THE SCHOOL FOR FIELD STUDIES

Coffee, Chocolate, and Sustainable Development in Costa Rica
SFS 3141

Syllabus
4 credits

The School for Field Studies (SFS)
Center for Ecological Resilience Studies (CERES)
Atenas, Costa Rica

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

Coffee (*Coffea arabica, Coffea canephora*) and chocolate/cacao (*Theobroma cacao*) are iconic food crop species in the Tropics. Their emotionally and physically addictive components have led to $98.2 billion in annual sales of chocolate (International Cacao Organization, Statistics, 2016) and coffee exports totaling $30.6 billion (World's Top Exporters, Coffee, 2016). These tropical crops are intimately intertwined with the natural and political history, culture, and ecology of Costa Rica.

This interdisciplinary 4-week summer program aims to explore the complex social and ecological components that are intertwined with the production of coffee and cacao in Costa Rica. We will delve into the natural and political history of this highly biodiverse country, considering the impacts of early cacao production, including the use of slavery, and the transformation of forested lands into coffee plantations owned by elites. We will examine current questions of cultural representation, agro-tourism, land use strategies, and agricultural certifications, and explore how these issues affect the local flora, fauna, and society. We will conduct site visits to different coffee and cacao farms and producers to learn about various production methods and policies and their impact on the local environment and communities. We will explore the relationships between cacao and coffee production, climate change, social justice movements, and biodiversity conservation.

By the end of the program, students should have gained a comprehensive understanding of the complex interplay between social, economic, and environmental factors in the production of coffee and cacao in Costa Rica. They will also have developed practical research skills and an appreciation for the importance of interdisciplinary approaches in understanding complex problems.

This program will include a variety of components, each designed to provide students with a deeper understanding of coffee and chocolate production, as well as the ecological and cultural impacts of different production methods. Some of the specific components of the program would include:

- Field trips to coffee and chocolate farms to observe production and processing techniques firsthand. These visits will also include conversations with farmers, allowing participants to gain insights into the challenges and opportunities associated with different farming practices.
- An evaluation of the ecological impacts of different production methods, including the environmental costs and benefits of various approaches to development of an understanding of the relationship between production methods and environmental sustainability.
- A comparative analysis of indigenous and non-indigenous cacao production systems, aimed at highlighting the differences in cultural significance and production methods to facilitate the appreciation of the diverse cultural practices that underpin coffee and chocolate production.
- An exploration of social justice issues related to coffee and chocolate production, as well as the viability of sustainable food certifications for an increasing world population. Through this component, students will examine the social and economic factors that shape production systems and consider strategies for promoting greater equity and sustainability in the industry.

These themes will be analyzed and discussed during lectures, discussions, and field trips. Additionally, we will explore specific problems during field exercises at different sites throughout the course. At the end of the course, students will actively integrate concepts and methodologies learned in class and field activities by writing an integrative essay related to the environmental or social aspects of chocolate and coffee production. A final discussion will be done with fellow students and faculty, to provide a comprehensive overview of how these two crops have affected the development of sustainable agricultural systems in Costa Rica and the tropics.

Learning Objectives

The learning objectives of this summer program are:

1. Investigate social and political factors leading to the cultivation of coffee and cacao in Costa Rica and the cultural impacts observable today.
2. Explore the intersection of service and agricultural economies in culinary tourism.
3. Assess the direct and indirect impacts of agritourism, from agrochemicals to water use and waste production.
4. Examine the ecological effects of various forms of cacao and coffee production.
5. Integrate the biological effects of agroforestry practices through in-field comparison in various ecological regions.

SFS students intercropping beans with coffee on a coffee farm.

Assessment

The assessment of student contributions has the following components. Grade corrections for any item should be requested in writing at least 24 hours after assignments are returned. No corrections will be considered afterward.

Assessment Item	Value (%)
Field Lab	15
Field Exercise 1	25
Field Exercise 2	25
Integrated Essay	25
Participation	10
TOTAL	**100**

Field Lab CATIE- Field notes on coffee and chocolate varieties (15%)

The success of a coffee or chocolate plantation, and the maintenance of high-quality standards, depends greatly on the identification of different genetic varieties, as well as their specific characteristics, uses, advantages, and capacity to resist environmental stresses. By doing so, the producers can reduce the use of agrochemicals and obtain healthy, high-quality products. To provide a practical example of this process, we will visit the coffee and chocolate collection of the Agronomical Center for Agriculture and Research (CATIE). During this visit, we encourage you to carefully record your observations and gather information using diagrams, illustrations, tables, and the information provided during the visit orientation in your field notebook. Your field notes will be evaluated in terms of the quality of the data collected and the creativity demonstrated by the students in presenting their findings.

