DYNAMICS OF INTEGRATED SOCIO-ENVIRONMENTAL SYSTEMS

INTERNATIONAL SYMPOSIUM

Implications for Natural Resource Management in Asia

VIRTUAL
8:00 AM - 5:00 PM EDT

SAT 11.6 2021

CAROLINA ASIA CENTER
UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
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Human and natural environmental systems are closely linked to each other via the impacts of human actions on the environment, with the resulting changes (often not anticipated and unintended) that feedback to the social system. These feedbacks can amplify or dampen the initial impacts of the human activity and influence the sustainability of the socio-environmental systems. Therefore, traditional research that solely focuses on either social system impacts on the environment or environmental system changes on social system cannot provide a holistic understanding of the dynamics of integrated socio-environmental systems. A new paradigm of research that deals with the social and environmental systems as an integrated holistic system has emerged in recent decades. The new DISES program at the US National Science Foundation supports such research endeavors as a testimony to the importance of such innovative research.

Over 4.6 billion people or 60% of the human population live in Asia. There are more poor people in Asia than other continents, exerting the greatest influence on UN global sustainable development goals. Poor people are generally more dependent on natural resources for their livelihoods than others, such as on forests for food, fiber, and fuel; on water for irrigation and household consumption, and fish for food and income; and on minerals for income. Therefore, how to better manage these natural resources is of paramount importance both to improve the livelihoods of the poor and to conserve the environment, which are among essential goals in sustainable development. The aim of this symposium is to share cutting-edge thinking about and empirical evidence from ongoing research and to collectively reflect on the needs for future research on the dynamics of the integrated socio-environmental systems, including (1) institutional settings and their impacts on sustainable natural resource management, (2) mechanisms by which natural resource management influences poor people’s livelihoods, (3) feedbacks to the social system from the environmental system as a result of changes in ecosystem goods and services from natural resource management, and (4) changes in ecosystem goods and services as a result of natural resource management. Studies which focus on more than one of these dimensions are particularly welcome.

Due to the recent surge of Covid-19 cases from the delta variant, the Symposium will be held virtually. The Symposium will be free to all who are interested. To attend the Symposium, please register at the following web: https://go.unc.edu/dises.
SESSION 1

8:00AM - 8:15AM Opening remark
Dr. Conghe Song

Welcome from Carolina Asia Center
Dr. Ji-Yeon Jo

8:15AM - 9:00AM KEYNOTE SPEECH
Indian Cities as Dynamic Integrated Socio-Environmental Systems
Dr. Harini Nagendra, Professor, Azim Premji University, India

9:00AM - 9:20AM Understanding the Interactions of “Forestry-Water-Livelihoods” Nexus to Address Global Change Issues with Nature-based Solutions in Nepal
Dr. Lu Hao, Professor, Nanjing University of Information Science & Technology, China

9:20AM - 9:40AM Summary of Community Forestry in Nepal
Dr. Bir Bahadur Khanal Chhetri, Professor, Tribhuvan University, Nepal

9:40AM - 10:00AM The Changing Priorities of Community Forestry Governance in Nepal
Dr. Bishnu Devkota, Associate Professor, Tribhuvan University, Nepal

10:00AM - 10:15AM - Coffee Break -

SESSION 2

10:15AM - 11:00AM KEYNOTE SPEECH
Metacoupling Framework and Implications for Natural Resource Management
Dr. Jianguo Liu, Rachel Carson Chair and Distinguished Professor, Michigan State University, USA

11:00AM - 11:20AM A Critical Analysis of Human-Environment Dynamics through the Lens of Ecosystem Services: A Case Study of Nepal
Dr. Sunita Chaudhary, Ecosystem Services Specialist, ICIMOD, Nepal

11:20AM - 11:40AM Divergent Social-Ecological Outcomes of Payment for Ecosystem Services
Dr. Qi Zhang, Post-Doctoral Fellow, Boston University, USA

11:40AM - 12:00PM Human-Wildlife Interaction in the Mid-Hills of Nepal: Feedback Effects of Community Forests to the Social System
Mr. Rajesh Bista, PhD Candidate, UNC Chapel Hill, USA

12:00PM - 13:15PM - Lunch -
SESSION 3

13:15PM - 14:00PM KEYNOTE SPEECH Sustainability Science for Sustainable Development
Dr. Arun Agrawal, Samuel T. Dana Professor, University of Michigan, USA

14:00PM - 14:20PM Leveraging Concurrent Green Efforts in the Pandemic Shadowed World
Dr. Li An, Professor, San Diego State University, USA

14:20PM - 14:40PM Mobile Species, Global Industry, and National Interest in the Western and Central Pacific Ocean Tuna Fishery
Dr. Elizabeth Havice, Professor, UNC Chapel Hill, USA

