THE SCHOOL FOR FIELD STUDIES

Eastern Himalayan Forests and Biodiversity
SFS 3580

Syllabus
6 credits

The School for Field Studies (SFS)
Center for Climate and Sustainable Futures (CCSF)
Paro, Bhutan

This syllabus may develop or change over time based on local conditions, learning opportunities, and faculty expertise. Course content may vary from semester to semester.

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COURSE CONTENT SUBJECT TO CHANGE

Please note that this is a copy of a recent syllabus. A final syllabus will be provided to students on the first day of academic programming.

SFS programs are different from other travel or study abroad programs. Each iteration of a program is unique and often cannot be implemented exactly as planned for a variety of reasons. There are factors which, although monitored closely, are beyond our control. For example:

- Changes in access to or expiration or change in terms of permits to the highly regulated and sensitive environments in which we work;
- Changes in social/political conditions or tenuous weather situations/natural disasters may require changes to sites or plans, often with little notice;
- Some aspects of programs depend on the current faculty team as well as the goodwill and generosity of individuals, communities, and institutions which lend support.

Please be advised that these or other variables may require changes before or during the program. Part of the SFS experience is adapting to changing conditions and overcoming the obstacles that they may present. In other words, this is a field program, and the field can change.

Course Overview

The eastern Himalayan region is characterized by extensive and numerous mountains and valleys, hosting the world's highest peaks and a diversity of vegetation and wildlife. Identified as one of the world's ten biodiversity hot spots, the Kingdom of Bhutan is home to an estimated 770 species of birds and other diverse fauna, including the takin, snow leopard, golden langur, blue sheep, and tiger. Varied ecosystems are also found in the country, ranging from subtropical broadleaf forests in the south, to subalpine conifer forests, alpine shrub, and high-mountain meadows. The highest elevations comprise rock and ice. While located in the subtropics latitude-wise, Bhutan's high altitude and mountainous terrain mean that its climate is more influenced by altitude than by latitude. The climate is dominated by summer monsoons which bring the majority of precipitation for the year. The country also has more than 70% forest cover and about 50% of Bhutan is under formal conservation protection.

Bhutan is internationally famous for its development concept of Gross National Happiness (GNH). GNH is the guiding principle of development guides Bhutan through its four pillars: good governance, cultural protection and preservation, sustainable development, and environmental conservation. Across the country, people have developed and maintained rich cultural traditions and social and political institutions that reflect the Buddhist principle of 'The Middle Path', integrating people and nature as well as traditional knowledge systems and modern science. Sustainable management of natural resources, including soil, water, biodiversity, and minerals, is critical for Bhutan, as these resources are fundamental to the national identity as well as to the economy.

In early 2008, Bhutan's government became a democratic constitutional monarchy, opening the door for devolution of authority to regional governments and communities. Since the majority of the population reside in rural areas, sustainable management of natural resources is critical for achieving the dual goals of poverty alleviation and biodiversity conservation. Defining baselines for biodiversity and ecosystem function is critical and, coupled with training in field research methodologies and communication in science, scientists and environmental authorities are increasingly effective at achieving development and conservation goals.

The SFS-Bhutan summer program is a 6-week field-based course where students study a country and region characterized by dramatic mountain landscapes and rich flora and fauna. Traveling through Bhutan, our SFS group will learn about Bhutan's forests and biodiversity. They will also be exposed to the role which culture and religion plays in forest and biodiversity conservation. Students will stay in Bhutanese villages and trek across Himalayan landscapes to experience and understand local environments and rural livelihoods. Academically, students will develop skills in assessing environmental problems, defining research questions, conducting field research, and communicating results. Students will learn camera trapping, forest measurement techniques, and landscape reading skills. Moreover, SFS students will come to appreciate the complexity of identifying and addressing conservation and development issues in a rapidly changing region.

SFS partners with the Royal University of Bhutan (RUB), College of Natural Resources (CNR), and the Bhutan Ecological Society (BES), a Civil Society Organization promoting environmental sustainability in Bhutan. SFS students and faculty will collaborate with RUB, CNR and BES to advance their research agenda in several priority areas, including forest management, biodiversity conservation, community resource assessment, climate change, and development policy.