FEX 1: Applying Integrated Pest Management in a coffee plantation (25%)

Costa Rica is known for having one of the highest rates of pesticide use per area, which poses a serious challenge for coffee farmers, especially under tropical conditions. To address this issue, the development of an integrated pest management (IPM) program is necessary. The IPM program consists of three main steps: prevention, monitoring, and control. Our objective in this exercise is to assess the

presence of pests in a coffee plantation located within a protected water source in Atenas. Students will collect and analyze data on pest incidence and will prepare a brief report. The results of this exercise will be shared with the farm's owner to aid in the implementation of an effective IPM program. By reducing the use of agrochemicals, this program aims to promote sustainable and environmentally friendly practices in the coffee industry.

FEX 2: Cacao agroforestry and socioeconomic resilience (25%)

In Agroecology, holistic thinking and experiential learning are crucial for understanding the interconnectedness of agricultural systems. This assignment aims to foster this understanding by collaborating with the family at La Iguana Chocolate Farm and achieve 3 goals: (1) to map agroforestry plant clusters and investigate the mutual benefits among plants, (2) to gain knowledge about the plants used in chocolate products, and (3) to identify potential economic opportunities based on our understanding of the farm and the Mastatal community. By working with the La Iguana family, we aim to demonstrate how diverse agroecological farm systems can lead to diverse economic systems. Ultimately, our findings will contribute to promoting sustainable agricultural practices.

Integrated Essay: SWOT analysis comparing coffee and chocolate tours (25%)

After completing the coffee and chocolate tours, you will have the opportunity to apply your newly acquired knowledge. Your assignment is to conduct a SWOT analysis comparing the tours you attended, evaluating the quality of the information received and the relationship between ecotourism activities and the production system. This analysis should identify the strengths, weaknesses, opportunities, and threats of each tour. In doing so, you will gain a deeper understanding of the coffee and chocolate production process, as well as the role of ecotourism in promoting sustainable practices. This exercise will enable you to develop critical thinking skills and provide insights into the importance of balancing economic growth with environmental conservation. SWOT stands for:

- **Strengths**: characteristics of the business or project that give it an advantage over others.
- **Weaknesses**: internal characteristics of the business or project that may limit its success.
- **Opportunities**: external factors that can be leveraged to the business or project's advantage.
- **Threats**: external factors that may pose a risk to the business or project's success.

Use this framework to analyze the tours you attended and present your findings in a clear and concise report. Be sure to provide specific examples to support your analysis and recommendations for how the tours could be improved based on your findings.

Participation (10%)

Students will be graded based on their contribution to the program during discussions, field labs, and field experiments. Active participation is fundamental for the successful completion of the summer session.

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

Readings – Readings for each lecture and exercises are listed in the syllabus or will be assigned before, or after, the lecture. The material will be provided in the form of an anthology to save printing paper and reduce waste. You are expected to read these materials before class and use them as background information for discussion. If you stay for summer 2, readings will be more specific to the subject of the research component implemented at the end of that session.

SFS students harvesting cacao at a chocolate farm

Plagiarism – Using the ideas and material of others without giving due credit is cheating and will not be tolerated. A grade of zero will be assigned if anyone is caught cheating or aiding another person to cheat actively or passively (e.g., allowing someone to look at your exam).

Deadlines – Deadlines for assignments are established to promote equity among students, to allow faculty enough time to review and return comments and grades before other assignments are due; and to avoid clashes with other activities and courses. Therefore, deadlines are firm, and extensions will only be considered under extreme circumstances.

Please check ahead of time with the professor in charge regarding the assignments' deadlines. 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 not be accepted anymore. Assignments will be handed back to students after a one-week grading period. All grade revisions should be in writing explaining the issues at hand within the 24 hours after receiving the grade in any activity, be this an exam or field related work.


SFS students grinding cacao on an indigenous *metate* at a chocolate farm.

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, **D:** Discussion, **Lab:** Classroom lab/workshop