14:40PM - 15:00PM Can Community Forestry Contribute to SDGs? Evidence from Nepal
Dr. Randy Bluffstone, Professor, Portland State University, USA

15:00PM - 15:15PM - Coffee Break -

SESSION 4

15:15PM - 16:00PM KEYNOTE SPEECH How to Maintain the High Carbon Sink in China’s Forests in the Near Future
Dr. Jing Ming Chen, Professor, University of Toronto, Canada

16:00PM - 16:20PM China’s Ongoing Vegetation Greening and its Influences on Carbon and Water Dynamics
Dr. Yulong Zhang, Research Assistant Professor, Univ. of Tennessee Knoxville, USA

16:20PM - 16:40PM Urban Vegetation in Cities, Neighborhoods and Parcels: the Role of Socioeconomic and Institutional Contexts
Dr. Rinku Chowdhury, Associate Professor, Clark University, USA

16:40PM - 17:00PM Twenty-five Years of Forest Dynamics in Nepal
Dr. Jefferson Fox, Senior Fellow and Acting Director, East-West Center, USA

17:00PM - 17:10PM - Coffee Break -

17:10PM - 18:00PM Reflection of the Day: Identifying Key Research Questions in DISES
SUSTAINABILITY SCIENCE FOR SUSTAINABLE DEVELOPMENT

KEYNOTE SPEECH
DR. ARUN AGRAWAL
Samuel Trask Dana Professor of Governance and Sustainability
University of Michigan, USA
Email: arunagra@umich.edu

Abstract
Sustainability science provides an overarching framework and approach to advance the possibility of sustainable development. This talk focuses on the need for more systematic analyses of tradeoffs and co-benefits, transitions, implementation, and synthesis for a robust sustainability science that can form the foundation for greater sustainability and prosperity.

Biosketch
Arun Agrawal is Samuel Trask Dana Professor of Governance and Sustainability, affiliated faculty at the Gerald R. Ford School of Public Policy, and Faculty Associate at the Center for Political Studies at the University of Michigan. His research and teaching emphasize the politics of international development, institutional change, conservation, and sustainability. He has conducted research in more than 20 countries in the tropical world, and his papers have appeared in Science, PNAS, Conservation Biology, Current Anthropology, American Political Science Review, Development and Change, World Development, and various Nature journals. Preceding his work at U-M, Agrawal was educated at Duke University, the Indian Institute of Management, and Delhi University and has held teaching or research positions at Yale, Florida, McGill, Berkeley, and Harvard among other universities. Agrawal is also the author of “Greener Pastures” and “Environmentality.” He serves on the Editorial Board for Ecology and Society and PNAS. Agrawal was elected to the National Academy of Sciences in 2018.

HOW TO MAINTAIN THE HIGH CARBON SINK IN CHINA’S FORESTS IN THE NEAR FUTURE?

KEYNOTE SPEECH
DR. JING MING CHEN
Professor of Geography
University of Toronto, Canada
Email: jing.chen@utoronto.ca

Abstract
Currently, the terrestrial ecosystems in China are carbon sinks of about 0.3-0.4 PgC/y, mostly occurring in forest ecosystems. Many ecological restoration and afforestation projects over the last several decades increased China’s forest area from 157 MHa in 1990 to 220 MHa in 2018, and correspondingly China’s forest carbon sink increased from 0.1-0.2 PgC/y in 1990’s to 0.3-0.4 PgC/y in 2010’s. According to our analysis, the largest sinks are found in mid-age forests planted over the period of 1980-2000, which are actively growing and storing carbon in both biomass and soil organic matter. While China still has potential to increase its forest area by about 40Mh (but on less productive land), the mid-age forests are getting matured and growing slower, and it becomes a concern that the current sink might have peaked and start to decline soon. However, the carbon density of China’s forests is much lower than the world average, suggesting there is much potential to enhance the sink through forest management options. Climate change is critical to consider in projecting the future carbon sink in China. CO2 fertilization will continue to play a role in maintaining the terrestrial carbon sink, but its effect may be declining.

