



## **CIEE in Monteverde, Costa Rica**

<b>Course name:</b>	Sustainable Development for the Tropics
<b>Course number:</b>	DEVE 3001 MTVE / ENVI 3002 MTVE
<b>Programs offering course:</b>	Sustainability and the Environment
<b>Language of instruction:</b>	English
<b>U.S. Semester Credits:</b>	3
<b>Contact Hours:</b>	45
<b>Term:</b>	Summer 2019, Session II

### **Course Description**

This course critically assesses the “triple bottom line”, i.e., the balance of the environment, economy, and society, in theory and practice through its exploration of contemporary development issues in Costa Rican contexts. The focus is on topics of economic development where there is a strong interface between the environment, society, and economic activities. The principal topics explored are food systems, energy production, and tourism. Examples are drawn from Monteverde in particular, Costa Rica in general, and beyond.

Costa Rica is a perfect location for students of sustainability and for explorations of the intersection between the environment, society, and the economy. This tiny country emerged as a world leader in the environmental movement in the 1970’s with its daring initiatives to create a national park system and protect its impressive natural capital. It leveraged these riches as it shifted from small-scale agriculture to the emerging industry of eco-tourism, ostensibly creating a “green economy”. Fueled primarily by renewable energies (hydropower, geothermal, wind, solar and biomass), the country receives international accolades for its use of clean energy developed from local sources. These actions have led some analysts to deem Costa Rica the “best case scenario” for sustainable development in the world. However, there is much more to the Costa Rica backstory than meets the eye at first acquaintance. The principal energy source, hydropower, has displaced thousands of people from their communities and has led to the disruption of important aquatic ecosystems. International travel to Costa Rica and globalization of trade have fueled ever-increasing consumption of material goods. This increases the impact on fragile ecosystems, and threatens the preservation cultural identity. The triple bottom line for Costa Rica hangs in the balance. Students will travel to fascinating locations and hear from insiders to experience these tensions firsthand.

### **Learning Objectives**

Upon completion of this course, students will:

- Have command over the basic concepts and terminology necessary to relate and critically discuss the essential components and operating systems of renewable electricity power plants (wind, solar, geothermal, and hydropower)
- Be competent at questioning, assessing, and articulating the advantages and disadvantages of renewable energies and centralized distribution systems of electricity in terms of social, economic, and environmental impacts



- Have command over the essential concepts and terminology necessary to relate and critically discuss systems of coffee, bananas, and pineapple in Costa Rica
- Be competent at questioning, assessing, and articulating the advantages and disadvantages of Costa Rica's agricultural trade system in terms of dependency theory, food sovereignty, and food security
- Be able to relate poverty and poverty traps to food security and food sovereignty in Costa Rica and other tropical, developing nations in general, and propose agricultural trade and production practices and systems that can avoid or minimize poverty traps
- Have command over the basic concepts and terminology necessary to describe, explain, and critically discuss (with peers as well as with tourism business owners and other stakeholders) the essential features of rural, adventure, and eco-tourism
- Be competent at assessing the conditions for successful implementation of ICDPs (Integrated conservation and Development Programs), specifically in tourism
- Be able to evaluate conditions under which international tourism and travel lead to tourism treadmills and mass tourism, as well as critically judge whether eco-tourism undermines or enhances the protection of tropical biodiversity in Costa Rica and other tropical, developing nations
- Be able to analyze and articulate the potential for international tourism and travel as a poverty-reduction strategy in tropical, developing nations
- Become an enlightened and engaged stakeholder when making decisions related to food purchase and consumption, tourism, and energy production and consumption.

### **Course Prerequisites**

Two (2) semesters of university-level courses in the natural sciences, environmental studies, sustainability, or agriculture

### **Methods of Instruction**

This course is taught through the use of lectures, field visits and interviews with professionals and locals, videos and documentaries, critical reading exercises, surveys of residents, group discussions, debates, and persuasive writing assignments.

An overnight field excursion to northwestern Costa Rica allows students to visit four different kinds of renewable energy power plants and a National Park that may be impacted negatively if the government approves geothermal energy exploration in protected areas. Interviews with engineers and other professionals in the energy sector offer opportunities to learn from the experts, including perspectives on why expansion into national parks may be necessary. One-day excursions to diverse Monteverde farms (small- and large-scale, organic and conventional, transnational or locally-owned), with different crops and livestock, give students direct experiences with agricultural production and opportunities for exchange with local agriculturalists. Daylong outings to experience different kinds of tourist attractions (in eco-, agro-, and adventure tourism), coupled with discussions involving diverse stakeholders, give students an insider's view on the complex consequences of international tourism and travel for the local community, economy, and the natural environment.