***Required readings are in bold**

No	*Title and outline*	*Type*	*Time (hrs)*	*Readings*
1	**General Orientation and Introduction to the Program**	L	1.0	
2	**Socioeconomic context and trends in Costa Rica** Key historic points in C.R.'s development" - Sustainable development successes and challenges -Ethical issues related to development -The impacts of Covid-19 on development	L	1.0	**Sada, M.J., 2017.**
3	**The Costa Rican Conservation System** Socio-economic drivers of deforestation in CR focusing on agricultural development. History of Conservation. Evolution of the National System of Protected Areas (SINAC)	L	1.0	
4	**The role of chocolate and coffee in Costa Rica's development** Origin and adaptation of these crops. Economic, political, and environmental reasons favoring cultivation in Costa Rica. Socioeconomic impacts of production today.	L	1.5	**Gordon, 2013.** **Posas, 2013.** **Hager, Little, et al., 2021.**
5	**Agroecology** Basic concepts. Nutrient cycling and hydrology in agroecosystems. Productivity and food security and sustainable agriculture in the tropics.	L	1.0	Hunter et al., 2017. Perfecto & Vandermeer, 2008.
6	**Evaluating environmental and social food certifications** Comparison of social and environmental sustainability of food certification and their adoption in Costa Rica. Do these certifications support sustainable livelihoods and agricultural practices?	L	1.0	Bacon & Sundstrom et al., 2014.
7	**Intro to Costa Rica´s natural History** The biological context: origin of the CR´s biota, geologic history, climate, biological exchanges.	L	1.0	**Little & Blau, 2019.**
8	**The intertwined histories of cacao, coffee, and Costa Rica** How Costa Rica's culture was formed and influenced by coffee production. Impacts of limited cocoa production. How these crops impact social norms and views.	L	1.0	**Avalos, G. 2019.** **Global Biodiversity Chapter 4.**
9	**Introduction to Sustainability/social contract**	D	1.0	Gordon-Chipembere, 2016.
10	**Field Trip: Toledo Coffee farm** - Farm interpretation and AFS management - Sustainable agricultural practices on small farms - Organic farming - AFS management	FL	2.0	

No	*Title and outline*	*Type*	*Time (hrs)*	*Readings*
11	**Field Trip: Coope-Atenas** Example of farmer organization for coffee production. Certifications.	FL	2.0	Tscharntke et al., 2011. Nieters et al., 2015
12	**Field trip: Aquiares and CATIE orientation**	FL	5.0	
13	**Biodiversity and Agroecosystems**	L	1.0	
14	**Work on FLAB** Field notes on coffee and chocolate varieties	Lab	3.0	
15	**Excel Workshop** Organize data using Excel. Graphic representation of data	Lab	2.0	
16	**Field trip PN Arenal**	FL	3.0	
17	**Guest lecture and orientation at BiciChocolate** Chocolate tasting accompanied by experiences of a sustainable cacao entrepreneur.	FL	1.0	
18	**Field trip: La Paz San Ramón** Project Our Coffee, Our Birds.	FL/GL	2.0	
19	**Economic and cultural opportunities of agrotourism**	L	1.0	
20	**Field Trip: Altos de Naranjo** FEX 1, Part 1: Identifying pests in coffee plantations.	Lab	1.0	
21	**FEX 1, Part 2** Applying Integrated Pest Management in a coffee	Lab	2.0	
22	**FEX 1, Part 3** Analysis and writing	Lab	2.0	
23	**Who produces cacao/coffee? The economic and cultural opportunities of agrotourism** How can agrotourism promote and protect cultural traditions while contributing to rural livelihood? What challenges do farmers face implementing agritourism? Is there a danger of acculturation through marketing traditions?	L/D	1.5	
24	**Field Trip: Mastatal** FEX 2, Part 1: Roots and Branches of Chocolate and Coffee	FL	3.0	
25	**FEX 2, Part 2** Data analysis and Discussion	Lab/D	3.0	
26	**Local knowledge workshop**	Lab	1.0	
27	**Field trip: San José**	FL	1.0	
28	**Integrated discussion/SWOT Analysis**	D	2.0	
29	**Integrated essay**		3.0	
	TOTAL		**51**	

