NATIONAL CONFERENCE 2025

March 25 - 27

Connecting Practitioners & Researchers

Royal University of Bhutan

Thematic areas: *Climate Crisis, Natural Disaster, Environmental Sustainability, Agriculture & Food*

Organised by:

College of Natural Resources & the Department of the Academic and Research Services, OVC, RUB

Co-Sponsored by:

B-KIND Tarayana Foundation and Royal Society for Protection of Nature, and Asian Food & Agriculture Cooperation Initiative

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A. Conference Program

Thematic areas: *Climate Crisis, Natural Disaster, Environmental Sustainability, Agriculture & Food.*

DAY 1

25 March	Agenda	Responsible Person
8.30 - 9.00	Registration of participants	Organizing team
9.00 - 9.10	Welcome remarks	DRIL, CNR
9.10 - 9.25	Opening address by the Chief Guest	Dasho Secretary, MoAL
9.25 - 9.40	Keynote address by Dasho VC, RUB	Dasho VC, RUB
9.40 - 9.45	Program overview/Introduce partners	MC/Organizers
9.45 - 10.15	PHOTO SESSION & TEA BREAK	
SESSION I: Moderator Dr. Sonam Tashi, Assoc Professor & DRIL, CNR		
10.15-10.30	Altitude, Land Use and Soil Depth Effects on Earthworm Density and its Relationship to Soil Properties in an On-Farm Study	Ms.Ameeta Adhikari (NSSC, MoAL)
10.30-10.45	Impact of Arecanut Plantation on Farming System and Livelihood: A Case Study of Chhuzanggang Gewog, Sarpang	Mr. Ugyen Gyeltshen (NSSC, MoAL)
10.45-11.00	Panbang Youth Cooperative	Mr. Pema Zangpo, Agri-entreprenuer, Zhemgang
11.00-11.15	Re-imagining Bhutanese Agriculture in a Land and Labour Constrained Scenario	Dr. Nawang Norbu (Executive Director, BES)
11.15-12.15	QA Session in plenary	Moderator: Dr. Sonam Tashi
12.15-13.15	LUNCH	
SESSION II: Moderator Dr. Ugyen Thinley, Asst. Professor & DAA, CNR		
13.15-13.30	Role of local traditions and cultural norms for environmental sustainability, health, and well being	Dr. Tshering Yangden (Tarayana)
13.30-13.45	Unlocking Nature's Wealth: Bhutan's Model for Conservation and Sustainable Use of Biodiversity	Mr. Mani Prasad Nirola (NBC, MoAL)

13.45-14.00	Transboundary Micro-Plastic Contaminations in Fish and Aquatic Food Chain along Brahmaputra River	Ms.Yogeeta Dahal (Lecturer, CNR)
14.00-15.00	QA Session in plenary	Moderator: Dr. Ugyen Thinley
15.00-15.30	TEA BREAK/Poster Presentation	
PANEL SESSION 1: Moderated by Dr. Sangay Dema (NBC, MoAL)		
15.30-16.30	PANEL SESSION 1: Youth and Women in Agriculture: Harnessing Their Potential for Climate Action.	Panelists: Dr.Tulsi Gurung, (CNR)/Mr.Mahesh Ghimiray (CNR)/Ms.Kesang Tshomo (DoA, MoAL)/Mr. Nado (Asst. DAO, Wangdue)
16.45-17.00	DAY 1 CLOSE/ Followed by Reception Dinner	MC/Organizers

Day 2

26 March	Agenda	Responsible Person
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SESSION III: Moderator Dr.Tulsi Gurung, Assoc.Professor, CNR		
9.05-9.20	*Tupistra* (Nakima) - an Underutilized Plant Species and its Socio-economic Contributions	Dr. Sonam Tashi (CNR)
9.35-9.50	The impact of African Swine Fever (ASF) on Bhutan's food security	Dr. Rinchen Dorji (DVO, Punakha)
9.50-10.05	Transhumant pastoralism in a changing world: challenges and opportunities to sustainable yak farming in Bhutan	Dr. Nedup Dorji (Lecturer, CNR)
10.05-11.05	QA Session in plenary	Moderator: Dr. Tulsi Gurung
11.05-11.25	TEA BREAK	
PANEL SESSION 2: Moderated by Mr. Mani Prasad Nirola, NBC, MoAL		
11.25-12.25	PANEL SESSION 2:Natural Resource Management and Conservation: Balancing Development and Sustainability.	Panelists: Dr.Nawang Norbu (BES) /Dr.Sangay Dema (NBC)/Dr.DB Gurung (CNR)/ Mr.Tsheten Dorji (RSPN)
12.25-13.25	LUNCH	

SESSION IV: Moderator Dr. Nedup Dorji, Lecturer, CNR		
13.25-13.40	Knowledge and Public Perception Toward Conservation of Bats in Bhutan	Mr. Sangay Tshering (Lecturer, CNR)
13.40-13.55	Assessing the Fish Diversity of Bhutan using a Combination of Molecular and Morphometric Techniques	Dr. DB Gurung (Professor, CNR)
13.55-14.10	Ecohydrological factors regulating Brown Trout in Himalayan River Systems in Thimphu, Bhutan	Mr. Laxmi Sagar (Assoc. Lecturer, CNR)
14.10-15.10	QA Session in plenary	Moderator: Dr. Nedup Dorji
15.10-15.30	Closing of Plenary Sessions/ Collaborations & Way forward	Dr. Sonam Tashi, DRIL,CNR
15.30-16.30	HIGH TEA	

Master of Ceremony (MC): Ms. Kinzang Tshomo & Mr. Wangdi Rigsel, Final year , BSc Forest Science.
Rapporteur: Ms. Sonam Lhazeen Wangmo & Mr. Namgay Wangchuk, Final year, BSc Forest Science

Day 3		
27 March	Agenda	Responsible Person
Session V: Technical Session - Policy brief		
8.30-12.30	Exercise to formulate a policy brief on waste management in Bhutan.	Ms. Sonam Wangmo, Chief, Research & Development, DeARS
12.30-13.30	LUNCH	
13.30-16.00	Presentation by the working team/ Discussion and Collaborations	Expert Team (TBC)
16.00-16.30	A way forward and closing	DRIL,CNR/DeARS,RUB

B. Bio and Abstracts of the Speakers

1. Altitude, Land Use and Soil Depth Effects on Earthworm Density and its Relationship to Soil Properties in an On-Farm Study

Ameeta Adhikari, currently serves as the Assistant Laboratory Officer of the National Soil Services Centre, Department of Agriculture under Ministry of Agriculture and Livestock. She holds a Bachelor of Science Degree with Honours in Microbiology. She is currently working in the field of Soil microbiology, focusing on isolating beneficial microbes from soils associated with various commercial crops cultivated across different regions of the country. These microbes are being studied for their potential use in biofertilizer production and possible applications in bio-prospecting processes.While working in this field, she has recognized the crucial role of molecular biology and biotechnology, mainly the use of sequencing machines and PCR techniques for identifying microbes at the strain level. Therefore, this is an area that she is currently interested in and keen on exploring more about.