Learning Objectives

The Summer course is focused on gaining an in-depth understanding of the forests and biodiversity of Bhutan. Topics will cover conservation and development policy; forest and resource management; local knowledge systems; and changing rural livelihoods. These will be addressed through classroom lectures and discussions, field lectures, and field research, including field exercises and group project work. Classroom and field lecture topics will include essential background information, and field exercises will be used to reinforce key concepts and provide students with field-based experiences. Field trips will enable students to examine landscapes and communities and help cultivate a deeper understanding of the role which forests and biodiversity play in Bhutan.

Following this course, students should:

1. Understand basic concepts of forestry, community resource management, forest-based livelihoods, and biodiversity conservation as well as the practical application of those concepts. They will become aware of the important (and often underestimated) societal factors that affect forest management and conservation.
2. Be able to recognize several vegetation types according to elevation, and to identify threats to ecosystems and conservation strategies to maintain them.
3. Have implemented a field research project, conducted field data collection, managed, and interpreted data sets, and communicated research results to diverse audiences and constituents in Bhutan.

Assessment

Several field exercises and a directed research project, which entails field-based data collection and analysis, will provide students with experience in scientific research. Some assignments encourage students to work together, to share ideas and knowledge. This allows students to take advantage of the range of backgrounds within the group. Unless the assignment indicates that only one copy of the answers is required from the group, students are expected to complete their own assignments. The final course grade will be based on the following assessment items.

Assessment Item	Value (%)
Active Participation and Field Notes	10
FEX: Mapping Livelihoods	10
FEX: Forest Resource Assessment	10
FEX: Camera Trapping	10
Exam	15
Project Proposal	10
Final Poster	25
Poster Presentation	10
TOTAL	**100**

Active Participation and Field Notes (10%)

During this program, we will travel through many eco-regions and rural communities. We expect that you will be an *active observer*, constantly observing the landscape, livelihoods, and culture and *participating in discussions* regarding these observations. Active participation includes constructive engagement with the full range of course activities, respectful awareness of our cultural context, and responsible behavior as a group member who is involved in others' learning.

You will also develop a comprehensive *program field notebook* that documents and captures your on-the-ground learning experiences and serves as your primary record of content and reflections during the course. This notebook should always accompany you: in the classroom, guest lectures, and the field. All class notes, field notes, data from field exercises, reflective comments and questions on course material, notes from discussions, and short written assignments should be contained in this notebook. You must develop a Table of Contents with numbered pages so you can easily locate material for the exam and to reference it in your research. You may want to develop sections for observations during travel, translations or words in Dzongkha, notes to remember for your directed research, cultural notes, and reflective writing on how this experience is reshaping your understanding of people and the environment. Keep this separate from personal journaling you may do. Additional course handouts should be kept in the folder provided.

When using citable material from your field notebook in written reports, use the following format to acknowledge the source: (*Tenzin Student*, Field notes, *Jakar, 12 June 2019*). Whenever possible, use the name of the person providing the information; if not possible, cite descriptively, for example: "Firewood gatherer in Paro forest."

FEX: Mapping Livelihoods (10%)

We will geolocate ourselves, explore the local area, note development indicators and examine changes in the landscape and livelihood strategies based on proximity to town. In small groups, students will survey routes and create a rough map of land use and livelihood strategies and note the ways that these change in relation to Paro town. Students will learn basic mapping skills and alternative ways to approach mapping as a geographical tool. Students will ask: "what are some of the roles played by mapping in conservation and development initiatives?"

FEX: Forest Resource Assessment (10%)

Students will work in groups to conduct a forest inventory. Student groups will collect data on forest species composition and stand parameters such as height and DBH of trees. Measurements will be used to estimate forest growing stock, stand characteristics and biodiversity parameters.

FEX: Camera Trapping (10%)

Camera traps are one of the most efficient methods of surveying animals in forested landscapes. Data collected from camera traps are being increasingly used for conservation and management purposes. Students will learn how to operate and set up camera traps, retrieve data from previously set up traps, and analyze the data to estimate diversity and density of animals.

Exam (15%)

One comprehensive exam will be administered at the end of the course. Students will be examined on what they have been exposed to in class (lectures, discussions, etc.) and in the field, and what they have been asked to read. The exam allows students to draw on multiple concepts and experiences, and to synthesize information.

Project Proposal, Final Poster, Poster Presentation (10%, 25%, 10%)

Student teams will design and conduct a field-based project led by the instructors. The team will write and revise a proposal, conduct data collection, and produce a project report on their findings. This paper should follow the general framework of a research report and will give students experience in concise organization and presentation of data. Each group will prepare poster presentations which will be assessed by faculty. Specific guidelines will be provided when the projects are introduced.