Reading List

***Required readings are in bold**

1. **Avalos, G. (2019).** Still searching the rich coast: Biodiversity of Costa Rica, numbers, processes, patterns, and challenges.
2. Bacon, C. M., W. A. Sundstrom, et al. (2014). Explaining the 'hungry farmer paradox': Smallholders and fair-trade cooperatives navigate seasonality and change in Nicaragua's corn and coffee markets. *Global Environmental Change* 25: 133-149.
3. Bacon, Christopher & Méndez, V & Fox, Jonathan. (2008). Cultivating Sustainable Coffee: Persistent Paradoxes. Confronting the Coffee Crisis: Fair Trade, Sustainable Livelihoods and Ecosystems in Mexico and Central America.
4. Blackman, A. and Naranjo, M.A. (2012). Does eco-certification have environmental benefits? Organic coffee in Costa Rica, *Ecological Economics*.
5. Cruz-Angón, A., Baena, M. L., & Greenberg, R. (2009). The contribution of epiphytes to the abundance and species richness of canopy insects in a Mexican coffee plantation. *Journal of Tropical Ecology*, *25*(5), 453-463.
6. Dahlquist, R. M., Whelan, M. P., Winowiecki, L., Polidoro, B., Candela, S., Harvey, C. A., … Bosque-Pérez, N. A. (2007). Incorporating livelihoods in biodiversity conservation: a case study of cacao agroforestry systems in Talamanca, Costa Rica. Biodiversity and Conservation, 16(8), 2311–2333. doi:10.1007/s10531-007-9192-4
7. González-Valdivia N.A., Cetzal-Ix W., Basu S.K., Casanova-Lugo F., Martínez-Puc J.F. (2017) Diversity of Trees in the Mesoamerican Agroforestry System. In: Ahuja M., Jain S. (eds) Biodiversity and Conservation of Woody Plants. Sustainable Development and Biodiversity, Vol 17. Springer, Cham.
8. **Gordon-Chipembere, N. (July 11, 2016).** African-Costa Rica Voices in the National Achieves: A History of Slavery and Cacao Production. *Tico Times*.
9. Guzel, Berrin and Paydin, Müge (2016) Gastronomy Tourism: Motivations and Destinations in Global Trends and Issues in Tourism, ed. Avcikurt, A.
10. **Häger, Little, M., Amel,E. & Calderón, G. (2021).** Transformation Toward Sustainability on a Costa Rican Coffee Farm: *Environmental, Socioeconomic, and Psychological Perspectives*. *Case Studies in the Environment*, 5 (1): 1227777. doi: https://doi.org/10.1525/cse.2021.1227777
11. Häger, A., et al. (2015). Effects of management and landscape composition on the diversity and structure of tree species assemblages in coffee agroforests. *Agriculture, Ecosystems & Environment* 199: 43-51.
12. Heinen, J. T. (1992). Comparisons of the leaf litter herpetofauna in abandoned cacao plantations and primary rainforest in Costa Rica: some implications for faunal restoration. *Biotropica*, 431-439.
13. Hunter, M.C. et al. (2017). Agriculture in 2050: Recalibrating targets for sustainable intensification. *BioScience* 67: 386-391.
14. **Little, M. & Blau, E (2019).** Social adaptation and climate mitigation through agrotourism: a case study of tourism in Mastatal, Costa Rica, Journal of Ecotourism, DOI: 10.1080/14724049.2019.1652305.
15. Lohse, R. (2010). Cacao and slavery in Matina, Costa Rica, 1650-17-50 in Black and Blackness in Central America, ed. L. Gudmendson and J. Wolfe, Duke University Press.
16. Moguel, P., & Toledo, V. M. (1999). Biodiversity conservation in traditional coffee systems of Mexico. *Conservation Biology*, *13*(1), 11-21.
17. Nieters, A., Grabs, J., Jimenez, G. and Jimenez, W. (2015). NAMA Café Costa Rica – A Tool for Low-Carbon Development. NAMA Facility Technical Support Unit on behalf of German Federal Ministry for the

Environment, Nature Conservation, Building and Nuclear Safety (BMUB)/ UK Department for Energy and Climate Change (DECC).

18. Paige, J. (1997). Coffee and Power: Revolution and the Rise of Democracy in Central America, Chapter 3, Neo-Liberalism and Agro-Industry in Costa Rican. *Harvard University Press*.
19. Perfecto, I. and Vandermeer, J. (2008). Biodiversity Conservation in Tropical Agroecosystems. Annals of the New York Academy of Sciences, 1134: 173-200.
20. Perfecto, I., Rice, R. A., Greenberg, R., & Van der Voort, M. E. (1996). Shade coffee: a disappearing refuge for biodiversity: shade coffee plantations can contain as much biodiversity as forest habitats. *BioScience*, *46*(8), 598-608.
21. **Posas, P. (2013).** Shocks and Bribri Agriculture Past and Present. *Journal of Ecological Anthropology* 16, no. 1: 43-60
22. **Pullaiah, T. (editor).** Global Biodiversity Volume 4: Americas. CRC Press, Florida, USA.
23. Reitsma, R., Parrish, J. D., & McLarney, W. (2001). The role of cacao plantations in maintaining forest avian diversity in southeastern Costa Rica. *Agroforestry Systems*, *53*(2), 185-193.
24. Richards, M. B. and Mendez, V. E. (2014), Interactions between Carbon Sequestration and Shade Tree Diversity in a Smallholder Coffee Cooperative in El Salvador. *Conservation Biology*, 28: 489-497
25. **Sada, M.J. (2017).** The Curious Case of Costa Rica. Harvard International Review.
26. Tscharntke, T. et al. (2011). Multifunctional shade-tree management in tropical agroforestry landscapes–a review. Journal of Applied Ecology 48(3): 619-29.
27. Vivanco, L. A. (2007). Green encounters: Shaping and contesting environmentalism in rural Costa Rica (Vol. 3). Berghahn Books.