahseer and overall freshwater ecology. A better understanding of the current distribution, habitat requirement, and dispersal of non-native fish is therefore essential to manage the growing threats to mahseer in the Indian Himalayan region.

For further reading:https://doi.org/10.1002/aqc.3275

ECOLOGICAL PROCESSES UNDERLYING COMMUNITY ASSEMBLY OF AQUATIC BACTERIA AND MACROINVERTEBRATES UNDER CONTRASTING CLIMATES ON THE TIBETAN PLATEAU

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*Science of the Total Environment*702: 134974

Understanding the role of climatic variation on biodiversity is of chief importance due to the ongoing biodiversity loss and climate change. Freshwaters, one of the most threatened ecosystems in the world, offer a valuable context to study biodiversity patterns of distinct organism groups in relation to climatic variation. In the Tibetan Plateau biodiversity hotspot - Hengduan Mountain region, we studied the effects of climate and local physico-chemical factors on stream microorganisms (i.e. bacteria) and macroorganisms (i.e. macroinvertebrates) in two parallel catchments with contrasting precipitation and temperature, that is, the Nujiang and Lancang Rivers. Diversities and community structures were better explained by climatic and local environmental variables in the drier and colder catchment and at higher elevations, than in the warmer and wetter conditions and at lower elevations. This suggests that communities may be more strongly assembled by deterministic processes in the former, comparatively harsher conditions, compared to the latter, more benign conditions. Macroinvertebrates were more strongly affected by climatic and local environmental factors compared to bacteria, but the diversities and community structures of the two groups showed spatially similar responses to overall abiotic variation, being especially evident with their community structures' responses to climate. Furthermore, bacterial and macroinvertebrate diversities were positively correlated in the drier and colder catchment, implying that these biologically and ecologically distinct organism groups are likely to be driven by similar processes in areas with such climatic conditions. We conclude that changes in climatic and local environmental conditions may affect the diversity of macroorganisms more strongly than that of microorganisms, at least in subtropical mountainous stream ecosystems studied here, but simultaneous responses of both groups to environmental changes can also be expected.

For further reading:https://doi.org/10.1016/j.scitotenv.2019.134974

ASSESSMENT OF THE VULNERABILITY OF ALPINE GRASSLANDS ON THE QINGHAI- TIBETAN PLATEAU

Meng Li, Xianzhou Zhang, Yongtao He, Ben Niu, and Jianshuang Wu

*Peer J*8: e8513

Assessing ecosystem vulnerability to climate change is critical for sustainable and adaptive ecosystem management. Alpine grasslands on the Qinghai-Tibetan Plateau are considered to be vulnerable to climate change, yet the ecosystem tends to maintain stability by increasing resilience and decreasing sensitivity. To date, the spatial pattern of grassland vulnerability to climate change and the mechanisms that vegetation applies to mitigate the impacts of climate change on grasslands by altering relevant ecosystem characteristics, especially sensitivity and resilience, remain unknown. In this study, we first assessed the spatial pattern of grassland vulnerability to climate change by integrating exposure, sensitivity, and resilience simultaneously, and then identified its driving forces. The results show that grasslands with high vulnerability were mainly located on the edges of the plateau, whereas alpine grasslands in the hinterlands of the plateau showed a low vulnerability. This spatial pattern of alpine grassland vulnerability was controlled by climatic exposure, and grassland sensitivity and resilience to

climate change might also exacerbate or alleviate the degree of vulnerability. Climate change had variable impacts on different grassland types. Desert steppes were more vulnerable to climate change than alpine meadows and alpine steppes because of the high variability in environmental factors and their low ability to recover from perturbations. Our findings also confirm that grazing intensity, a quantitative index of the most important human disturbance on alpine grasslands in this plateau, was significantly correlated with ecosystem vulnerability. Moderate grazing intensity was of benefit for increasing grassland resilience and then subsequently reducing grassland vulnerability. Thus, this study suggests that future assessments of ecosystem vulnerability should not ignore anthropogenic disturbances, which might benefit environmental protection and sustainable management of grasslands on the Qinghai-Tibetan Plateau.