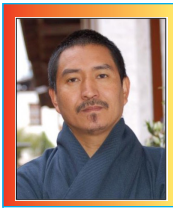
Abstract:

Ameeta Adhikari[1], Yadunath Bajgai[2,3], Jimba Rabgyal[3], Rattan Lal[2], Nima Tshering[1], Sarda Gurung[1] and Tashi Wangdi[1]

Earthworms play a critical role in soil ecosystem functions through the cycling of organic matter and nutrients. However, some land uses or environmental conditions provide more favorable habitats for them than others. Therefore, the objectives of this study were to evaluate the prevalence of earthworm density and its relationship to land uses and soil properties. The study was conducted in three districts in Bhutan-Wangdue Phodrang, Chhukha, and Dagana-across three land uses: organic fields (OrgF), conventional fields (ConF), and natural vegetation (NatV). It also accounted for three altitudinal gradients (high-, mid-, and low-altitudes) and three soil depths. The results indicated that overall earthworm density at high-altitude sites was significantly ($P < 0.001$) higher than that at mid- and low-altitude sites. Further,

across altitudes and soil depths, OrgF sites exhibited a significantly ($P < 0.001$) higher earthworm density (120 earthworms m^{-2}) compared to NatV (56 earthworms m^{-2}) and ConF (43 earthworms m^{-2}) sites. Moreover, earthworm density decreased significantly ($P < 0.001$) and successively with increasing soil depth. The coefficient of determination ($R^2 \geq 0.51$; $P < 0.001$) demonstrated a positive and moderate relationship between earthworm density and soil organic C and total N in OrgF sites, whereas this relationship was weak ($R^2 \leq 0.22$) in ConF sites and absent in NatV sites. In conclusion, substituting chemical fertilizers with organic manures could increase earthworm density by enhancing soil health through the cycling of organic materials and nutrients in the soil. These findings provide empirical evidence for the prevalence of earthworms in different land use types across altitudinal gradients and offer valuable decision-making insights for land users and policymakers alike.

2. Assessing the Fish Diversity of Bhutan using a Combination of Molecular and Morphometric Techniques



Professor Dhan Bdr Gurung joined the Royal Civil Services of Bhutan in 1989 and joined the Natural Resources Training Institute as a Lecturer in 1992. He continued to serve in the institute and became a faculty member in the College of Natural Resources of the Royal University of Bhutan in 2006. He has MSc in Forestry from Dehradun, India and MSc in Natural Resources Management from the University of Edinburgh in Scotland. He completed his PhD from ETH, Zurich, Switzerland. He has served as the Dean of Academic Affairs and the Dean of Research and Industrial Linkages in the college. He also served as the project coordinator in various projects such as the project funded by Danida, Norway and currently by the Swiss National Science Foundation, Switzerland. He is currently serving as a Professor in the Department of Forest Science in the college and has contributed significantly in fish and orchid taxonomy of Bhutan.

Abstract:

DB Gurung, Karma Wangchuk and Ugyen Dorji

Bhutan, which is located in the eastern Himalayas, is part of the 10 global biodiversity hotspots. While the terrestrial flora and fauna have been well studied, aquatic biodiversity remains under surveyed. The first ichthyofaunal diversity of Bhutan was done in 1978 which recorded 41 fish species. The list was reviewed in 1999 without any change in the number. However, the academic rigour to ichthyofaunal study was initiated in 2009. Since then, there is a record of 109 species of fish known to occur in Bhutan. Since the conventional morphometric method is not efficient in fish diversity study for many groups such as nemacheilids and sisorids, this study made attempts to combine the morphometric and molecular methods to assess the fish diversity of Bhutan. While the morphometric method relied on meristic counts, counts, banding patterns, and colours; the molecular method primarily used DNA barcoding targeted to CO1 gene. In few cases, 16S rDNA and 12S rDNA genes were also used in combination with the CO1 gene. Currently, the fish diversity of Bhutan stands at about 125 species. With shifting focus to molecular study, it is projected that the fish diversity of Bhutan will extend beyond the current figure of 125 species.

3. Unlocking Nature's Wealth: Bhutan's Model for Conservation and Sustainable Use of Biodiversity

Mr. Mani has been working at the National Biodiversity Centre, Ministry of Agriculture & Forests especially looking after the Bioprospecting and ABS program, and has 15 years of experience working in the field of biodiversity conservation, bioprospecting and Access and Benefit Sharing. His work envisions deriving tangible benefit from Bhutan's rich biodiversity and associated traditional knowledge for the enhancement of conservation and rural livelihood and the promotion of people's leadership in conservation. He is the Bhutan's National Focal Point for the Nagoya Protocol. He has authored a number of scientific publications and technical and policy papers. On the academic front, Mr. Mani has a M.Sc. in Mountain Forestry from the University of Natural Resources and Life Sciences, Vienna, Austria.

Abstract:

Bhutan, a biodiversity hotspot, has taken significant strides in implementing the Nagoya Protocol on Access and Benefit Sharing (ABS) to safeguard its genetic resources and traditional knowledge. With its Access and Benefit Sharing Model, Bhutan addresses the challenges of biopiracy and resource misappropriation by fostering sustainable and equitable utilization of biodiversity. This paper highlights Bhutan's journey in implementing ABS, from instituting its program in 2009 to revising the Biodiversity Act in 2022. Through its ABS framework, Bhutan has developed standardized agreements, such as Material Transfer Agreements (MTAs) and Benefit Sharing Agreements, to regulate access and ensure fair benefits for custodians of traditional knowledge. These measures have led to the successful signing of 14 ABS agreements and the development of 13 bioprospecting-based products, including partnerships with global companies like Chanel Parfums Beauté, Quantum Pharmaceutical Ltd, and BlueZones Group. Notable products, such as anti-ageing creams and nutraceuticals, underscore Bhutan's capacity for high-value biodiversity-based enterprise development. The establishment of the Bhutan ABS Fund ensures sustainable financing for biodiversity conservation. However, Bhutan faces challenges, including limited capacity, low awareness, and gaps in product certification and supply chains. To overcome these, priorities include strengthening technical and laboratory capacities, fostering community-private sector collaborations, and enhancing branding and value addition to products.

Bhutan's ABS model showcases the potential of leveraging traditional knowledge and biodiversity for sustainable development. Its experience provides valuable insights for countries seeking to balance conservation and economic growth through equitable bioprospecting initiatives.

4. Re-imagining Bhutanese Agriculture in a Land and Labour Constrained Scenario

Nawang Norbu (PhD) is the Founder and Executive Director at the Bhutan Ecological Society. He is also Center Director of the Center for Climate and Sustainable Futures, a collaborative research and education initiative between the School for Field Studies in the US, the Royal University of Bhutan and the BES. Recently, he helped craft Bhutan's RNR Strategy 2030, and also drafted, in collaboration with the Royal Government and the FAO, the national pathways to transform Bhutan's food systems. Nawang is committed to building a just and verdant world and continues to explore the drivers and consequences of development and change.

Abstract:

Close to 60% of the Bhutanese population continue to rely on subsistence-based agriculture. This equates to a farmer feeding only herself/himself and one additional non-farming Bhutanese population. Efficiency, yield and production are constrained by low land holdings, steep terrain, and low availability of farm labour. Across the world, as countries develop, the contribution of primary sectors such as agriculture to employment, wanes. We contend that Bhutan will be no exception to this global trend. Based on the secondary data, we examine land holding patterns, rates of rural-urban migration, and generic farming challenges which constrain agriculture productivity. Eighty-two percent of Bhutan's farming households own less than 5 acres of land (with 99% owning less than 5 acres of wetland; and 85% own less than 5 acres of dryland). Productivity on these small land holdings is further constrained by an aging farming population, and lack of farm labour, due to continued migration of youth, from rural to urban areas. Extant strategies aimed at developing farming, including disbursement of input subsidies, have not resulted in a robust agricultural sector. This is made clear by the significant rise in imports of agricultural produce over the last two decades. Given small land holdings, continued loss of farm labour, and allied factors which limit production, we propose a radical re-imagination of Bhutan's agricultural sector to prepare for a labour constrained future in the coming decades, where a significant proportion of Bhutanese population will not engage in farming, as their primary source

of income. Amongst other things, this re-imagination should provide frameworks to consolidate farms; upscale support to aggregators; promote the adoption of site-specific technology and crops; and allow for import of seasonal farm labour.