Biosketch
Dr. Jing M. Chen is a Professor in the Department of Geography and Planning at the University of Toronto, Canada Research Chair, and Fellow of the Royal Society of Canada. He is also the adjunct director of the International Institute of Earth System Science at Nanjing University. He holds B.Sc. in 1982 from the Nanjing Institute of Meteorology in China, and Ph.D. in 1986 from the Reading University in the United Kingdom. His major research interests include (1) remote sensing of vegetation structural and physiological traits and function, and (2) quantifying carbon and water cycles of terrestrial ecosystems. He has published over 400 papers in refereed journals, which are cited over 20,000 times in the scientific literature with an H index of 73 (Web of Science). He is currently an Editor-in-Chief of Remote Sensing of Environment and an Associate Editor of the Journal of Geophysical Research-Biogeosciences, Canadian Journal of Remote Sensing, and Frontiers of Earth Science. He serves on the Expert Panel of the Global Change Program of the Chinese Ministry of Science and Technology and Scientific Steering Committee of the American Flux Network.
Abstract
Socioeconomic-environmental interactions across administrative boundaries are widespread around the world. However, socio-environmental system research and natural resource management usually focus on patterns and processes within a place and pay little attention to interactions with other places nearby and faraway. This talk will present an integrated framework of metacoupling (socioeconomic-environmental interactions within as well as between adjacent and distant places), introduce examples of applying the framework to giant panda conservation and economic development within and across the boundaries of a high-profile nature reserve in China, and discuss implications of the framework for natural resource management in metacoupled socio-environmental systems.

Biosketch
Dr. Jianguo Jack Liu is the Rachel Carson Chair in Sustainability and University Distinguished Professor in the Department of Fisheries and Wildlife, and director for the Center for Systems Integration and Sustainability. Dr. Liu is the founder of the International Network of Research on Coupled Human and Natural Systems and a past president of the US Regional Association of the International Association for Landscape Ecology. Dr. Liu received many distinguished awards in recognition of his scholarly achievements, including being elected to the American Academy of Arts and Sciences, the American Philosophical Society and a fellow of the American Association for the Advancement of Sciences (AAAS). He received the Gunerus Award in Sustainability Science from the Royal Norwegian Society of Sciences and Letters, and many more. He is among the most influential researchers in the world according to the Clarivate Analytics.

Metacoupling Framework and Implications for Natural Resource Management

Keynote Speech
Dr. Jianguo Liu
Rachel Carson Chair in Sustainability and University Distinguished Professor
Michigan State University, USA
Email: liuji@msu.edu

Indian Cities as Dynamic Integrated Socio-Environmental Systems

Keynote Speech
Dr. Harini Nagendra
Professor and Director
Azim Premji University Research Center, India
Email: harini.nagendra@apu.edu.in

Abstract
India’s cities are on a breakneck path to growth. Cities are engines of prosperity and promise, but also concentrations of pollution, stress, and disease. Episodes of flood, drought, heat waves, and smog are clear signals of a misguided focus on economic and infrastructure development. Instead, cities must be seen as integrated socio-environmental systems where human-nature relationships play a central role in influencing change. The patterns of growth in many Indian cities depended on local ecology and human uses of the environment, shaped by the geological structure and ecosystems around these cities. Yet over centuries, urbanization has considerably transformed human-nature relationships, to the point where the original socio-environmental system has been lost from memory. This talk will draw on archival material and contemporary research to demonstrate the dialectical and dynamic nature of human-environment relationships in fast growing Indian cities.

Biosketch
Dr. Harini Nagendra is Director of the Azim Premji University Research Center and leads the University’s Center for Climate Change and Sustainability. Over the past 25 years, Prof. Nagendra has been at the leading edge of research examining conservation in forests and cities of South Asia from the perspective of both landscape ecology and social justice. For her interdisciplinary research and practice, she has received a number of awards including the 2009 Cozzarelli Prize from the US National Academy of Sciences, the 2013 Elinor Ostrom Senior Scholar award, and the 2017 Clarivate Web of Science award. Her publications include the books “Nature in the City: Bengaluru in the Past, Present and Future” (Oxford University Press, 2016) and “Cities and Canopies: Trees of Indian Cities” (Penguin, 2019) as well as recent papers in Nature, Nature Sustainability, and Science. She writes a monthly column 'The Green Goblin' in the Deccan Herald newspaper, and is a well known public speaker and writer on issues of urban sustainability in India. Professor Nagendra has been a Lead Author on the IPCC AR5 reports, and a past Science Committee member of DIVERSITAS and the Global Land Programme. She engages with international science and policy through her involvement as a Steering Committee member of the Future Earth Programme for Ecosystem Change and Society, and the Future Earth Urban Knowledge Advisory Network. She is on the Advisory Board of the European Institute of Innovation and Technology’s Climate-KIC, the WRI Ross Centre for Sustainable Cities, and the Earth Leadership Program (formerly the Leopold Leadership Program).
LEVERAGING CONCURRENT GREEN EFFORTS IN THE PANDEMIC SHADOWED WORLD

DR. LI AN
Professor of Geography
San Diego State University, USA
Email: lan@sdsu.edu