Grading Scheme

A	95.00 - 100.00%	B+	86.00 - 89.99%	C+	76.00 - 79.99%	D	60.00 - 69.99%
A-	90.00 - 94.99%	B	83.00 - 85.99%	C	73.00 - 75.99%	F	0.00 - 59.99%
		B-	80.00 - 82.99%	C-	70.00 - 72.99%		

General Reminders

Honor Code/Plagiarism – SFS places high expectations on their students and we hold students accountable for their behaviors. SFS students are held to the honor code below. SFS has a zero-tolerance policy towards student cheating, plagiarism, data falsification, and any other form of dishonest academic and/or research practice or behavior. Using the ideas or material of others without giving due credit is cheating and will not be tolerated. Any SFS student found to have engaged in or facilitated academic and/or research dishonesty will receive no credit (0%) for that activity.

> *"SFS does not tolerate cheating or plagiarism in any form. While participating in an SFS program, students are expected to refrain from cheating, plagiarism and any other behavior which would result in a student receiving credit for work which they did not accomplish on their own. Students are expected to report any instance of cheating or plagiarism by others."*

Deadlines – Deadlines for written and oral assignments are instated to promote equity among students and to allow faculty ample time to review and return assignments before others are due. As such, deadlines are firm; extensions will only be considered under extreme circumstances. Late assignments will incur a penalty of 10% of your grade for each day you are late. After two days past the deadline, assignments will no longer be accepted. Assignments will be handed back to students after a one-week grading period. Grade corrections for any assessment item should be requested in writing at least 24 hours after assignments are returned. No corrections will be considered afterwards.

Content Statement – Every student comes to SFS with unique life experiences, which contribute to the way various information is processed. Some of the content in this course may be intellectually or emotionally challenging but has been intentionally selected to achieve certain learning goals and/or showcase the complexity of many modern issues. If you anticipate a challenge engaging with a certain topic or find that you are struggling with certain discussions, we encourage you to talk about it with faculty, friends, family, the HWM, or access available mental health resources.

Participation – Since we offer a program that is likely more intensive than you might be used to at your home institution, missing even one lecture can have a proportionally greater effect on your final grade simply because there is little room to make up for lost time. Participation in all components of the course is mandatory, it is important that you are prompt for all activities, bring the necessary equipment for field exercises and class activities, and simply get involved.

Course Content

Type- L: Lecture, **FL:** Field Lecture, **GL:** Field Lecture, **FEX:** Field Exercise, **SLD:** Student Led Discussion, **PW:** Project Work

***Required readings are in bold**

No	*Title and outline*	*Type*	*Time (hrs)*	*Readings*
1	Academic Orientation	L, D	1.0	Syllabus
2	Basic Bhutanese Culture	L	1.0	
3	Bhutan – The Last Himalayan Biodiversity Refugia	L, D	1.0	
4	Conservation and Bhutanese Belief Systems	L, D	1.0	**Phuntsho 2013**
5	NRM Systems in the Bhutan Himalayas (PAs, FMUs, Traditional Methods)	L, D	1.0	**Wangdi 2018** **Dorji 2006**
6	Biogeography of the Himalayas	L, D	1.0	**Singh & Singh 1987** (pages 84-87)
7	Introduction to Bhutanese Language	L	1.0	
8	Forest Product Uses: Journey through Textiles	FL	2.0	Visit: Textile Museum
9	Natural and Cultural Landscapes I & II (Pangrizampa & Tango)	FEX	4.0	**Allison 2015** **Skog 2016**
10	Large Mammal Ecology (Takin Reserve)	FL	2.0	**Sangay 2016**
11	Forests, Water & Watershed Management in Bhutan	L, D	1.0	
12	Conservation and Development (Tourism & Eco-tourism)	L, D	1.0	**Peet & Hartwick 2009 (Ch1)**
13	Human Wildlife Conflict and Rural Livelihoods	L, D	1.0	**Siebert & Belsky 2014**
14	Mapping Livelihoods and Development Indicators in Paro	FEX	4.0	**FEX Handout** Plieninger *et al* 2015
15	Forest Produce Trade at Local Markets	FL	3.0	
16	Introduction to Project Work (Topics)	DR	1.0	
17	Lost Land of Tigers: Discourse on Wildlife Documentary	L, D	2.0	
18	Ecosystem Services of Himalayan Forests & Biodiversity	L	1.0	**Kubiszewski et al 2013** Costanza 1997
19	GNH, the Middle Path & Forests	L	1.0	**RGOB 1998** Sears et al 2017
20	Lifezone Ecology of Bhutan Himalaya (Flora & Fauna Identification FL) | Chelela Visit	FL	4.0	Namgay & Tenzin 2006, **Wangda & Ohsawa 2006**
21	Community Forests	L	1.0	**Moktan 2015** Phuntsho 2011
22	Forest Resource Assessment	FEX	4.0	**FEX Handout**
23	Big Cats and Bhutanese Forests	L	1.0	**Tempa et al. 2013**
24	Camera Trapping	L, FEX	4.0	**FEX Handout**
25	The Role of Forests in Rural Livelihoods: Interactive Learning with Farmers (Homestay)	FL	3.0	
26	Wetland Biodiversity & Conservation	FL	1.0	