5. Transhumant Pastoralism in a Changing World: Challenges and Opportunities to Sustainable Yak farming in Bhutan

Nedup Dorji is a Lecturer at the College of Natural Resources, The Royal University of Bhutan in 2007. In 2008, he was awarded for the Thai International Cooperation Agency to pursue a MSc in Agriculture at Khon Kaen University, Thailand (graduated in 2010). During his MSc, he assessed genetic variations of Bhutanese indigenous chickens, and compared with Thai native chickens and commercial chicken lines. In 2016, Nedup was awarded the Netherlands University Foundation for International Cooperation in Higher Education to pursue a PhD study at the Farm Technology group in collaboration with the Animal Production Systems group of Wageningen University. His study focused on transhumant yak farming in Bhutan.

Currently, he is the Managing editor and editorial board member of the Bhutan Journal of Natural Resources and Development (BJNRD) and till date he has been working as the Lecturer at the College of Natural Resources, The Royal University of Bhutan.

Abstracts:

Nedup Dorji [1*],Marjolein Derks [2], Peter W.G. Groot Koerkamp[2] and Eddie A.M. Bokkers [3]

In the high altitude of Bhutan, yak farming is the main livelihood of transhumant pastoralists living 2500 m above sea level. However, yak farming is under pressures because of external factors such as socioeconomic developments, policies and climate change. Little is known about the impact of these factors on yak farming, and what

policies and interventions might be required to sustain yak farming under these pressures. Therefore, the aim of this study was to assess the impact of external factors and management on yak farming in Bhutan, with a focus on past developments, the current situation and future perspectives in yak farming. Overall, increasing yak predation by predators, decreasing forage availability in the rangelands, and decreasing number of successors are the major threats to yak farming, while the market to sell yak products is the least threat. The factors causing forage shortage are specific to certain regions, e.g. competition with the horse population (west), cordyceps collection (central and west) and prohibited burning of shrubs around rangelands (east and central). Although concerns around yak farming have increased over the years due to external factors, most herders (82%) wish their children to continue yak farming in the future. Nonetheless, over half of the herders (58%) and most livestock professionals (96%) think that the number of yak farming families will decline in the future. To get insight into how different stakeholders perceive the challenges and opportunities related to yak farming, six focus group interviews were organised with different stakeholders (herders and representatives of governmental bodies). Most problems and solutions identified in the focus group interviews differed between the stakeholder groups. This suggests a need for a multi-stakeholder dialogue aiming to discuss problems and solutions together with different stakeholders. The government should streamline socioeconomic development by supporting and improving basic facilities in yak farming villages (e.g. better access to communication, animal health services), pay attention to human-wildlife conflicts and forage shortage, and explore sustainable income based on yak farming.

6. Panbang Youth Cooperative

Mr. Pema Zangpo is from Pongchaling, Panbang, Zhemgang Dzongkhag. He holds a Bachelor's degree in Environmental Science from Sherubtse College. He is one of the founding members of the Panbang Youth Cooperative, and currently serves as its secretary and marketing manager.

7. The Impact of African Swine Flu on Bhutan's Food Security

Rinchen Tshering holds a Bachelor of Veterinary Science and Animal Husbandry (BVSc & AH) degree and currently serves as the District Veterinary Officer under the Ministry of Agriculture & Livestock, Department of Livestock, Dzongkhag Administration, Punakha, at the District Veterinary Hospital. In addition to his professional role, he is an adjunct lecturer at the College of Natural Resources, where he teaches Veterinary Microbiology & Parasitology and Public Health for Sustainable Development. His research interests focus on Animal Health, the Animal Disease Economy, Transboundary Diseases, and Public Health.

Abstract:

African swine fever (ASF) is a highly contagious viral disease of domestic and wild pigs that has devastating effects on pig populations and the farming economy. The global spread of ASF has devastated the piggery farms, often an important source of income for the pig-rearing families. Globally, pork is a major source of animal protein; therefore, the disease poses serious threat to global food security. However, the impact of ASF on food security in Bhutan, an import-dependent country remains poorly explored. Government reports providing secondary data were utilized to assess the impact of ASF on pork production and market prices with a focus on its impact on national food security. Since the first case of ASF in May 2021, Bhutan reported 24 ASF outbreaks across 10 districts of the country. From May 2021 to June 2024, 336 pigs died due to ASF; 1712 pigs were culled in preemptive culling measure to contain the further spread of the disease. This has resulted in estimated loss of 143.4 MT pork in the country. As Bhutan imports pork to meet the consumer demand in the country (about 1224 Metric Ton), loss of pork production would further shift the balance of trade to negative and raise concerns over food security. Despite the series of outbreaks over past 3 years, Bhutan maintained its domestic pork production at levels comparable to recorded prior to the outbreak. These findings recommend continued proactive containment strategy in management of future outbreaks, implementation of preventive measures and enforcement of farm biosecurity measures to avoid

future outbreaks. The implementation and enforcement of these measures through close collaboration among various stakeholders are critical in mitigating the impact of African Swine Fever (ASF) on national food security and reducing the economic burden on farmers.

8. Knowledge and Public Perception Toward Conservation of Bats in Bhutan

Mr. Sangay Tshering is a lecturer at College of Natural Resources (CNR). He started working on bats since 2016 while pursuing MSc. in Environment Management in India. Currently, he is working on 'DNA Barcoding and Phylogenetic analysis of bats of Bumthang District, Bhutan' funded by College Research Grant (CRG).

Abstract:

Bats constitute the second most diverse order of mammals with more than 1400 species globally. In Bhutan, bats are lesser known and low profile species as we don't have even a 'check list'. In 2004 Bhutan is reported to have the record of 65 species which represents 33% of mammal taxa. However, a proper and exhaustive study is required to confirm its actual presence. Exact number of species present in Bhutan still remains uncertain as the information on many of the species is solely based on literature surveys. At present, a reliable diversity and distribution database is available for species recorded from eight Districts (Chhukha, Punakha, Dagana, Sarpang, Thimphu, Paro, Bumthang, Haa and few locations from other district). For this, a combination of capture and acoustic methods were used. Capacity building events and conservation awareness were also conducted as there are different myths. Its important conserve as they are one of the important components of forest ecosystem and agriculture farming as pollinators, seed dispersers and pest controllers.

9. *Tupistra* - an Underutilised Plant Species and its Socio-economic Contributions

Assoc. Professor (Dr.) Sonam Tashi currently serves as the Dean of Research and Industrial Linkages at the College of Natural Resources, Royal University of Bhutan. Prior to his current position, Dr. Tashi served as the Dean of Academic Affairs. He is the Editor-in-Chief of the Bhutan Journal of Natural Resource Development and also serves as an Editor for the International Journal of Environment. Previously, he was an Associate Editor of the official journal of the International Society of Organic Agriculture Research. Dr. Tashi has authored numerous peer-reviewed articles and is a regular reviewer for both national and international journals. He is specialized in organic and sustainable agriculture practices.