Abstract
Green efforts—i.e., initiatives, programs, payments, or endeavors that restore, sustain or improve nature’s capacities to benefit human beings—are made to conserve such capacities from local to global scales. Increasingly, multiple green efforts are made to the same recipients or on the same geographic areas concurrently, which we define as concurrent green efforts. Despite their popularity, little attention has been paid to their potential spillover effects. Based on empirical data from around the world, we systematically explored whether spillover effects exist among three dimensions of concurrent green efforts: policy, their expected behavior, and corresponding gain(s). Surprisingly, we found strong evidence for horizontal (i.e., policy vs. policy, behavior vs. behavior, or gain vs. gain) spillover effects. Vertical (policy to behavior, behavior to gain, or gain to policy) spillover effects between different green efforts—often via unrecognized pathways—are also evident worldwide. Finally, temporal spillover effects are found to be emerging in many contexts, suggesting evolution of these spillover effects. Overlooking such spillover effects may blind and/or lose many nature’s services or benefits. We thus call for attention to these spillover effects so that concurrent green efforts are made to strengthen (not offset at minimum) each other, effectively securing nature’s services that are vital to mankind.

Biosketch
Dr. Li An is a full professor at San Diego State University in the USA. His research focuses on understanding, envisioning, architecting, and engineering complex human-environment systems for improved sustainability and resilience via a hybrid of data science, artificial intelligence, agent-based modeling and microsimulation, and spatial/applied statistics approaches. He is a Fellow of The American Association for the Advancement of Science (AAAS). He received multiple awards or recognitions from college, university, national, and international organizations. He has been leading or played a key role in research projects located in Nepal, Ghana, USA, and China. His service spans from local to international scales, such as guest-editing special issues, contributing to federal research/review panels, and serving on editorial boards of several prestigious international journals. He is Councilor-at-Large and Executive Committee member of the International Association of Landscape Ecology-North America.

HUMAN-WILDLIFE INTERACTION IN THE MID-HILLS OF NEPAL: FEEDBACK EFFECTS OF COMMUNITY FORESTS TO THE SOCIAL SYSTEM

MR. RAJESH BISTA
PhD Candidate, Department of Geography
University of North Carolina at Chapel Hill, USA
Email: raaj@live.unc.edu

Abstract
Human-wildlife conflict (HWC) is emerging as one of the major conservation challenges around the world. With the restoration of degraded forests after the initiation of the community forestry (CF) program, this issue is getting more prominent in the Mid Hills of Nepal. In this regard, there have been inadequate studies in CF landscapes where community-agriculture and forest are mosaicked together. This study is based on data collected from an extensive survey of 415 households from 15 community forest user groups and 1,325 GPS located cropland parcels owned by these households. This study comprehensively evaluated the HWC feedback effects of community forests to the social system, particularly livestock depredation and crop-raiding caused by the wildlife attracted to the community forests. These feedbacks directly influence the livelihoods of the local people. We found that 47 % of the cropland parcels experienced crop-raiding, and 29 % of the households lost livestock to wild-animals in the study area. The study also analyzed the economic loss incurred due to crop raiding and livestock depredation and found remarkable impacts of HWC on rural livelihood. We also found an increasing trend of cropland abandonment due to the crop-raiding incidence. The study also determined the socio-economic and bio-physical factors associated with crop raiding and livestock depredation and discussed the existing policy-loopholes of wildlife conflict management in the CF. The study provides recommendations to the forest managers and policy makers in designing effective HWC mitigation measures, that can be replicated in other countries practicing community-based forest management.

Biosketch
Mr. Rajesh Bista is a Ph.D. candidate in the Department of Geography at University of North Carolina at Chapel Hill. He received his B.S. degree in forestry science from Tribhuvan University, Nepal and M.S. in Development Studies from Purbanchal University, Nepal. His research interests include community-based forest management, human-environment interactions, community based climate change adaptation, GIS and remote sensing applications in natural resource management.
CAN COMMUNITY FORESTRY CONTRIBUTE TO THE SDGS? EVIDENCE FROM NEPAL

DR. RANDY BLUFFSTONE
Professor of Economics and Director of the Institute for Economics and the Environment
Portland State University, USA
Email: bluffsto@pdx.edu

Abstract
The seventeen UN Sustainable Development Goals (SDGs) are intended to guide the world toward a sustainable future that fully considers both human welfare and conserves the natural world. Forests are a key part of the SDGs, figuring prominently in perhaps half of the goals. They are important assets for people, delivering provisioning ecosystem services to over a billion people. They are also critical ecosystem linchpins, providing a variety of regulating and supporting services to people, other species and the planet. Forest devolution is a very important trend in global forest management, and most devolution has been to communities. Currently, about 30% of lower-income country forests are controlled by communities. Does community forest devolution support achieving the SDGs? What are potential roles for these forests and the communities that control them? The presentation will present empirical evidence from Nepal on the possible role of community forests and forest collective action more generally in carbon sequestration, equitable livelihoods and biodiversity protection. The presentation will also discuss key differences in the functioning of formal user groups and informal groups that de facto control local forests.