For further reading: https://doi.org/10.7717/peerj.8513

DO PROTECTED AREAS IMPROVE ECOSYSTEM SERVICES? A CASE STUDY OF HOH XIL NATURE RESERVE IN QINGHAI-TIBETAN PLATEAU

Jie Zeng, Tianyang Chen, Xiaowei Yao, and Wanxu Chen

*Remote Sensing*12: 471

Although there is a consensus that protected areas (PAs) can provide various ecosystem services, it is unclear whether protected areas effectively contribute to the preservation and enhancement of ecosystem services. We conducted a case study of the Hoh Xil Nature Reserve (HXNR) in Qinghai-Tibetan Plateau, China, in order to examine the effectiveness of PA in the conservation of ecosystem services. First, the dynamics of land use/land cover (LULC) were analyzed based on remotely sensed data sets. Then, the ecosystem service value (ESV) in the PA and non-PA were evaluated using a modified benefit transfer method that had been adjusted using normalized difference vegetation index (NDVI). Finally, hotspot analysis was implemented to reveal the ESV changes for the different districts of the PA. The results of the comparison experiment indicate that: (1) The ESV of the HXNR has considerably increased after it was designated as protected, which had been in decline in the previous stage. The ESVs in a near-by non-PA showed opposite results where the values initially increased but then dropped due to urban expansion and desertification. (2) The areas in HXNR with increased ESV significantly outnumbered the areas that had declining values from 1980 to 2018. For the non-PA, the areas that had increased ESV in 1980–1995 saw a decline in value in 1995–2008; moreover, new areas with decreasing ESV emerged in 2008–2018. (3) The HXNR was found to be more effective than non-PA in improving ecosystem services. (4) The core zone of the nature reserve demonstrated better effectiveness in ecosystem service preservation.

For further reading:https://doi.org/10.3390/rs12030471

PLANT COMMUNITY RESPONSES TO WARMING MODIFIED BY SOIL MOISTURE IN THE TIBETAN PLATEAU

AhuiPeng, Kari Klanderud, Genxu Wang, Li Zhang, Yao Xiao, and Yan Yang

Arctic, Antarctic, and Alpine Research 52: 60-69

Predicted warming in Tibetan Plateau may have profound effects on plant community structure and function. We used open-top chambers to artificially warm two different plant communities in Tibet from 2012 to 2016. We recorded species richness, vegetation height, and graminoid, forb, legume, and litter cover each year of the experiment and leaf growth and chemical traits of the most dominant species after four years of warming. Our results showed that vegetation height increased under warming in both the alpine meadow and the swamp. Warming also marginally increased legume cover and C:N ratio of all species in the alpine meadow but not in the

swamp, suggesting that plant growth rate and nitrogen cycling are higher in the meadow in a warmer future. An observed tradeoff between water use efficiency and nitrogen use efficiency in the alpine meadow, but not in the swamp, also indicated that resource use may be more efficient in plants in the drier meadow under future warming. Overall, our results support predictions that soil moisture may modify plant community responses to climate warming and that changes in carbon and nutrient cycling may be more pronounced in drier alpine meadows than in wetter swamps under climate warming.

For further reading:https://doi.org/10.1080/15230430.2020.1712875

DECOUPLING ELASTICITY AND DRIVING FACTORS OF ENERGY CONSUMPTION AND ECONOMIC DEVELOPMENT IN THE QINGHAI- TIBET PLATEAU

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Sustainability 12: 1326

Decoupling of energy consumption and economic development is a key factor in achieving sustainable regional development. The decoupling relationship between energy consumption and economic development in the Qinghai-Tibet Plateau region is still unclear. This paper uses the logarithmic mean Divisia index (LMDI) decomposition method and Tapio elastic index model to analyze the decoupling degree and driving factors of energy consumption and economic development, and evaluates the decoupling effort level in Qinghai-Tibet Plateau from 2006 to 2016. The results indicate that the Qinghai-Tibet Plateau region showed a weak decoupling as a whole, and that only Tibet experienced expanding negative decoupling in 2006–2007 and an expansion link in 2007–2008. Economic scale is a primary factor that hinders the decoupling of energy consumption, followed by investment intensity and industrial energy structure. The cumulative promotion effect of research and development (R&D) efficiency and intensity and the inhibition effect of investment intensity cancel each other out. With the exception of Tibet and Xinjiang, all provinces in the Qinghai-Tibet plateau have made decoupling efforts. Decoupling efforts made by R&D efficiency contributed the most, followed by energy intensity and R&D intensity. This paper provides policy recommendations for the decoupling of energy consumption experience for underdeveloped regions.