Abstract:

The *Tupistra* species, native to the Eastern Himalayas, serves as both a delicacy with therapeutic properties and a source of income for farmers. Although its domestication is getting popular among farmers, studies on this species remains relatively less. Therefore, this study aimed to evaluate the socio-economic contributions of *Tupistra* species. Using the snowball sampling method, 200 farmers across four districts who domesticate as well as depend on the wild collection of *Tupistra* species were identified and interviewed using semi-structured questionnaires. Results showed that farmers earned between Nu 5,100 to more than Nu 21,000 in a season, with income variations depending on market location and whether middlemen were involved or not. The income earned from the sale was used in various household expenses, including annual rituals, land tax payments, children's education and the purchase of seeds and fertilizers. Approximately 65% of farmers depended on wild *Tupistra* collection for sale and consumption, while 35% practised domestication, with the majority (31%) cultivating about half an acre. By promoting domestication, rural livelihoods could be improved and at the same time pressure on wild collection could be reduced thus conserving *Tupistra* species in their natural habitats.

10. Role of local traditions and cultural norms on community wellbeing and environmental sustainability

Tshering Yangden is a Senior Researcher with the Tarayana Center for Research Development. She has a master's Degree in Economics from Oita University in Japan, a second master's in Sociology from the University of Canterbury in New Zealand, and completed her PhD in Sociology from the University of Wollongong in Australia. She has conducted several research on social issues in Bhutan, particularly in the areas of gender, domestic violence, and human trafficking. Besides being a freelance consultant, she also worked as the National Project Coordinator for BAFRA, the then Ministry of Agriculture and Forests, and worked on drafting the Biosafety Rules and Regulations of Bhutan.

Abstract:

Tshering Yangden[1] and Tulsi Gurung[2]

Traditional practices and indigenous knowledge are integral to environmental conservation and sustainability. These practices stem from a community's extensive understanding of their local environment, cultivated over generations, which promotes sustainable interactions with nature across centuries. This traditional knowledge manifests in various daily activities, including sustainable agricultural techniques, management of natural resources, medicinal herbs, and spiritual beliefs that honor the sanctity of the natural world. This research aims to document the intricate web of local traditions and cultural practices, their influence on community well-being, and their role in nature preservation in the gewogs of Laya in Gasa, Dzomi and Kabjisa, in Punakha, and Gangtey and Phobji gewogs in Wangdue Phodrang. A qualitative research approach explored traditional knowledge, spiritual beliefs, and community-based healing practices about nature. The findings revealed that various practitioners, such as shamans, utilize plants for ritualistic purposes, while joint fixers employ herbs for treating dislocations and fractures, and hot springs are revered places of various healing, highlighting the community's commitment to protecting these species and sites. Additionally, traditional agricultural methods contribute to environmental

protection through soil conservation and use of local plants as pest repellent, and crop biodiversity via seed preservation and crop rotation. Astrologers also play a role by advising individuals on the significance of honoring sacred sites. The reliance on astrologers for selecting auspicious dates for significant dates is decreasing with the availability of information from online sources. Nevertheless, their role in performing rituals aimed at achieving positive results remains significant. Consequently, the spiritual belief in the detrimental effects of polluting sacred areas fosters a culture of respect for nature, thereby upholding its sanctity and sustainability. Therefore, documentation of the existing and disappearing traditional knowledge and cultural norms is recommended to ensure their transmission to future generations.

11. Ecohydrological factors regulating Brown Trout in Himalayan River Systems in Thimphu, Bhutan

Mr. Ugyen Dorji is a freshwater ecologist with extensive expertise in the conservation of freshwater fauna and flora. Currently serving as the Dean of Student Affaris at the College of Natural Resources, Royal University of Bhutan, he is an Editor for the *Bhutan Journal of Natural Resources and Development* and he was also the Programme Leader for the MSc in Natural Resources Management (HDR). His research interests include freshwater biodiversity, aquatic ecosystems, and the impacts of anthropogenic activities on freshwater habitats. Over the years, he has successfully led numerous research projects, including molecular analysis of aquatic species, climate change impacts on water sources, and macroinvertebrate diversity studies. He is also a co-founder of Water Research Bhutan and has served as a National Consultant for various hydropower and ecological impact assessments.

With proficiency in GIS software, R, SPSS, and statistical modeling tools, Mr. Ugyen Dorji is a skilled educator and mentor, having facilitated over 60 capacity-building programs for both national and international participants. His contributions extend to policy-making as a member of the National Technical Working Group on water resource management in Bhutan. Mr. Ugyen Dorji is an accomplished researcher with numerous peer-reviewed publications on freshwater ecology, biodiversity, and

climate change impacts. His current projects focus on addressing river pollution and enhancing ecosystem services in the Hindu Kush region.

Abstract:
The introduction of brown trout (Salmo trutta) to Himalayan river systems, including Thimphu, Bhutan, has raised ecological concerns due to competition with native fish, especially the snow trout. This study explores the ecohydrological factors influencing brown trout distribution and habitat selection across seasonal variations within these river systems. Fieldwork was conducted in the Thimphu Chhu River, spanning elevations from 2,485 to 5,620 m, across three seasons (pre-monsoon, monsoon, and post-monsoon) in 2023-2024. Systematic sampling across 30 stretches involved electrofishing and habitat assessments of water depth, velocity, substrate type, cover, and water quality. Results show significant seasonal shifts in habitat use: during the monsoon, brown trout predominantly occupied pool habitats for refuge, while runs were favored during pre- and post-monsoon seasons for foraging. Substrate composition also influenced habitat choice, with a preference for cobble substrates during high flows in the monsoon, shifting to organic substrates like dead wood in calmer pre-monsoon conditions. Larger individuals (>30 cm) were found in deeper, faster sections, especially during monsoon flows, whereas smaller trout (<15 cm) occupied shallower areas with slower currents. Spatial analysis indicated the highest trout densities in mid-altitude zones, with a decline at higher altitudes, likely due to colder temperatures and steeper gradients. This research underscores the adaptability of brown trout in diverse ecohydrological conditions, highlighting their competitive edge over native species. Findings contribute to understanding brown trout's invasive success in Himalayan rivers, emphasizing the need for habitat management and conservation efforts to mitigate impacts on native biodiversity.

12. Impact of Arecanut Plantation on Farming System and Livelihood: A Case Study of Chhuzanggang Gewog, Sarpang

Mr. Ugyen Gyeltshen has over eight years of experience serving as an Agriculture Extension Supervisor in Tareythang and Samtenling Gewog under Sarpang Dzongkhag. Currently, he serves the Soil Fertility Program under NSSC and provides technical support related to soil and plant nutrients. His ongoing research focuses on assessing the impacts of potato farming soil management practices on the Wetlands of Phobjikha-Gangtey Valley, with an emphasis on improving agricultural sustainability and productivity in these areas.