Biosketch
Dr. Randy Bluffstone is Professor of Economics and Director of the Institute for Economics and the Environment at Portland State University. His research and teaching interests focus on environmental and resource economics, including pollution policies, climate change and REDD+, deforestation in low-income countries and urban forestry. He is the author of a number of papers, book chapters and three co-edited books, including Forest Tenure Reform in Asia and Africa: Local Control for Improved Livelihoods, Forest Management, and Carbon Sequestration with Elizabeth J. Z. Robinson. Dr. Bluffstone is a faculty associate with the Environment for Development (EfD) Initiative and co-leads the EfD Forest Collaborative. In 2017/2018 Randy was a Fulbright Senior Scholar in Nepal and from 2006 to 2007 conducted collaborative research on land use and forestry policies in Ethiopia. Before coming to Portland State, Randy taught at the University of Redlands and was deputy director of the International Environment Program at the Harvard Institute for International Development (HIID) at Harvard University. While at Harvard, Randy directed HIID’s environmental policy program in Central Asia, and served for three years as senior environmental policy advisor to the Government of Lithuania. Dr. Bluffstone received his Ph.D. in economics from Boston University and was a US Peace Corps volunteer in Nepal.

A CRITICAL ANALYSIS OF HUMAN-ENVIRONMENT DYNAMICS THROUGH THE LENS OF ECOSYSTEM SERVICES: A CASE STUDY OF NEPAL

DR. SUNITA CHAUDHARY
Ecosystem Services Specialist
International Centre for Integrated Mountain Development (ICIMOD), Khumaltar, Lalitpur, Nepal. Email: sunita.chaudhary@icimod.org; suni.chaudhary@gmail.com

Abstract
The ‘ecosystem services’ concept is one of the most popular frameworks for understanding human-nature system today. Framed by political ecology, the paper will adopt environmental justice and discourse theories to explore the global ecosystem services discourse and analyse varied frictions that emerge when applied in Nepal. It will highlight how the global discourse is being interpreted in policy, and practice, and discuss the implications on ecosystem governance at the national and community scales. Further, the paper will discuss the risks and opportunities produced through global-national-local encounters of ecosystem services discourse in Nepal. As such, the paper will bring the grounded evidence on the dynamics of human-environment interactions.

Biosketch
Dr. Sunita Chaudhary works as Ecosystem Services Specialist at the International Center for Integrated Mountain Development (ICIMOD). She is responsible for research, policy inputs, capacity building and advocacy of evidence-based policy for conservation and sustainable development of Hindu Kush Himalaya. She is an established forester with almost a decade experience on natural resources management in Australia, Austria, Cambodia and Hindu Kush Himalaya region. Her research interests fall under the broad umbrella of conservation science and political ecology. She has a PhD from Macquarie University, Australia; MSc in Management of Protected Areas, Austria; and a graduate leadership program from the University of Hawaii, USA. She was also a visiting researcher at University of Cambridge, UK, and has been awarded several fellowships and grants including Nepal Bidhya Bhusan ‘B’; MQ Research Excellence Fellowship, East-West Centre Graduate Fellowship, Austrian Development Agency, Ford Foundation, WWF Prince Bernhard, Nuffic, International Tropical Timber Organisation (ITTO) and others. She has more than two dozen articles in high impact factor journals, and scholarly books to her credit. Sunita is a proud mother of two young girls with the younger one about 2-years old.
SUMMARY OF COMMUNITY FORESTRY IN NEPAL

DR. BIR BAHADUR KHANAL CHHETRI
Professor and Dean
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Abstract
Nepal’s forestry sector was administered under feudal system over several centuries, favouring the ruling elites before community forestry (CF) program was formally launched in 1978. The CF program was further strengthened through the forest act 1993 and forest regulation 1995. Community forests not only expanded rapidly but also moved from subsistence use to commercial management in the first two decades. After its initiation for thirty years, institutionalized scientific management was introduced. Over the fifty years of its history, CF has evolved from an initial community management forest to technical forestry and now gradually moving towards scientific forest management based on the sustained yield principle. At present, CF covers 2.6 million ha of national forest area managed by 23,500 CFUGs involving 3.3 million Nepalese households. In addition to ecosystem improvement, community forestry could contribute to reducing extreme poverty and hunger by concentrating on small scale forest based enterprises and lobbying for receiving environmental benefits, and through value addition in the forest products generated by the community forests. The program is also expected for the promotion of gender, equity and empowering women as well as ensuring environmental stability, that in turn contributes for sustainable development of the nation itself.