### **Assessment and Final Grade**

- Attendance and Participation 10%
- Survey, Data Analysis, and Report 20%
- Resilience Analysis and Persuasive Writing Exercise 20%
- Summary for Policy Makers (Oral Presentation) 20%
- Final exam 30%

### **Course Requirements**

#### **Attendance and Participation**

Attendance is noted for each lecture, discussion, and outing. As the semester proceeds, students earn points for attendance, thoughtful commentary, questions, and engagement in interviews and discussions

#### **Survey, Data Analysis, and Report**

Students conduct a survey to investigate a controversial energy expansion plan in Costa Rica. They analyze results, graph them, and write a report in the style of a publication for a peer-reviewed journal.

#### **Resilience Analysis and Persuasive Writing Exercise**

Students make visits to tourism businesses and interview stakeholders on the economic, social, and environmental impacts of tourism. They conduct a resilience analysis, and based upon these results, they write a 1,000-word persuasive argument that argues for or against tourism expansion.

#### **Summary for Policy Makers (Oral Presentation)**

Students make a PowerPoint presentation crafted for an audience of policy makers on the topic of food security and the agricultural practices that enhance it. They make recommendations, based on peer-reviewed studies and their experiences in farm interviews/visits.

#### **Final exam**

Students take a 100-point exam. It consists of questions of multiple choice and short answer questions related to the lectures, field activities, and assigned readings (70 points) as well as a take-home portion (30 points) that consists of essays (open book, open-notes), due on the final exam date.



## Weekly Schedule

### Week 1

- Lecture 1: Sustainable Development in and for the Tropics. The 3 pillars of sustainability, the Earth Summits, the Brundtland Report, Rio Declaration rights and responsibilities, Rio Principles, Integrated Conservation and Development Programs, Kyoto Protocol, Clean Development Mechanisms, Joint Implementation, Emissions trading, all from the perspective of the global south
- Lecture 2: Energy Distribution and Consumption in Costa Rica: Essential Background. Energy consumption by sector; consumption trends for electricity and for transportation fuel; international trade in electricity; national and international (SIEPAC) distribution systems; pilot program in small-scale distributed electricity generation
- Lecture 3: Hydropower Electricity Production in CR. Basic operations hydropower plants; cost to build and operate; levelized costs; land footprint of power plant and associated infrastructure; impacts on the human community; impacts on the surrounding ecosystem; social, environmental and economic impacts on regional and larger scales; controversial proposal for large-scale dam in Costa Rica indigenous region (the Diquís proposal)
- Lecture 4: Wind Electricity Production in CR. Basic operations wind farms; cost to build and operate; levelized costs; land footprint of power plant and associated infrastructure; impacts on the human community; impacts on the surrounding ecosystem; social, environmental and economic impacts on regional and larger scales; Costa Rican wind farms and the Clean Development Mechanism of Kyoto
- Lecture 5: Solar Electricity Production in CR. Basic operations solar panels and solar power plants; cost to build and operate; levelized costs; land footprint of power plant and associated infrastructure; impacts on the human community; impacts on the surrounding ecosystem; social, environmental and economic impacts on regional and larger scales
- Lecture 6: Geothermal Electricity Production in CR. Basic operations geothermal plants; cost to build and operate; levelized costs; land footprint of power plant and associated infrastructure; impacts on the human community; impacts on the surrounding ecosystem; social, environmental and economic impacts on regional and larger scales; issue of siting geothermal plants in Costa Rica; Costa Rican geothermal plants and the Build-Own-Transfer Program of Kyoto
- Discussions
  - Energy Exploration in Costa Rica's National Parks? This follows a visit to a geothermal power plant and to Rincón de la Vieja National Park, the site of extensive geothermal activity and the subject of a controversial plan to open national parks and protected areas to energy exploration.
  - Sustainability of Costa Rican Electricity Production? This follows visits to four renewable power plants and related sites. Students discuss the pro's and con's of all systems observed, and compare and contrast the Arenal Hydropower Plant to the proposed mega project, Hydropower Plant Diquís.



- Overnight excursion to northwest Costa Rica
  - Visit wind farm, hydropower, geothermal and solar power plants, as well as Rincón de la Vieja National Park.
  