Abstract:

Ugyen Gyeltshen[1] and Tenzin Wangchuk[1]

Chhuzanggang, a region with a favourable climate for the cultivation of various essential food crops, primarily uses its available land for arecanut cultivation. However, the implications of increased plantations of arecanut are left unknown to many. Therefore, the study was conducted to evaluate the impact of arecanut plantations on the farming system and livelihood in the area. The survey used a multi-stage sampling method: purposive, proportionate, and simple random. A sample of 177 (n=30%) households was chosen from a total population of 389 households, and the data on different types of crop production was analysed to determine achievement of food self-sufficiency, per capita income, land allocation for crop cultivation, the richness of crop diversity, and perception on impact and factors influencing arecanut plantations. Three distinct farm types were identified based on the percentage of land allocated to arecanut plantations. These are (I) Low Arecanut Coverage (LAC) (defined as <25% land usage; n=44, 38%), (ii) Medium Arecanut Coverage (MAC) (defined as 25% to 75% land usage; n=62, 53%) and (iii) High Arecanut Coverage (HAC) (defined as >75% land usage; n=11, 9%). The study revealed households with the highest portion of land allocated to arecanut plantations have the lowest calorific fulfilment of 14.58%. However, they were found to have the highest income per capita of 8.21$PPP day-1 person-1, suggesting that while food self-sufficiency may be impacted, farmers can remain food secure. Crop diversity

was also observed to decrease with an increase in arecanut plantations; SDI score of 0.16 was recorded, indicating low diversity. Although arecanut cultivation has significantly contributed to economic growth, its expansion has affected practices of the diversified farming system. This study acknowledges the need for further research on the impact of increased arecanut production on household dietary habits and crop performance under arecanut plantations.

13. Microplastics Contaminations in Fish and Aquatic Food Chain in Bhutan

Ms. Yogeeta Dahal is a faculty member in the Department of Environment and Climate Studies in College of Natural Resources (CNR). She holds MSc in Natural Resource Management by Research from CNR and BSc in Environmental Science from Asian University for Women in Bangladesh. Her research interest is in the areas of environmental pollution (waste management, freshwater quality analysis, air pollution), and Climate Change.

Abstract:

Microplastics pollution in natural waters is a growing concern throughout the world. Rivers transport around 8 million pieces of plastics to oceans every day. South Asia ranks 2nd globally in plastic pollution and three mighty rivers (Ganges, Brahmaputra, Irrawaddy) transport most of them to the Bay of Bengal. Considering the huge volume of discharges confluence at the Brahmaputra River, the proposed research is aimed at investigating microplastics contaminations in fish & in Bhutan's major rivers (which ultimately contributes to the Brahmaputra River). Samples of fish, river sediment, river water will be studied for presence of microplastic. The results will showcase the presence, type, size and colour identification of the microplastic found in different samples and an analysis on the implications of these findings to exposure & risks to local community.

C. Bio of the Poster Presenters

Poster Title: **Evaluating the Seismic Risk of Non-Structural Building Components (NSC) in Urban Schools in Bhutan using RVS-Based Assessment**

Mr. Chimi is a practicing architect and Lecturer at College of Science and Technology under Architecture Department since 2012. As a first architecture faculty, he has started Bachelor of Architecture Programme at CST and taken up a role as founding Head of Architecture Department. He has graduated from School of Planning and Architecture, New Delhi and completed his master in Architectural Design from SRM university, Chennai in 2016 under Nehru- Wangchuk Scholarship. Beside teaching students, he has also carried out management works like College Management Committee, College Academic Committee and College Research Committee. He has also taken up role in contributing infrastructure planning and Design in college and university. As an academician he has also actively engaged in carrying out research work in the field of Heritage Conservation, Urban planning, Nature based solution for disaster management and Tertiary Teaching-learning Pedagogy. He is working as a Member of Working Group V- Nature-based Resilience (NBR), under South Asia Alliance of Disaster Research Institutes (SADRI), IEEE R10 Bhutan Subsection and Centre for Disaster working member Risk Reduction and Community Development Studies (CDRR&CDS) under RUB. Currently, he is involved in key projects listed below:

1. Evaluating the Seismic Risk of Reinforced Concrete Buildings of Colleges under the Royal University of Bhutan Using the RVS Method-A research to policy-making, supported by the CDRI fellowship.
2. Exploring strategies for Sustainable riverfront development in Bhutan: A case study of the Omchu river under Phuentsholing Throm supported by the AURG.

Poster Title: **Mapping and Monitoring Rice Agriculture in Bhutan Incorporating Climate Variability Using Remotely Sensed Data**

Short profile:

Mr. Indra Bahadur Chhetri received his Master of Engineering in Civil and Earth Resources Engineering (Geo-informatics), in March 2022, from Kyoto University, Kyoto, Japan, and his Bachelor of Engineering (Civil Engineering), in June 2014, from the College of Science and Technology, Royal University of Bhutan. Mr Indra is currently working as an associate lecturer in the Department of Civil Engineering and Surveying at Jigme Namgyel Engineering College, the Royal University of Bhutan since joining the institution in the year 2014. He has availed the prestigious scholarship of the Sustainable Development Goals (SDGs) Global Leadership Program under the framework of the Japan International Corporation Agency, Development Studies Program (JICA-DSP) to undergo a Master in Civil and Earth Resources Engineering at an esteemed university, Kyoto University, Japan. His research interests are mainly in earth resources, geo-information (GI), geo-statistical analysis, application of GIS in transportation and geohazards, Geo-spatial data quality assessment, and Drone technology.

Professional Experience:

» Associate Lecturer, Jigme Namgyel Engineering College since August 2014.
» Program leader, BE in Surveying and Geo-informatics and Diploma in Surveying, July 2022 -now
» Member representative of the Centre for GIS Coordination (CGISC), Department of Survey & Land Records (DSLR) under National Land Commission Secretariate (NLCS), 2015-2019.

Educational Background:

» Masters of Engineering in Civil and Earth Resources Engineering (Geo-informatics), March 2022, Kyoto University, Kyoto, Japan.
» Bachelor of Engineering (Civil Engineering), June 2014, The Royal University of Bhutan.

Poster Title: **Multi-Hazard Zoning for National Scale Population Risk Mapping: A Pilot Study in Bhutan**

Karma Tempa is an Assistant Professor with a Master's degree in Civil Engineering, specializing in Geotechnical Earthquake Engineering. He is a dedicated interdisciplinary researcher with expertise in areas such as local seismic response analysis, civil designs, CAD applications, natural hazards, remote sensing and GIS, and disaster risk reduction (DRR)-informed governance. Currently, he is actively engaged in two significant research projects: The Erasmus+ SQUARES project (2024–2026), which focuses on sustainability and quality in urban environments, and an AURG-funded study (2024–2025) assessing temporal land surface temperature (LST) dynamics using Landsat imagery, with a particular emphasis on the impacts of climate threats on agriculture and socioeconomic conditions in Punakha, Bhutan. Karma Tempa is also passionate about fostering collaborations across disciplines to address complex challenges in civil engineering and disaster risk management.

Poster Title: **Forest Fire Hazard Mapping in Bhutan**

Ms. Monika Thapa is a Faculty at the College of Science and Technology (CST) under Royal University of Bhutan (RUB). She has a Bachelor's Degree in Civil Engineering from the College of Science and Technology and Master's degree in Structural Engineering from the National Institute of Technology, Karnataka, India. Currently she serves as a Lecturer at the College. Her main research interests are building modeling and analysis, construction materials, disaster management and hazard mapping. She had served as a Head of the Centre for Disaster Risk Reduction and Community Development Services (CDRR&CDS) at the college, a member of College Research Committee at the college, and NAP-RUB and Water Infrastructure and Technology Advisory Committee (WITAC) member at the University level. She was actively involved in E-Flow project under National Environment Commission Secretariat (NECS), Royal Government of Bhutan, Thimphu; developing guidelines for Hydropower projects in Bhutan. She also served as a thematic working group member for NAP (National Adaptation Plan)

project under NECS. Mrs. Monika Thapa is also the team leader and recipient of the International CDRI and National REF grant projects for the year 2021-2022 and a GCIT design group member under RUB for GCIT infrastructure development project.