Biosketch
Dr. Bir Bahadur Khanal Chhetri is a Professor of Natural Resources Management and also the Dean of Institute of Forestry, Tribhuvan University, Nepal. He has a PhD degree in natural resource management from the University of Copenhagen, Denmark. Most of his research is concerned with forest poverty linkages, decentralized natural resource (forest) management and its livelihood improvement potential for local communities. He has published a numbers of peer reviewed journal articles, several research reports and discussion papers. As the Dean of the Institute of Forestry, Dr. Chhetri is responsible for all academic and administrative services of the Institute. This role is directly accountable for leading all aspects of operations to promote high levels of academic quality, student engagement, and student and faculty success in all programs and services.

URBAN VEGETATION IN CITIES, NEIGHBORHOODS AND PARCELS: THE ROLE OF SOCIOECONOMIC AND INSTITUTIONAL CONTEXTS

DR. RINKU CHOWDHURY
Associate Professor
Clark University, USA
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Abstract
Urban and suburban expansion is among the greatest sources of landscape change in the USA and globally. While such changes have been linked to ecological homogenization, research in urban socio-ecological systems and political ecology also shows that urban vegetation is unevenly distributed, linked to socioeconomic contexts, and strongly mediated by formal and informal institutions. I present a multi-sited, multi-scalar, collaborative study of urban vegetation in six U.S. cities, investigating the role of neighborhood (census block group) characteristics as well as formal and informal institutions. Integrating high-resolution remote sensing, secondary data analysis, and household and parcel surveys, we find that while neighborhood urbanicity and socioeconomic status shaped cover outcomes at the CBG scale, tree and grass cover on individual parcels were strongly linked to formal and informal institutions across the cities, including homeowner and neighborhood associations. Our systematic, cross-site approach (a) complements site-specific studies of urban vegetation, (b) integrates indices of landscape structure along with the more commonly examined tree cover extents, and (c) links neighborhood scale analyses to parcel-level vegetation with a particular focus on institutional drivers. Understanding the nature and extent of differentiation of urban landscapes and vegetative cover is critical for estimating the impacts of these outcomes at the local to regional scales, for improving equity in the planning and conservation of environmental amenities, and for developing strategies targeting urban sustainability.

Biosketch
Rinku is an Associate Professor at Clark University’s Graduate School of Geography and George Perkins Marsh Institute. Her background includes a bachelor's degree in Computer Science and Environmental Science (Wellesley College), a master's in Conservation Ecology and Sustainable Development (University of Georgia), and a PhD in Geography (Clark University). Her research, broadly interdisciplinary in scope and approach, focuses on human-environment interactions in social and ecological systems spread across diverse geographical locations. These include: tropical forest-agricultural mosaics (Mexico), urban residential land use and environmental outcomes (multiple sites in the continental USA), hydrology and
water policy in the Florida Everglades, and coastal mangrove and urban vulnerability to anthropogenic and climate change (Americas, South Asia). She is particularly interested in linking theoretical, methodological and field-based approaches from the social and ecological sciences to understand land and (agri)biodiversity management in rural and urban contexts, how institutional structures and local agency interact to shape landscapes, and the evolution of adaptive strategies in the face of climate and political-economic change. She is active in the US Long-Term Ecological Research (LTER) network, has co-chaired the Global Land Programme (the international scientific programme on land use/cover change), and was a coordinating lead author of Chapter 4 in the historic Inter-governmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Global Assessment of biodiversity released in 2019.

THE CHANGING PRIORITIES OF COMMUNITY FORESTRY GOVERNANCE IN NEPAL

DR. BISHNU PRASAD DEVKOTA
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Abstract
The involvement of local people in natural resource governance through active participation of disadvantaged people in decision-making and justice in benefit sharing have been the emerging strategies for sustainable management of natural resources all around the world. However, closer scrutiny of the values of resource governance is needed in order to evaluate its effectiveness, contribute to its legitimacy and understand the interactions of governance attributes. Both at the international and national levels, there is a lack of clarity around the kinds of governance arrangements that can be implemented on the ground when striving natural resource management, particularly forest resources. This paper assesses the practicability and priorities of community forestry governance to articulate climate change mitigation initiatives by forest users. The focus includes benefit sharing process, patterns of engagement of disadvantaged groups and its impact on social inclusivity of community forest user groups in Nepal. Based on grounded theory of qualitative approaches and through the lens of a theoretical framework of common resources governance, the study assesses the similarities and differences between policy goals and observations of forest governance values and their impacts, explains the nature of factors affecting benefit sharing process and investigates how social inclusivity enhances representation and deliberation of disadvantaged groups in community forestry. Qualitative differences in the implementation of governance initiatives have increased the level of dissatisfaction among the community forest users. Rich users of community forests benefit comparatively more due to their control over decision-making structures. The formal structures for engagement of disadvantaged groups in community forestry do not provide enough space for genuine participation. However, proportional representation of disadvantaged groups has been achieved but the criteria need revisiting to prioritize the inclusion of highly dependent users in community forestry.