For further reading:https://doi.org/10.3390/su12041326

STATUS AND CHALLENGES OF QINGHAI-TIBET PLATEAU'S GRASSLANDS: AN ANALYSIS OF CAUSES, MITIGATION MEASURES, AND WAY FORWARD

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*Sustainability*12: 1099

Grassland ecosystems on the Qinghai–Tibet Plateau (QTP) provide numerous ecosystem services and functions to both local communities and the populations living downstream through the provision of water, habitat, food, herbal medicines, and shelter. This review examined the current ecological status, degradation causes, and impacts of the various grassland degradation mitigation measures employed and their effects on grassland health and growth in the QTP. Our findings revealed that QTP grasslands are continually being degraded as a result of complex biotic and abiotic drivers and processes. The biotic and abiotic actions have resulted in soil erosion, plant biomass loss, soil organic carbon loss, a reduction in grazing and carrying capacity, the emergence of pioneer plant species, loss of soil nutrients, and an increase in soil pH. A combination of factors such as overgrazing, land-use changes, invasive species encroachment, mining activities, rodent burrowing activities, road and dam

constructions, tourism, migration, urbanization, and climate change have caused the degradation of grasslands on the QTP. A conceptual framework on the way forward in tackling grassland degradation on the QTP is presented together with other appropriate measures needed to amicably combat grassland degradation on the QTP. It is recommended that a comprehensive and detailed survey be carried out across the QTP to determine the percentage of degraded grasslands and hence, support a sound policy intervention.

For further reading:https://doi.org/10.3390/su12031099

RURAL HOUSEHOLD ENERGY CONSUMPTION OF FARMERS AND HERDERS IN THE QINGHAI-TIBET PLATEAU

Lu Jiang, Bing Xue, Ran Xing, Xingpeng Chen, Lan Song, Yutao Wang, D'Maris Coffman, and ZhifuMi

*Energy*192: 116649

Rural energy consumption not only significantly affects the national economy but also informs us about the living conditions of rural residents. A comprehensive survey of households in the agropastoral area of Qinghai Province was conducted from 2017 to 2018 to identify its energy consumption characteristics. In this paper, a typical household energy flow model was established. The results show that 1) the proportion of noncommercial energy in the agropastoral area of Qinghai Province is 52.89%, and it is affected by the 'returning farmland to forest' (RFF) policy and the 'returning grazing land to grassland project' (RGLGP). Furthermore, the household energy consumption structure has shifted from traditional biomass to coal and a combination of other energy sources. 2) Households of different cultural backgrounds have different energy consumption patterns. 3) High-income households consume more energy and have more frequent energy flows compared with low-income households. The results of this survey will help policymakers and scholars to formulate strategies for energy conservation and more effectively assess energy policies.

For further reading:https://doi.org/10.1016/j.energy.2019.116649

LANDSCAPE DYNAMICS AND HUMAN-ENVIRONMENT INTERACTIONS IN THE NORTHERN FOOTHILLS OF CHOOYU AND MOUNT EVEREST (SOUTHERN TIBET) DURING THE LATE PLEISTOCENE AND HOLOCENE

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*Quaternary Science Reviews*229: 106127

Here we present an integrated earth surface process and paleoenvironmental study from the Tingrigraben and the archaeological site of Su-re, located on the southern rim of the Tibetan plateau, spanning the past ca. 30 ka. The study area is characterized by cold climate earth surface processes and aridity due to its altitude and location in the rain shadow of the Mount Everest–Cho Oyu massif and is thus sensitive to climatic and anthropogenic perturbations. In this highly dynamic geomorphic environment, paired-cosmogenic nuclide results from boulders on a massive hummocky moraine in the southern Tingrigraben reveal complex exposure histories that limit our capability of directly dating the corresponding glacial advance, and shed a note of caution on previously published single-nuclide-based exposure ages along the northern Himalaya. Based on geomorphic considerations, however, the moraine clearly represents the local last glacial maximum, and likely coincided with a ~344 ± 109 m drepression of discontinuous permafrost zone relative to today during the global last glacial maximum (gLGM). This greatly intensified permafrost and periglacial hill slope processes and led to fluvial aggradation of the valley floors of ≥12 m. We observe formation of a thick (≥50 cm) pedo-complex starting at ca. 6.7 ka before present (BP) and erosional truncation at ca. 3.9 ka BP. Widespread landscape instability and erosion characterize the region subsequent to 3.9 ka and intensifies in the 15th century AD. Several lines of (geo)archaeological evidence,

including the presence of pottery sherds, sling-shot projectiles and hammer stones within the sedimentary record, indicate human presence at Su-re since ca. 3.9 ka BP. Our data suggest that in the Su-re-Tingri area climatic conditions were warm and moist enough to allow vegetation expansion and soil formation only from ca. 6.7–3.9 ka, followed by weakening of the Indian summer monsoon (ISM) strength between ca. 4.2 and 3.9 ka, which is a prominent climatic event in the wider Asian monsoon region, and reflected in the investigation area by the 3.9 ka erosional boundary. Merging our Holocene landscape reconstruction with the geoarchaeological evidence, we speculate that the combined effect of Little Ice Age (LIA) cooling and an anthropogenic overuse of the landscape led to climatically induced landscape degradation and ultimately to an anthropogenically triggered ecological collapse in the 15th century. Such a scenario is in-line with regional historical data on declining monastery construction and migration of the ethnic group of the Sherpas.

