



Climate Change and Its Impacts in the Tropics

ENVI-3000 (3 credits / 45 hours)

SIT Study Abroad program:

Tanzania: Climate Change and Sustainability from Mount Kilimanjaro to Zanzibar (Summer)

Please Note: This syllabus represents a recent semester. Because courses develop and change over time to take advantage of unique learning opportunities, actual course content varies from semester to semester.

Course Description

Climate Change and Its Impacts in the Tropics is an interdisciplinary course that addresses climate change and its social and natural impacts in East Africa. During the summer semester, the program visits three areas: Mount Kilimanjaro / Ngorongoro Conservation Area, the Usambara Mountains, and the Zanzibar Archipelago. Activities, discussions, and lectures engage the natural and social sciences. In this course, students study ecology and the societies of northern and coastal Tanzania. The program emphasizes climate change, its human impacts, and national and local solutions to this critical global issue. Through four complimentary modules, delivered by in-country faculty, researchers, and environmental custodians, students achieve familiarity with climate change and the complexities of management solutions in East Africa.

Course Learning Outcomes

Climate Change and Sustainability in Tanzania comprises academic study and events (3 credits). At the completion of the course, students will:

- Know climate change as a complex concept;
- Know ecology, the science of climate change, and resource management as critical practices;
- Master the basic signatures of climate change;
- Demonstrate familiarity with the ecology and natural history of key terrestrial and marine environments in Tanzania;
- Comprehend present climate change challenges and solutions for environments, species, and human communities in Tanzania; and
- Show an in-depth understanding of human sustainability and resource management in the region.

Course Requirements

Excursions, lectures, readings, and reflexive discussions help students to learn about ecology, climate change, and sustainability in Tanzania. The academic director evaluates student participation and assignments based on timeliness, completeness, quality of research, seriousness of purpose, and, when

relevant, the demonstration of cooperative teamwork among group members. The evaluation of assignments further accounts for their clarity of organization, accurate background, supportive data, appropriate analysis, coherence and depth of argument, and the quality of written, visual, and/or oral presentation.

Course Program

This course takes the form of interrelated modules that incorporate excursions, lectures, readings, discussions, and assignments:

Module I: Ecology, Climate Change, and Society in Tanzania

(Zanzibar Archipelago)

This **one week-module** introduces key concepts of nature, climate dynamics, climate change, sustainability, and the traits of Tanzanian communities and ecosystems. Students engage “nature” as a multifaceted concept understood somewhat differently by scientists, different publics, and the state. Short field trips and discussions introduce Tanzania’s environments and the lifeways of its diverse people. This module helps students to grasp the intellectual concepts, social context, and human practices relevant to ecological study, climate change, and resource management in Tanzania and wider East Africa.

- Anonymous. 2010. *Acting on Climate Change for Sustainable Development in Africa*. Africa Development Forum. (excerpts)
- Ghosh, A. 2016. *The Great Derangement: Climate Change and the Unthinkable*. U. of Chicago Press.
- Maslin, M. 2014. *Climate Change*. Oxford U. Press. (excerpts)
- Shemsanga, C. 2010. “The Cost of Climate Change in Tanzania.” *Journal of American Science*.
- Walley, C. 2010. “Where there is No Nature.” In *Rough Waters: Nature and Development in an East African Marine Park*. Princeton U. Press.

Module II: Sustainability and Climate Change Impacts on Coastal Communities and Marine

Environments

(Zanzibar Archipelago)

This **two week-module** addresses the marine ecosystem and climate change. Time in Zanzibar highlights the complexities of marine conservation and natural resource management, particularly among communities dependent on the ocean for their livelihood. The group discusses mangrove forests, sea grass beds, and coral reefs, for instance at Chumbe Coral Park, recently partially bleached due to higher sea surface temperatures. From multiple management standpoints - those of the government, scientists, and local communities - students consider the complexities of climate change mitigation strategies. Lastly, the group wrestles with climate change policies and the inner workings of climate politics in the western Indian Ocean.

- Braje, T., et al. 2017. “Humans and Island Environments: Archaeology, Historical Ecology and Anthropogenic Island Ecosystems.” *Environmental Conservation*.
- Deutsche Welle. n.d. *Zanzibar: Sustainable Marine Economy*. (video)
- Kombo, Y. n.d. “Zanzibar Biodiversity, Climate Change, and the Energy Crisis.” Unpublished Report.
- McClanahan, C., et al., eds. 2000. *Coral Reefs of the Indian Ocean: Their Ecology and Conservation*. Oxford. (excerpts)
- Walley, C. 2010. *Rough Waters: Nature and Development in an East African Marine Park*. Princeton U. Press. (excerpts)

- Walsh, M. 2009. "The Use of Wild and Cultivated Plants as Famine Foods on Pemba Island, Zanzibar," *Etude Océan Indien* 42-43. (excerpts)

Module III: Sustainability and Climate Change Impacts on Farmers and Forests (Usambara Mountains)

This **one-week module** emphasizes the influences of climate change on forests and farmers in the Eastern Arc Mountains of northeastern Tanzania. Students travel to the picturesque East and West Usambara Mountains to study climate refugia, the diverse endemic plants and animals of highland forests, and, most importantly, the impacts of recent climate change on the environments and the productivity of Shambaa farmers. Presentations by NGOs and activities with community members examine indigenous solutions to manage and mitigate the impacts of climate change on the highland ecosystem. Of particular interest is a partnership with the Forest Conservation Group on integrated approaches to climate adaptation.