No	*Title and outline*	*Type*	*Time (hrs)*	*Readings*
27	Assess Avi-faunal Diversity along an Inter-valley Mountain System	FL	4.0	
28	Can Forests be a Major Driver of Economic Growth for Bhutan?	SLD	2.0	**Namgyel 2019** Persha *et al* 2010
29	People and Forests: Changing Socio-economic Dimensions	L	1.0	**Wangchuk & Wangdi 2015** Rinzin 200,
30	Forests in A Changing World	L	1.0	Savaresi 2015
31	Exam Review	L	1.0	
Project Work				
32	Quantitative Data Management and Presentation	L	1.0	
32	Project Work: Field Data Collection	PW	15.0	Project related readings provided
33	Project Work: Analysis & Write-up	PW	10.0	
34	Symposium	PW	5.0	
	Total		**88**	
	UMN Instructional Hours*		**105.6**	

**UMN defines* an instructional hour as a 50-minute block. SFS syllabi are written in full 60-minute hours for programming purposes. Therefore 50 full hours = 60 UMN instructional hours (for four credit courses) and 25 full hours = 30 UMN instructional hours (for two credit courses).*

Reading List

***Required readings are in bold**

1. **Allison, E. A. 2015.** Religion Inscribed in the Landscape: Sacred Sites, Local Deities and Natural Resource Use in the Himalayas. In S. D. Brunn (Ed.), *The Changing World Religion Map* pp. 439–459). Springer Netherlands.
2. Costanza,R., R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, S. Naeem, K. Limburg, J. Paruelo, R.V. O'Neill, R. Raskin, P. Sutton, M. van den Belt. 1997. The value of the world's ecosystem services and natural capital. Nature 387:253-260.
3. Diaz et al. (2015). The IPBES conceptual framework – connecting nature and people. *Current Opinion in Environmental Sustainability.* 14:1–16,
4. **Dorji, L., Webb, E.L., and G.P. Shivakoti. 2006.** Forest property rights under nationalized forest management in Bhutan. Environmental Conservation, 33(2): 141–147.
5. **Grimmett, R., Inskipp, C., & Inskipp, T. (2016).** *Birds of the Indian Subcontinent: India, Pakistan, Sri Lanka, Nepal, Bhutan, Bangladesh and the Maldives*. Bloomsbury Publishing.
6. **Jadin, S., Meyfroidt, P., and E.F. Lambin**. 2015. Forest protection and economic development by offshoring wood extraction: Bhutan's clean development path. Regional Environment Change.
7. **Katel, O., Gurung, D. B., Harada, K., & Schmidt-Vogt, D. (2021).** Watershed conservation for ecosystem services and its implication for green growth policies in the context of global environmental change: A case of Bhutan. *Water Security in Asia: Opportunities and Challenges in the Context of Climate Change*, 505-516.

8. **Kelly, J. M., Tempa, T., & Wangdi,** Y. (2013). Camera trapping protocols for wildlife studies (With emphasis on tiger density estimation). *Wildlife Research Techniques in Rugged Mountainous Asian Landscapes, Ugyen Wangchuck Institute for Conservation and Environment, Bhumtang*, 93-124.

9. **Kubiszewski, I., Costanza, R., Dorji, L., Thoennes, P., & Tshering, K. (2013).** An initial estimate of the value of ecosystem services in Bhutan. *Ecosystem Services*, *3*, e11-e21.