Poster Title: **Understanding the relations between sheep farming and its changing environment in Bhutan: A case of the Brokpa shepherds of Merak and Sakteng**

Nedup Dorji is a Lecturer at the College of Natural Resources, The Royal University of Bhutan in 2007. In 2008, he was awarded for the Thai International Cooperation Agency to pursue a MSc in Agriculture at Khon Kaen University, Thailand (graduated in 2010). During his MSc, he assessed genetic variations of Bhutanese indigenous chickens, and compared with Thai native chickens and commercial chicken lines. In 2016, Nedup was awarded the Netherlands University Foundation for International Cooperation in Higher Education to pursue a PhD study at the Farm Technology group in collaboration with the Animal Production Systems group of Wageningen University. His study focused on transhumant yak farming in Bhutan.

Currently, he is the Managing editor and editorial board member of the Bhutan Journal of Natural Resources and Development (BJNRD) and till date he has been working as the Lecturer at the College of Natural Resources, The Royal University of Bhutan.

Poster Title: **Food Delicacies in West-Central Bhutan**

Serki Wangmo serves as an Associate Lecturer at the College of Natural Resources, Royal University of Bhutan. She holds a Master of Science in Agriculture with a specialization in agroecosystem services, complemented by a Bachelor's degree in Sustainable Development and a Postgraduate Diploma in Higher Education. With a strong academic foundation and a passion for sustainability, her research focuses on systems thinking, agroecosystems, and bridging innovations with indigenous knowledge to promote sustainable practices.

Poster Title: **Establishment of Asian Food Composition Database**

Tenzin Wangchuk is an associate Lecturer, teaching under Department of Agriculture at College of Natural Resources (CNR), RUB. He graduated with a master's degree in plant science (Specialization Crop Science) from Wageningen University and Research, Netherlands. His field of interest are Agricultural statistics, Crop production, System analysis and, Climate and crop relation. He is the principal Investigator for the project titled Asian Food Composition Database, Bhutan which was implement in 13 Asian Countries funded by AFACI, Korea.

Poster Title: **Evaluating the Seismic Risk of Non-Structural Building Components (NSC) in Urban Schools in Bhutan using RVS-Based Assessment**

Ms. Tshering Cheki is serving as an Associate Lecturer at the College of Science and Technology, under Civil Engineering Department since 2013. She completed her Master's in Geotechnical Engineering from IIT Roorkee in 2019 and earned her Civil Engineering degree from College of Science and Technology. Ms. Cheki is passionate about teaching and research, focusing on geotechnical engineering and slope stability. Her work involves field studies, lab testing, and computer modelling. She aims to inspire future engineers and help them build strong technical skills. Currently, she is involved in key projects listed below:

1. Regional cooperation for Freshwater Ecosystem Services in Himalayas (REFRESH), examining the impacts of monsoon variability and compound extremes, under the Asia-Pacific Network (APN) for Global Change Research.
2. Evaluating the Seismic Risk of Reinforced Concrete Buildings of Colleges under the Royal University of Bhutan Using the RVS Method, aimed at integrating research with policy-making, supported by the CDRI fellowship.

Poster Title: **Microplastics to Macroinvertebrates: Assessing the Health of Freshwater Ecosystems in the Streams and Rivers of Thimphu, Bhutan**

Mr. Ugyen Dorji is a freshwater ecologist with extensive expertise in the conservation of freshwater fauna and flora. Currently serving as the Dean of Student Affaris at the College of Natural Resources, Royal University of Bhutan, he is an Editor for the *Bhutan Journal of Natural Resources and Development* and he was also the Programme Leader for the MSc in Natural Resources Management (HDR). His research interests include freshwater biodiversity, aquatic ecosystems, and the impacts of anthropogenic activities on freshwater habitats. Over the years, he has successfully led numerous research projects, including molecular analysis of aquatic species, climate change impacts on water sources, and macroinvertebrate diversity studies. He is also a co-founder of Water Research Bhutan and has served as a National Consultant for various hydropower and ecological impact assessments. With proficiency in GIS software, R, SPSS, and statistical modeling tools, Mr. Ugyen Dorji is a skilled educator and mentor, having facilitated over 60 capacity-building programs for both national and international participants. His contributions extend to policy-making as a member of the National Technical Working Group on water resource management in Bhutan. Mr. Ugyen Dorji is an accomplished researcher with numerous peer-reviewed publications on freshwater ecology, biodiversity, and climate change impacts. His current projects focus on addressing river pollution and enhancing ecosystem services in the Hindu Kush region.

Poster Title: **Proposals for the Improvement of the Bhutanese Seed Chain in order to Contribute to the Food Security of the Kingdom**

Wang Gyeltshen is an Associate Lecturer with a focus on seed science and technology. With a Master's degree in Science and Engineering, his academic journey has been deeply rooted in exploring the intricate processes involved in seed development, storage, and germination. His research interests lie at

the intersection of plant biology and applied technologies that enhance seed quality, preservation methods, and sustainable agricultural practices. He also worked as a Research Assistant in the seed sector, where he gained hands-on experience in various aspects of seed production, quality control, and research. He has worked extensively on value chain analysis of crop, examining the flow of outputs throughout systems. This has allowed him to assess the efficiencies and bottlenecks in chains and propose strategies for improvement. Additionally, he has contributed to studies aimed at developing seed policies that support sustainable agricultural practices and enhance seed accessibility, quality, and distribution. His work in seed policy development focuses on creating frameworks that foster resilience in local farming communities while ensuring long-term sustainability in seed production and usage.

Poster Title: **Soil Carbon Sequestration Dynamics in Himalayan Bhutan amidst the Changing Climate**

Dr. Yonten Dorji is an Academic at the College of Natural Resources, Royal University of Bhutan, specializing in forest dynamics, carbon sequestration, and tree architecture complexity. Dr. Dorji earned his PhD in Forest Sciences and Forest Ecology from the University of Göttingen, Germany. He also holds an MSc in Climatology & Mountain Forestry from BOKU University, Austria, and a BSc in Environmental Botany (Hons) from the University of Queensland, Australia. He has numerous published works in renowned journals like *Current Forestry Reports, Trees and Remote Sensing.* He has served as a Research Associate at Goettingen University, Germany, and previously headed the Department of Forest Sciences in CNR. Currently, he is a Programme Leader for MSc Conservation Biology at the College of Natural Resources.

Poster Title: **Assessing the Effectiveness of Seeds Pelleted with Trichoderma sp. and Vermicompost**

Sonam Pelzin Dorji serves as the Research and Liaison Officer at the College of Natural Resources (CNR). A top achiever, Sonam graduated with a Bachelors in Organic Agriculture at the top of his class and secured second place in the prestigious Royal Civil Service Examination (Technical Bio-Science) in 2024. With a passion for innovation and sustainability, Sonam's research interests include Microbiology, Sustainable Agriculture and Biotechnology, reflecting a commitment to advancing agricultural science and environmental stewardship.