- Burgess, N. 2007. "The Biological Importance of the Eastern Arc Mountains of Tanzania and Kenya." *Biological Conservation* 134.
- Conte, C. 2004. *Highland Sanctuary: Environmental History in Tanzania's Usambara Mountains*. Ohio U. Press.
- Feierman, S. 1990. *Peasant Intellectuals: Anthropology and History in Tanzania*. U. of Wisconsin Press.
- Harrison, S., and R. Noss. 2017. "Endemism Hotspots are linked to Stable Climatic Refugia." *Annals of Botany* 119.

Module IV: Sustainability and Climate Change Impacts on Herders, Wildlife, and Grasslands (Ngorongoro Conservation Area)

This **one week-module** engages climate change and its impacts on the pastoralists, wildlife, and grasslands of northern Tanzania. Students travel to Ngorongoro Conservation Area - including a visit to Ngorongoro Crater - to identify and investigate the impacts of recent climate change on plant communities, migrating wildlife (such as wildebeests and zebras), and the livelihoods of the Maasai, who live in villages and keep cattle, camels, donkeys, and small stock. Presentations by park rangers and state officials introduce the impacts of climate change and promote state and park solutions for sustainability, approaches that often favor the government and international tourism at the expense of rural Tanzanians.

- Bedelian, C., and J. Ogotu. 2016. *Trade-offs for Climate-Resilient Pastoral Livelihoods in Wildlife Conservancies in the Mara Ecosystem, Kenya*. Overseas Development Institute.
- Galvin, K., et al. 2015. "Transitions in the Ngorongoro Conservation Area: The Story of Land Use, Human Well-being, and Conservation." In *Serengeti IV: Sustaining Biodiversity in a Coupled Human-Natural System*. U. of Chicago Press.
- Gichohi, H., et al. 1996. "Savanna Ecosystems." In *East African Ecosystems and Their Conservation*. Oxford U. Press.
- Shetler, J. 2007. *Imagining Serengeti: A History of Landscape Memory*. Ohio U. Press. (excerpts)
- Sinclair, A., et al., eds. 2008. *Serengeti III: Human Impacts on Ecosystem Dynamics*. U. of Chicago Press. (excerpts)

Module V: Critical Reflections on Climate Change and Sustainability

(Arusha and Mount Kilimanjaro)

This **one week-module** offers students an opportunity to critically reflect on the impacts of climate change in Tanzania, East Africa, and the tropics, in general. As a case study, students consider the climate change debate surrounding the melting glaciers on Mount Kilimanjaro and, moreover, the implementation of sustainable solutions to mitigate its effects on Chagga communities. Students further consider and address the roles and responsibilities of stakeholders in this particular climate change debate: international organizations, state government, parks, NGOs, local communities, scientists, and tourists.

Course Readings

Reference articles and books (see above) are available from the program library (in Zanzibar) and through SIT's electronic library database. (NOTE: COURSE CONTENT, LECTURERS, READINGS, AND ASSIGNMENTS MAY BE MODIFIED. STUDENTS WILL BE NOTIFIED PROMPTLY OF ANY CHANGES.)

Course Grading Distribution

Participation in Readings and Discussions	10%
Quizzes	15%
Paper 1: Complexities of Climate Change	15% (4-page Paper 10% / Pres. 5%)
Paper 2: Zanzibar - Sustainable Solutions to Climate Change	30% (8-page Paper 17.5% / Pres. 7.5%)
Final Exam	30%

Course Grading Scale

The grading scale is as follows:

94-100%	A
90-93%	A-
87-89%	B+
84-86%	B
80-83%	B-
77-79%	C+
74-76%	C
70-73%	C-
67-69%	D+
64-66%	D
Below 64%	F

Course Grading Criteria

All assigned grades take into account the students' special circumstances and challenges as foreigner. An "A" grade entails superior (not just "very good") performance in terms of accuracy, structure, and organization for assignments. An "A" grade refers to full attendance, punctuality, attentive listening, and active engagement in all language classes, field exercises, and other activities. It also means polite and respectful behavior. The frequency and quality of the students' participation is monitored and taken into account.

Disability Services: Students with disabilities are encouraged to contact Disability Services at disabilityservices@sit.edu for information and support in facilitating an accessible educational experience. Additional information regarding SIT Disability Services, including a link to the online request form, can be found on the Disability Services website at <http://studyabroad.sit.edu/disabilityservices>.

Student Expectations

Please refer to the SIT Study Abroad handbook for policies on academic integrity, ethics, warnings, probations, diversity, disability, sexual harassment, and the academic appeals process. In addition, students should refer to information in the Student Handbook and the Program Dossier distributed during orientation.