- Assignments: Survey, Data Analysis, and Scientific Report (20%)
  
- Readings and online resources
  - Ambientico (2015)
  - Instituto Costarricense de Electricidad (2015)
  - Kates *et al.* (2005).
  - United Nations Environment Programme (2015)
  - World Commission on Environment and Development (1987)

## Week 2

- Lecture 7: Tourism: Global and regional trends. Patterns and trends in the tourism industry worldwide and for Costa Rica. Tourism as an Integrated Conservation and Development Project. Impacts of international travel on local and regional cultures, with examples from Costa Rica; impacts of international travel on the economies of Central American nations, including Costa Rica; management of solid waste and wastewater associated with international travel; greenhouse gases associated with air travel for tourism
- Lecture 8: History of conservation and tourism in Monteverde. Introduction to MV's original watershed, Monteverde Cloud Forest Preserve, Children's Eternal Rainforest, Monteverde Conservation League; tourism trends in MV; tourism infrastructure and services in MV; Eco-, agro-, rural, and mass tourism defined and distinguished; tourism treadmills explained with examples from Costa Rica and Monteverde
- Lecture 9: Tourism certification. Third party versus first party certification; Costa Rica's Certificate of Sustainable Tourism (protocol, monitoring, and impacts on tourism practices); green-washing; certification pitfalls, myths, and impacts of certification on consumer psychology, especially in context of eco- and agro-tourism
  
- Discussion
  - Sustainability of Eco-tourism? Be prepared to discuss the videos, readings, and your own tourism experiences.
  
- Films
  - "Gringo Trails": a documentary about the unexpected consequences of international tourism and how to improve the sustainability of tourism-centered economies
  - "Cracking the Golden Egg", by CREST (Center for Responsible Tourism). A documentary on the impacts of, and controversies surrounding, international tourism on Costa Rica's Pacific coast.
  
- Excursions



- Monteverde Cloud Forest Preserve (eco-tourism attraction); visit example of agro-tourism attraction; visit example of adventure tourism
- Assignments: Resilience Analysis and Persuasive Writing Exercise (20%)
- Readings and online resources
  - Davis (2009)
  - Higham (2007)
  - Honey (2008)
  - Honey (2011)
  - Instituto Costarricense de Turismo (2015)
  - Koens *et al.* (2009)
  - National Academy of Sciences (2010)
- Media
  - *Cracking the Golden Egg* (2010)
  - *Gringo Trails* (2013)

### Week 3

- Lecture 10: Food Security. Food production, famine, and food availability in the tropics; the Green Revolution; concepts of food security, community food security, and food sovereignty compared; rise of transnationals, corporate agriculture, agribusiness
- Lecture 11: Livestock of Monteverde. History of dairy farming in Costa Rica and in Monteverde; dairy cattle-pig connection; water and carbon footprints, waste water, and other environmental impacts of large and small dairy and pig production systems; economics of dairy and pig farming in Monteverde; livestock husbandry in CAFO's contrasted with traditional Monteverde farms
- Lecture 12: Crops of Costa Rica: Coffee. History and trends in coffee production and consumption; role of cooperatives in coffee history in Costa Rica, fair trade coffee, direct trade coffee, value chains, and value-added products.
- Lecture 13: Crops of Costa Rica: Bananas and Pineapple. History of bananas in Latin America, with emphasis on Costa Rica; "banana republics"; import and export crops and dependency theory; environmental and social ills of banana production; persistent organic pollutants; history and trends in pineapple production and consumption; "precarious labor", undocumented laborers in Costa Rica; socio-economic and environmental impacts
- Lecture 14: Agriculture for the future: principles of sustainable agriculture, permaculture, organic agriculture, local production; hydroponics and biodynamic production; community-supported agriculture; small-scale production economics; obstacles and options for food sovereignty for Costa Rica's future



- Discussion
  - Food Security, Sovereignty, and Sustainability in Food Systems in Costa Rica?
- Excursions
  - Visit smallholder farm with organic coffee and subsistence agriculture; visit a large-scale pineapple plantation; visit a small-scale pig farm; visit a large-scale cattle ranch
- Assignments: Summary for Policy Makers (Oral Presentation; 20%)
- Readings and online resources
  - Altieri & Toledo (2011)
  - Barraza *et al.* (2011)
  - Chappell *et al.* (2013)
  - Clapp (2010)
  - Food and Agriculture Organization of the United Nations (2015)
  - International Labor Rights Forum (2008)
  - International Labor Rights Forum (2010)
  - International Labour Organization of the United Nations (2015)
  - Rudel *et al.* (2009)
  - World Food Programme (2015)

#### **Week 4**

- Lecture 15: Great problems and great solutions. Review of the challenges that Costa Rica confronts in terms of protecting biological and cultural diversity in the face of developing economic activities (electricity production and international trade, food production by transnationals, and tourism); current policies, practices, and norms that show promise for sustainable economic development; how individuals (Costa Rican and others) can make a difference and advance sustainability
- Assignments: Final Exam (30%)
  - Final Exam take-home essays assigned. A take-home portion of the final exam (30 points) consists of essays (open book, open-notes), which are due on the final exam date.
  - Final Exam (in class) Students take a 70-point exam consisting of questions of multiple choice and short answer questions related to the lectures, field activities, and assigned readings.