Poster Title: **Isolation, Characterization, and Biological Activity Assessment of Lactic Acid Bacteria from Milk and Milk Products of Bhutan**

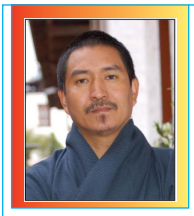
Sumba is a Bachelor of Technology graduate in Dairy Science and Technology from Sam Higginbotom University of Agriculture Technology and Sciences, Uttar Pradesh, India. He is currently an Assistant Lecturer in the Department of Food Science and Technology at the College of Natural Resources. With a strong background in coordinating academic programs, Sumba successfully coordinated three years of field attachment for Food Science and Technology second-year students from mid-2021 to mid-2024. Their research experience includes a study titled "Isolation, Characterization, and Biological Assessment of Lactic Acid Bacteria from Indigenous Milk Products," reflecting a deep interest in dairy microbiology and dairy technology. Sumba's future research interests focus on exploring ethnic food products and advancing dairy processing techniques in mountain regions.

D. Bio of the Panelists/Moderators

Ms. Kesang Tshomo has over 29 years of experience in agriculture sector working in horticulture research and rural agriculture development based on farmer needs in integrated farming systems. She has been active in initiating organic sector in Bhutan with pilots to a position where the National Organic Programme, at the Research and Development Centre of Organic Agriculture now provides supports to the vision of making the country's organic vision into action plans since the last 20 years. She has coordinated the development of key documents for the development of organic sector.

She has professional training in Horticulture, BSc. Appl Sci.(Agri) from the University of Adelaide, South Australia and a MSc.Hort) Plant pathology from Lincoln University, New Zealand, Advanced training in Organic Agriculture Development in Sweden and represented Bhutan at various International events and recently completed a Scientific Research Fellowship at UC. Davis, Ca. USA.

She currently serves as the Advisor to the Department of Agriculture, Ministry of Agriculture and Livestock (MOAL). Her main responsibility is providing policy, planning and developmental advice, guidance and technical support to the office of the Director. She is also the technical Chair of the technical working group for the National Organic Programme the development of the organic sector in the country by developing enabling environment and linking production, processing and marketing of organic products to local markets on a commercial mode and linking to domestic and export markets. Targeting to build capacity of stakeholders, institutions, private sector and farmer groups to prepare for participation in the organic sector, sectors and agencies within the MOAF to work in tandem for promotion of organic sector with a harmonious system that is user friendly to the farmers and affordable to the stakeholders.



Professor Dhan Bdr Gurung joined the Royal Civil Services of Bhutan in 1989 and joined the Natural Resources Training Institute as a Lecturer in 1992. He continued to serve in the institute and became a faculty member in the College of Natural Resources of the Royal University of Bhutan in 2006. He has MSc in Forestry from Dehradun, India and MSc in Natural Resources Management from the University of Edinburgh in Scotland. He completed his PhD from ETH, Zurich, Switzerland. He has served as the Dean of Academic Affairs and the Dean of Research and Industrial Linkages in the college. He also served as the project coordinator in various projects such as the project funded by Danida, Norway and currently by the Swiss National Science Foundation, Switzerland. He is currently serving as a Professor in the Department of Forest Science in the college and has contributed significantly in fish and orchid taxonomy of Bhutan.

Mahesh Ghimiray is a senior Lecturer, Department of Agriculture at the College of Natural Resources, Royal Government of Bhutan, Punakha. He holds a BSc Agriculture degree from GB Pant University of Agriculture and Technology, India, an MPhil in Plant Breeding and Biodiversity from the University of Reading and Birmingham, UK and a Doctorate (honoris causa) in Agriculture Research from the Thames International University, France. Specialized in crop breeding and variety improvement, he helped to develop several new varieties of rice, maize and wheat while posted in the Agriculture Research and Development Centre at Wangdue under the Department of Agriculture. After formally joining CNR, he teaches plant breeding, seed production, agronomy, climate resilient agriculture, nutrient management, organic agriculture etc. He has several publications to his credit.

Mr. Mani Prasad Nirola has been working at the National Biodiversity Centre, Ministry of Agriculture & Forests especially looking after the Bioprospecting and ABS program, and has 15 years of experience working in the field of biodiversity conservation, bioprospecting and Access and Benefit Sharing. His work envisions deriving tangible

benefit from Bhutan's rich biodiversity and associated traditional knowledge for the enhancement of conservation and rural livelihood and the promotion of people's leadership in conservation. He is the Bhutan's National Focal Point for the Nagoya Protocol. He has authored a number of scientific publications and technical and policy papers. On the academic front, Mr. Mani has a M.Sc. in Mountain Forestry from the University of Natural Resources and Life Sciences, Vienna, Austria.

Mr. Nado, Assistant Dzongkhag Agriculture Officer, works in the Agriculture Sector under Wangduephodrang Dzongkhag. Prior to this, he served as an Agriculture Extension Officer in Sephu and Nahi Gewogs. During his tenure at Nahi Gewog, he successfully implemented a one million BTFEC-funded Project in collaboration with the College of Natural Resources. It has benefited 13 households for drinking and vegetable gardening irrigation needs. He is a graduate of the Natural Resources Training Institute, Lobesa (1998-2001), with a Diploma in Agriculture. He pursued a Post Graduate Diploma in Agro-Biosystem from Khon Kaen University, Thailand (2008-2009). Later, he completed a nested in-service degree program at the College of Natural Resources with a Bachelor's in Agriculture (2012-2014). Currently, he is the focal officer for the Green Climate Fund Project, which is in the last phase of implementation in eight Dzongkhags, including Wangduephodrang.

Nawang Norbu (PhD) is the Founder and Executive Director at the Bhutan Ecological Society. He is also Center Director of the Center for Climate and Sustainable Futures, a collaborative research and education initiative between the School for Field Studies in the US, the Royal University of Bhutan and the BES. Recently, he helped craft Bhutan's RNR Strategy 2030, and also drafted, in collaboration with the Royal Government and the FAO, the national pathways to transform Bhutan's food systems. Nawang is committed to building a just and verdant world and continues to explore the drivers and consequences of development and change.

Nedup Dorji is a Lecturer at the College of Natural Resources, The Royal University of Bhutan in 2007. In 2008, he was awarded for the Thai International Cooperation Agency to pursue a MSc in Agriculture at Khon Kaen University, Thailand (graduated in 2010). During his MSc, he assessed genetic variations of Bhutanese indigenous chickens, and compared with Thai native chickens and commercial chicken lines. In 2016, Nedup was awarded the Netherlands University Foundation for International Cooperation in Higher Education to pursue a PhD study at the Farm Technology group in collaboration with the Animal Production Systems group of Wageningen University. His study focused on transhumant yak farming in Bhutan.

Currently, he is the Managing editor and editorial board member of the Bhutan Journal of Natural Resources and Development (BJNRD) and till date he has been working as the Lecturer at the College of Natural Resources, The Royal University of Bhutan.

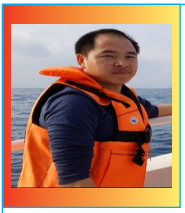
Sangay Dema (PhD) is a Principal Biodiversity Officer and a Head of Botanical Collections (National Herbarium and Royal Botanical Garden) of National Biodiversity Centre (NBC), Serbithang. She joined NBC in 2000 as a Biodiversity Conservation Officer, and since then she has been working at NBC, with a short tenure from 2007-2009 as senior lecturer and officiating Director at Ugyen Wangchuck Institute for Conservation & Environment (https://www.uwicer.gov.bt/), Bumthang. She has a Master of Science (Biology) and Graduate Certificate in Tropical Biology and Conservation from the University of Missouri, St. Louis, MO, USA and holds a doctorate degree from University of New England, Armidale, New South Wales, funded through Australian government's Endeavour Postgraduate Leadership Award. She is a recipient of numerous international grants and awards, the notable ones being National Geographic Society (NGS) Explorers grant awarded by NGS, USA, Joyce W. Vickery Scientific Research grant, awarded by Linnean Society of New South Wales, and Hans Wissmann Scientific Research grant for Systematic Botany, awarded by the School of Environmental & Rural Science, University of New England, Armidale, NSW, Australia.