Biosketch
Dr. Devkota is currently an Associate Professor in the Institute of Forestry, Pokhara Campus, Tribhuvan University. He obtained his BS and MS degrees in Forestry both from the Institute of Forestry, Pokhara Campus, Tribhuvan University in 2005 and 2009, respectively. He earned his PhD from the University of Eastern Finland in 2019. Before he joined the Institute of Forestry, he was an Assistant Professor at Kathmandu Forestry College during 2010-2012. His research interests include forest governance, community-based forest management and REDD+.

TWENTY-FIVE YEARS OF FOREST DYNAMICS IN NEPAL

DR. JEFFERSON FOX
Senior Fellow and Acting Director
Research Program at the East-West Center, USA
Email: FoxJ@EastWestCenter.org

Abstract
Since the 1980s, Nepal, one of the poorest countries in the world, has gained worldwide recognition for its successful community forestry program. Researchers, however, have not previously documented the spatially explicit impacts of this forest transition because topographic effects, e.g., shading, clouds, snow, and ice, have hindered remote-sensing imagery analysis. This multi-disciplinary research project built a comprehensive database of forest cover in Nepal between 1992 and 2016, identified the biophysical and socioeconomic variables associated with change and quantified their respective influences, and assessed how community forestry and foreign labor migration and remittances affect forest cover change across the country.

Biosketch
Dr. Jefferson Fox is a Senior Fellow and Acting Director of the Research Program at the East-West Center, USA. He conducts research on land-use and land-cover changes in Asia and the impact of these changes on the region and the global environment. Other areas of study include resource-management systems and land-cover transitions in Montane Mainland Southeast Asia—their role in altering regional hydrological processes under a changing climate; the ethics, values, and practice of spatial information technology and society; and natural resources and violent ethnic conflict in the Asia Pacific region. He holds a Ph.D. in development studies from the University of Wisconsin-Madison.
UNDERSTANDING THE INTERACTIONS OF 'FORESTRY-WATER-LIVELIHOODS' NEXUS TO ADDRESS GLOBAL CHANGE ISSUES WITH NATURE-BASED SOLUTIONS (NBS) IN NEPAL

DR. LU HAO
Professor of Applied Meteorology, Nanjing University of Information Science and Technology, Nanjing, China; Key laboratory of Meteorological Disaster, Ministry of Education (KLME)/Jiangsu Key Laboratory of Agricultural Meteorology
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Abstract
An international collaborative research project has been funded in 2020 by the United Nations Environment Programme (UNEP) and National Natural Science Foundation of China to address ‘Forest-Water-Livelihood’ nexus in Nepal. The overarching goal of this effort is to understand the interactions of forest management, water resource, and human wellbeing under a changing climate. ‘Community Forestry’ in Nepal is recognized as an effective way to improve people's livelihood toward sustainable development aligned with the principles of a Nature-based Solutions (NbS) approach. However, scientific data on the effectiveness of NbS are lacking globally. Implementations of NbS may have unintended and unwanted consequences when the tradeoffs of ecosystem services are not addressed. There is still a large knowledge gap on how land management policies and climate change impact on forests, water, and ecosystems services, and people's livelihood in Nepal. This study will focus on: (i) how Nepal’s climate and vegetation (including native forests and community forests) has changed over the past decades? (ii) has the climate and vegetation significantly changed ecohydrology characteristics during the past three decades in Nepal? and (iii) what is the contribution of vegetation and climate change to hydrological response and its effects on local water availability? The variability, extremes, and trends of precipitation, temperature, and watershed hydrology are examined. A water balance model (WaSSI) will be revised and parameterized at the national scale to model evapotranspiration (ET), streamflow, ecosystem productivity across Nepal. Climate change, land cover change (e.g., forest management) and associated changes in leaf area index (LAI) (greening up phenomena) will be investigated using MODIS remote sensing products and historic climate records and future climatic projections. The results from this study will contribute to understanding human-nature interactions that are essential in guiding local forest and watershed management practices in Asians ‘Water Tower’ region.