From an earth surface dynamics perspective, we find that transient landscape processes on the southern rim of the Tibetan plateau are strongly linked to millennial scale changes in the ISM intensity and duration. We identify three types of unidirectional non-linear ISM-landscape interactions. Given that the Tibetan plateau is the largest high-altitude landmass on our planet and our limited understanding of several of the key earth surface processes on the plateau, we pinpoint the need for more long-term (Quaternary scale) empirical data particularly on permafrost and periglacial processes and human-environment interactions.

For further reading:https://doi.org/10.1016/j.quascirev.2019.106127

Bhutan-Himalaya

PERCEPTION OF FARMERS ON CLIMATE CHANGE AND ITS IMPACTS ON AGRICULTURE ACROSS VARIOUS ALTITUDINAL ZONES OF BHUTAN HIMALAYAS

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International Journal of Environmental Science and Technology 17: 3607-3620

Climate change is real and is considered to be impacting agricultural development in Bhutan. To authenticate this claim, a survey was conducted in six districts of Bhutan, representing low- , mid- and high-altitude regions of the country from March to May, 2019. Based on the current research, we present farmers' perceptions of climate change and its impacts on agricultural production, including the different coping strategies prevalent in rural communities. The study found that the farmers were well aware of climate change, although perceptions varied among the respondents. For most of the farmers, climate change meant unpredictable weather (79%), less or no rain (70%) and drying of irrigation sources (55%). Some farmers referred to climate change as the emergence of diseases and pests (45%), high-intensity rains (30%), less or no snow (24%) and shorter winter (11%). These climate change impacts were assessed to be responsible for 10–20% crop damages, resulting in crop losses to the tune of 8079–16,159 t and 7202–14,405 t for rice and maize, respectively. This is likely to affect the already low domestic food production of the country. Additionally, the study has successfully captured information on climate change adaptation strategies applied by the farmers. The most commonly observed ones were: the use of plant protection chemicals, improved varieties, increasing frequency of irrigation, land fallowing, off-farm works and improved management practices. Findings such as these are important towards the identification and formulation of an integrated sustainable and climate-proof farming support system.

For further reading: https://doi.org/10.1007/s13762-020-02662-8

FLOOD VULNERABILITY ASSESSMENT USING MOVE FRAMEWORK: A CASE STUDY OF THE NORTHERN PART OFDISTRICT PESHAWAR PAKISTAN

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*Natural Hazards*101:385–408

Climate variability and changes in contemporary society such as increasing population, poor urbanization and expansion of residential areas are increasing the vulnerability and frequency of flooding hazards in Pakistan, especially in Khyber Pakhtunkhwa (KP) Province. Minimizing flood vulnerability needs an understanding of the factors that drive vulnerability to flooding hazard. The present study was conducted in the flood-prone areas of Peshawar, a district of KP, to evaluate flood vulnerability of the population using the Method for the Improvement of Vulnerability Assessment in Europe. Following this framework, an extensive literature review was conducted to develop relevant proxy indicators. Structured questionnaires were used for household surveys to collect data from 210 households in seven selected sites through simple random sampling method. The vulnerability factors, i.e., exposure, susceptibility and resilience, as well as the overall vulnerability were calculated and compared using ArcGIS tools. Results show that the overall vulnerability and the factor vulnerability of the studied sites were very high. Susceptibility and exposure factors were found to greatly influence vulnerability, and communities had low resilience in the face of flooding hazard. Addressing these indicators properly in developing strategies can reduce vulnerability and increase capacity of the communities to cope with floods in the future. Additionally, the government and disaster management agencies can play a significant role in minimizing the vulnerability to floods by strengthening physical and socioeconomic capacities through education, training and awareness about precautionary and mitigation measures.

For further reading: 10.1007/s11069-020-03878-0

Highlight of the Issue

CHLAMYDIA RELATED BACTERIA WAS FOUND BELOW ARCTIC OCEAN

Ney York Post: March 7 2020

A bacteria species that is the biological cousin of chlamydia, the most common bacterial sexually transmitted disease in the US was found under the Arctic Ocean's seafloor near the hydrothermal vent known as Loki's Castle, which is between Iceland and Norway. According to CDC, Chlamydia infects an estimated 2.9 million people every year in the US. This discovery of chlamydia could help to better understand how bacteria in the Chlamydiae family evolved to become infectious. This study indicates that chlamydiae can be found in the extreme but unexpected places.

Source: https://nypost.com/2020/03/07/scientists-find-bacteria-species-related-to-chlamydia-below-arctic-ocean/amp/