10. **Kuyakanon Knapp, R. S. 2014**. Contemplations on a Bhutanese Buddhist Environmental Narrative. In S. Kumagai (Ed.), *Bhutanese Buddhism and Its Culture* (pp. 183–205). Kathmandu, Nepal: Vajra Publications.

11. **Mani, M. S. (1974).** Biogeography of the Himalaya. *Ecology and Biogeography in India*, 664-681.

12. Moktan, M.R., Norbu, L., and K. Choden. 2015. Can community forestry contribute to household income and sustainable forestry practices in rural area? A case study from Tshapey and Zariphensum in Bhutan. Forest Policy and Economics.

13. Montes, J., & Kafley, B. (2022). Ecotourism discourses in Bhutan: contested perceptions and values. *Tourism Geographies*, *24*(6-7), 1173-1196.

14. **Peet, R., and E. Hartwick. 2009.** *Theories of Development: Contentions, Arguments, Alternatives.* Guilford Press.

15. Penjore, D. (2008). *Is National Environment Conservation Success a Rural Failure? The Other Side of Bhutan's Conservation Story* (pp. 66-87). The Centre for Bhutan Studies.

16. Phuntso, S., Schmidt, K., Kuyakanon, R., and K.J. Temphel. eds. 2011. *Community Forestry in Bhutan: Putting People at the Heart of Poverty Reduction*. UWICE.

17. Plieninger, T., Bieling, C., Fagerholm, N., Byg, A., Hartel, T., Hurley, P., L. Huntsinger. 2015. The role of cultural ecosystem services in landscape management and planning. Current Opinion in Environmental Sustainability, 14:28-33. doi:10.1016/j.cosust.2015.02.006.

18. Pommaret, F. 2004. Yul and yul lha: The territory and its deity in Bhutan. *Bulletin of Tibetology* 40 (1): 39-67.

19. Rinzin, C., Vermeulen, W.J.V., and P. Glasbergen. 2007. Public perceptions of Bhutan's approach to sustainable development in practice. *Sustainable Development* 15 (1):52–68.

20. **Sangay, T., & Vernes, K**. (2008). Human–wildlife conflict in the Kingdom of Bhutan: patterns of livestock predation by large mammalian carnivores. *Biological Conservation*, *141*(5), 1272-1282.

21. **Sangay, T., Rajaratnam, R., & Vernes, K. (2016).** Current distribution and conservation status of Bhutan TakinÂ Budorcas whitei Lydekker, 1907 (Artiodactyla: Bovidae). *Journal of Threatened Taxa*, *8*(14), 9630-9637.

22. **Sears, R. R., Phuntsho, S., Dorji, T., Choden, K., Norbu, N., & Baral, H. (2017).** Forest ecosystem services and the pillars of Bhutan's gross national happiness. occasional paper 178. *Bogor, Indonesia*.

23. **Skog, L.A.** 2016. Khumbi yullha and the Beyul: Sacred space and the cultural politics of religion in Khumbu, Nepal, Annals of the American Association of Geographers.

24. **Tempa, T., Hebblewhite, M., Goldberg, J. F., Norbu, N., Wangchuk, T. R., Xiao, W., & Mills, L. S. (2019).** The spatial distribution and population density of tigers in mountainous terrain of Bhutan. *Biological Conservation*, *238*, 108192.

25. **Tempa, T., Hebblewhite, M., Mills, L. S., Wangchuk, T. R., Norbu, N., Wangchuk, T., ... & Dorji, T. (2013).** Royal Manas National Park, Bhutan: a hot spot for wild felids. *Oryx*, *47*(2), 207-210.

26. **Wangchuk, K., and Jigme Wangdi. 2015**. Mountain pastoralism in transition: Consequences of legalizing *cordyceps* collection on yak farming practices in Bhutan. *Pastoralism: Research, Policy and Practice* 5 (4).

27. **Wangda, P., and M. Ohsawa. 2006**. Structure and regeneration dynamics of dominant tree species along altitudinal gradient in a dry valley slopes of the Bhutan Himalaya. Forest Ecology and Management, 230(1-3):136-150. doi:10.1016/j.foreco.2006.04.027.

28. **Wangdi, N., and Sherub. 2013**. Ecological and Socio-cultural Significance of High Altitude Wetlands-A case study of Nub Tshonapatra, Tshokar-Tshona, Tampe Tsho and Jigme Langtsho in Bhutan. Ugyen Wangchuck Institute for Conservation and Environment, Department of Forests and Park Services.