Biosketch
Dr. Lu Hao is a professor in the College of Applied Meteorology, Nanjing University of Information Science and Technology (NUIST), Nanjing, China. She holds Ph.D. and Master's degrees in Physical Geography from Beijing Normal University, and B.S. in Meteorology from NUIST.

MOBILE SPECIES, GLOBAL INDUSTRY, AND NATIONAL INTEREST IN THE WESTERN AND CENTRAL PACIFIC OCEAN TUNA FISHERY

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Abstract
The Western and Central Pacific Ocean is home to one of the earth's largest and most valuable fisheries. Tuna in this region is highly migratory and their ranges span the high seas and the national waters of sovereign Pacific Island countries. Their mobility, as well as that of the transnational firms that hunt them through the ocean, intimately shape what is institutionally possible for sustainable and equitable management of this fishery. In this presentation, I will focus on the integrated socio-environmental dynamics that shape and constrain Pacific Island countries' tuna-based development aspirations. I will highlight how attention to socio-environmental dynamics has enabled very small and remote Pacific Island countries to position themselves as leaders in the management of highly complex common-pool resource system, as well as the intertwined political-economic and ecological dynamics in a warming ocean that will shape future management prospects.

Biosketch
Elizabeth Havice is an Associate Professor of Geography at the University of North Carolina at Chapel Hill. She uses the lens of governance to explore distributional outcomes in marine spaces, food systems, and global value chains. She is a co-founder of the Digital Oceans Governance Lab that explores intersections of data technologies and oceans governance, and livelihood toward sustainable development aligned with the principles of a Nature-based Solutions (NbS) approach.
ABSTRACTS & BIOSKETCHES

DIVERGENT SOCIAL-ECOLOGICAL OUTCOMES OF PAYMENTS FOR ECOSYSTEM SERVICES: THE CASE OF CHINA’S CONVERSION OF CROPLAND TO FOREST PROGRAM IN TWO RURAL SITES

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Abstract
China’s Conversion of Cropland to Forest Program (CCFP) is one of the world’s largest Payments for Ecosystem Services (PES) programs. Its socioeconomic-ecological effects are of great interest to both scholars and policymakers. However, little is known about how the socioeconomic-ecological outcomes of CCFP differ across geographic regions. This study integrates household survey data, satellite imagery, and statistical models to examine labor migration and forest dynamics under CCFP. The investigation is carried out at two mountainous sites with distinct biophysical and socioeconomic conditions, one in a subtropical mountainous region (Anhui) and the other in the semi-arid Loess Plateau (Shanxi). We found divergent CCFP outcomes on migration behavior, stimulating both local- and distant-migration in the Anhui site while discouraging distant-migration in the Shanxi site, after controlling for factors at the individual, household, community, and regional levels. Forest recovery is positively associated with distant-migration in Anhui but with local-migration in Shanxi. Contextual factors interact with demographic-socioeconomic factors to influence household livelihoods in both areas, leading to various socio-ecological pathways from CCFP participation to enhanced forest sustainability. Regional differences should therefore be considered in the design of future large-scale PES programs.

Biosketch
Qi Zhang is currently a research scholar in the Department of Earth & Environment at Boston University. His research interests include understanding social-ecological dynamics in coupled human and natural systems, with focuses on land use change, forest conservation, and rural livelihoods. By using statistical models and remote sensing techniques, he integrates household survey data and satellite observations to understand how land use and land cover changes as emergence of human-environment interactions across scales.

CHINA’S ONGOING VEGETATION GREENING AND ITS INFLUENCES ON CARBON AND WATER DYNAMICS

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Abstract
China has experienced an unprecedented vegetating greening largely due to the national scale reforestation and forest protection programs. Such a greening marks China as the largest contributor to the Earth’s greening since 2000. The enhanced vegetation activity may have significantly influenced terrestrial carbon sequestration and water consumption, which inversely exert key feedbacks to the climate. In this talk, Dr. Zhang will show the unique pattern of China’s ongoing vegetation greening at different scales and highlight its influences on terrestrial carbon and water dynamics in the context of climate change and anthropogenic activity based on remote sensing and ecological models.

Biosketch
Dr. Yulong Zhang is an Assistant Research Professor in the Institute of Secure & Sustainable Environment from University of Tennessee, Knoxville (UTK). Before joining UTK, Dr. Zhang conducted his post-doc in University of North Carolina at Chapel Hill and received his PhD from University of Chinese Academy of Sciences. Dr. Zhang’s research interests are mainly focused on remote sensing, ecological modeling, vegetation dynamics and global carbon and water cycles. His research projects have been supported by NASA Carbon Cycle Sciences, National Science Foundation, USDA Forest Service and DOE-ORNL.
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