She is a botanist/plant systematist by profession who believes in living in harmony with nature. She is passionate about biodiversity conservation and sustainable utilisation. She aspires to promote sustainable and low-carbon footprint enterprises based on native biological resources as she believes that the economic valuation of native biodiversity would naturally lead to its conservation.

Check out her Linkedin and researchgate profile for details of her achievements and contributions, including select list of publications

Profiles: *https://www.linkedin.com/in/sangayd/details/publications/*
https://www.researchgate.net/profile/Sangay-Dema-2/research

Assoc. Professor (Dr.) Sonam Tashi currently serves as the Dean of Research and Industrial Linkages at the College of Natural Resources, Royal University of Bhutan. Prior to his current position, Dr. Tashi served as the Dean of Academic Affairs. He is the Editor-in-Chief of the *Bhutan Journal of Natural Resource Development* and also serves as an Editor for the *International Journal of Environment*. Previously, he was an Associate Editor of the *official journal of the International Society of Organic Agriculture Research*. Dr. Tashi has authored numerous peer-reviewed articles and is a regular reviewer for both national and international journals. He is specialized in organic and sustainable agriculture practices.



Tsheten Dorji
Chief, Sustainable Livelihood Program Division
Department of Program Coordination and Climate Change, RSPN
tdorji@rspnbhutan.org

I began my career with the Royal Society for Protection of Nature (RSPN) in early 2005, and currently, I oversee the Sustainable Livelihood Programs. Over the years, I have

gained experience in leading programs and projects related to community-based water resource management, springshed management, transboundary water governance, climate-smart agriculture, human-wildlife conflict resolution, ecotourism, waste management, and climate change. My passion for sustainable farming, conserving water, birdwatching, photography, cycling, and hiking in the countryside further reveals my commitment to nature conservation and sustainable living.

Professional Qualifications and Trainings:

» Master of Business Administration at University of Canberra, Australia.
» Research Training (two years) in Sustainable Water Resource Management at Eco-Peace Leadership Center, Kangwon National University, South Korea.
» Bachelor of Business Administration at Manipal Academy of Higher Education, India.
» Training on Transformational Leadership at Chulalongkorn University, Bangkok, Thailand.
» Training on Springshed Management in the HKH at ICIMOD, Kathmandu, Nepal.
» Training on Strategic Environment Assessment at Korea University, South Korea.
» Training on Participatory M&E at International Institute of Rural Reconstruction, Philippines.

Major Publications:

1. Dorji, T. (2024). Leadership Traits of Mohandas Karamchand Gandhi: Literature Review. International Journal of Science and Research, Vol. 12, Issue 4, pp. 1426-1429, ISSN: 2319-7064.
2. Dorji, T. (2024). Effects of Human Wildlife Conflict (HWC) on Livelihoods of the Communities: An Assessment of Crop Damage by Wildlife within the White-Bellied Heron Habitats Along the Punatsangchhu and Mandechhu Basins, Bhutan. International Journal of Agriculture, Environment and Bioresearch, Vol. 9, Issue-1, pp. 16-32, ISSN: 2456-8643.
3. Dorji, T. (2023). Dryland Water Resource Conservation and Conflict Management in Loisukut Sub-Catchment in Laikipia North Sub-Country, Kenya. International Journal for Multidisciplinary Research, Vol. 5, Issue-5, pp. 1-9, E-ISSN: 2582-2160.
4. Dorji, T. (2023). Managing Performance in Civil Society Organizations in Bhutan.

International Journal of Management Studies and Social Research, Vol.5, Issue-2, pp.118-124, ISSN: 2582-0265.

5. Dorji, T. (2023). Developing an Effective Solid Waste Management System to Minimize Adverse Impact on high- altitude Wetland Ecosystem in Phobjikha Valley, Wangdue, Bhutan. International Journal of Development Research, Vol.13, Issue-02, pp.61797-61801, ISSN:2230-9926.
6. Dorji, T. (2023). Comparative Analysis of GNH with SDGs and MDGs. International Journal of Current Research, Vol.15, Issue-02, pp.23644-23647, ISSN:0975-833X.
7. Dorji, T. (2015). Sustainable Water Source Management in Tshogonpa village, Lumang, Trashigang, Bhutan. Policy Analysis Paper, Journal of the Bhutan Ecological Society, Vol. I, Issue- II, pp. 104-117, ISSN 2410-3861.

Tulsi Gurung is an Associate Professor, Department of Agriculture at the College of Natural Resources, Royal University of Bhutan, Punakha. She holds a PhD in Agriculture from Khon Kaen University, Thailand and Masters in Horticulture from the University of Reading, UK. She is one of the pioneers in transforming a training institute to a college offering seven undergraduate programmes, three Masters programmes, and one PhD in climate studies. She has initiated many international research collaborations, and staff and student exchange programmes with other universities. She teaches horticulture, crop production, sustainable agriculture, and climate smart agriculture, water management and has several journal papers to her credit.

Dr Ugyen Thinley (Assistant Professor) currently serves as the Dean of Academic Affairs at the College of Natural Resources, Royal University of Bhutan. He has been an integral part of the institution since 1998. Today, he not only oversees academic programmes and courses, but also as an active research scholar, he as several publications and technical reports in the field of climate science, environment, and sustainable natural resource management.

E. Bio of the MCs/ Rapporteurs

Ms. Kinzang Tshomo is a final year student at the College of Natural Resources pursuing Bachelor's of Science in Forestry. She has served as a secretary of Health and Wellbeing club at the college and she is also a member of Entrepreneurship Club. Her research interests include ethnobotany, phytochemistry, and microbiology. Currently, she is doing her research on phytochemical analysis, antibacterial, and antioxidant properties of an endemic plant species in Bhutan.

Mr. Namgay Wangchuk is a final-year BSc Forestry student (CNR, RUB), focusing on specialising in GIS & RS for environmental applications. He has a deep appreciation for nature, demonstrated through bird watching and photography. He has leadership experience and a keen interest in leveraging technology and AI for advancement.

Ms. Sonam Lhazeen Wangmo, is a final-year student pursuing BSc. in Forestry. Her passion lies in environmental conservation, food security, and youth engagement. As one of the chapter leaders of the World Food Forum-Bhutan Chapter and a member of the Adolescent Youth Advisory Panel, she actively advocates for sustainable solutions and youth participation in decision-making processes. Through her work, she strives to contribute to a more resilient and environmentally conscious future.

Mr. Wangdi Rigsel is a final-year B.Sc. Forestry student with a strong research interest in freshwater ecology. His current thesis, " Spatiotemporal Variability of Parachiloglanis benjii Assemblage in Relation to Ecohydrological Drivers in Dangchhu River," explores ecological dynamics in freshwater ecosystems. He has also participated in pre-assessment studies for aquatic biodiversity in hydropower projects, focusing on fish, macroinvertebrates, and water quality. Passionate about aquatic conservation, he serves as an ambassador for SDG 14: Life Below Water in the Global 17 University Ambassador's Consortium, advocating for the protection and sustainable management of freshwater ecosystems.