## **Course Materials**

### **Readings**

- Altieri, M. A. & Toledo, V. M. (2011) The agroecological revolution in Latin America: Rescuing nature, ensuring food sovereignty and empowering peasants, *The Journal of Peasant Studies*, 38 (3), 587-612, doi: 10.1080/03066150.2011.582947
- Barraza, D., Jansen, K., van Wendel de Joode, B., & Wesseling, C. (2011). Pesticide use in banana and plantain production and risk perception among local actors in Talamanca, Costa Rica. *Environmental Research* 111, 708-711.
- Chappell, M. J., Wittman, H., Bacon, C. M., Ferguson, B. G., Barrios, L. G., Barrios, R. G., Jaffee, D., Lima, J., Méndez, V. E., Morales, H., Soto-Pinto, L., Vandermeer, J., & Perfecto, I. (2013). Food sovereignty: an alternative paradigm for poverty reduction and biodiversity conservation in Latin America [v1; ref status: indexed, <http://f1000r.es/23s>] F1000Research 2:235. doi: 10.12688/f1000research.2-235.v1.
- Clapp, J. (2010). *Food*. Cambridge: Polity Press, chapters 1-4.
- Davis, J. (2009). The creation and management of protected areas in Monteverde, Costa Rica. *Global Environment* 3-2009. Retrieved 7 January 2013, from <http://www.globalenvironment.it/DAVIS.pdf>. Pp 96-119
- Higham, J. (2007). Ecotourism: Competing and conflicting schools of thought. In J. Higham (Ed.), *Critical issues in ecotourism: understanding a complex tourism phenomenon* (pp. 1-20). Elsevier Press, Boston.
- Honey, M. (2008). *Ecotourism and sustainable development: Who owns paradise?*, 2nd edn., (pp. 160-214). Washington: Island Press.
- Honey, M. (2011). Giving a grade to Costa Rica's green tourism. In S. B. Gmelch (Ed.), *Tourists and tourism: A reader*, 2nd edn. (pp. 439-449). Long Grove: Waveland Press, Inc.
- International Labor Rights Forum. (2008). The sour taste of pineapples: How an expanding export industry undermines workers and their communities. Retrieved from: <http://www.laborrights.org/creating-a-sweatfree-world/resources/10745>
- Kates, R. W., Parris, T. M. & Leiserowitz, A. A. (2005). What is sustainable development? Goals, indicators, values, and practice. *Environment: Science and Policy for Sustainable Development*, 47, 8–21. doi: 0.1080/00139157.2005.10524444
- Koens, J. F., Dieperink, C. & Miranda, M. (2009). Ecotourism as a development strategy: experiences from Costa Rica. *Environment, Development and Sustainability* 11, 1225-1237
- National Academy of Sciences. (2010). *Certiifiably sustainable? The role of third-party certification systems: Report of a Workshop*. <http://www.nap.edu/catalog/12805.html>. Pp. 9-26
- Rudel, T. K., Defries, R., Asner, G. P., Laurance, W. F. (2009). Changing drivers of deforestation and new opportunities for conservation. *Conservation biology*, 23, 1396-1405.
- World Commission on Environment and Development. (1987). *Our Common Future*. Oxford University Press. Pp. 44-65



### **Online Resources**

Ambientico. (2015). <http://www.ambientico.una.ac.cr>

Food and Agriculture Organization of the United Nations. (2015). <http://www.fao.org>

International Labour Organization of the United Nations. (2015). <http://www.ilo.org/global/lang-en/index.htm>

Instituto Costarricense de Electricidad. (2015). *Proyectos energicos*. <https://www.grupoice.com>

Instituto Costarricense de Turismo. (2015). *Certificate of sustainable tourism*.  
<http://www.visitcostarica.com/ict/paginas/sostenibilidad.asp?tab=4>

United Nations Environment Programme (2015). *Rio Declaration on Environment and Development*.

<http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163>

World Food Programme. (2015). *Hunger*. <http://www.wfp.org/hunger>

### **Media Resources**

Center for Responsible Tourism (Producers). (2010). *Cracking the Golden Egg* [Motion Picture].  
United States: LocalFilms

Vail, P. (Director/Producer) & Estrella, M. (Producer). (2013) *Gringo Trails* [Motion Picture].  
United States: Icarus Films