

Auburn University/New Mexico State University International Course

AGRI 4000 (Auburn) **Tropical Agro-Ecosystems of Belize, Past and Present** (3 credits)

ABCD 3XX (NMSU) **Tropical Agro-Ecosystems of Belize, Past and Present** (3 credits)

Trip Dates: May 11- 20, 2013

Instructors:

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SECTION I

1. General Course Description:

This course surveys a wide range of agricultural, food, forestry and fisheries systems within the small, neo-tropical country of Belize. It examines the social, economic and ecological impacts of the food production sector, its importance in food security and economic development and its linkage to the global economy.

Detailed Course Description:

The course is designed and offered as a joint effort between Auburn University and New Mexico State University. Students and faculty from both institutions will be brought together through social networking and distance learning technology to meet one another, introduce basic concepts covered in the course, review and plan the ten-day travel itinerary, and prepare for departure.

The first region of interest will be in the central part of the country known as the Cayo District and encompassing the agriculturally-dominated Belize River Valley. After foundation lectures on local soil and water systems (including a float down the Macal River), the class will visit sites once dominated by the "forest gardens" of the Ancient Maya, walk through milpa systems and small-scale farms of present day Maya, Hispanic, Creole and Mennonite farmers, and tour the mechanized agricultural landscape and processing facilities around Spanish Lookout, a rapidly growing community of progressive Mennonite farmers. We will also visit the Agriculture Department facilities operated by the Government of Belize and the University of Belize Agriculture Program Campus located at Central Farm.

To reach the next locale, we will travel down the Hummingbird Highway through the coastal floodplains of the Sibun, North Stann Creek and South Stann Creek Watersheds, stopping to observe agricultural lime kilns, banana plantations and citrus production facilities; visit a Maya community farm system and cultural museum at Maya Center; and visit a working shrimp farm. When we arrive in the Garifuna town of Dangriga, we will board water taxis for Tobacco Caye, a community of fishers and their families who now supplement their livelihoods with small-scale ecotourism. There we will learn about other aquaculture ventures in open waters as well as management strategies to protect the wild-catch fisheries resources, including fish, lobster, conch, and sea cucumbers.

Throughout this experience, the class will be exploring the importance of agriculture to the security and development of Belize by visiting local markets, sampling local fruits and vegetables, eating local and ethnic dishes, hearing about national export and import conditions from Belizean economists and understanding the effects of the global market on a small developing nation. During our travels, the ecological impacts of each

farming system and solutions to those impacts will be presented, and we will discuss some of the efforts underway to develop more sustainable agricultural systems in a rapidly changing world.

2. Hours: This is a 3-semester-hour course with classes meeting three times before the trip (for 1 ½ to 2 hours each time), a ten-day trip in Belize averaging 4-6 hours of class time each day, and two or three meetings after returning from Belize.

3. Prerequisites and Advisories:

No prerequisites are required to take this course. It is imperative that students take detailed notes during lectures, discussions, field activities and lab sessions. It is also expected that students signing up for this course are committed to:

- reading all course materials, including this syllabus
- taking good notes
- paying close attention to all health and safety advisories and packing instructions
- asking what to do rather than standing around waiting to be told
- attending pre-travel and post-travel meetings and being prepared to contribute to discussions, planning sessions, and other relevant matters
- submitting all assignments on time
- using all available resources to put forth your best writing
- being an active and valued team member
- thinking independently but acting as a team based on the principles of Team-Based Learning

4. Course Objectives/ Student Benefits

Upon successful completion of this course, students will be able use information, knowledge and critical thinking skills to:

OBJECTIVES	BENEFITS
Describe the scope of agricultural practices found in Belize and neighboring countries and the types of crops produced for local and export markets	Provides a general understanding of farming systems and an appreciation of the importance of agriculture to both the food security of the country and its economic development potential
Apply principles of soil and water ecology related to agricultural production and ecological services	Familiarizes students with the importance of a country’s soil and water resources to food security, ecological conservation and economic sustainability
Illustrate social, historical, cultural and political influences on farming systems	Introduces students to the complexity of agribusiness in the modern age
Discuss financial trade-offs between economic and environmental constraints and opportunities	Gives students an appreciation of the internal benefits and costs of various agricultural practices
Survey the range, characteristics and causes of ecological impacts on soil and water resources from agricultural practices	Gives students a better understanding of the external benefits and costs of agriculture and provides examples of problems due to non-sustainable agricultural expansion
Compare and contrast ancient vs. modern agricultural practices and small farming systems vs. mechanized systems.	Help students determine empirically what the societal benefits and costs are from alternative farming systems.
Attempt to measure differences in productivity and environmental impact between the various farming systems	Learn methods for estimating yields and acreages needed to support the large populations surrounding ancient Mayan cities
Utilize landscape-scale tools to understand impacts of agricultural practices on watershed ecosystems	Introduces the landscape and watershed concepts for use in measuring off-site and non-point source impacts in agricultural management
Describe various strategies and solutions for curbing, reducing and eliminating environmental impacts of agricultural practices while maintaining productivity	Exposes students to many alternatives to current practices that are available to farmers whereby critical soil and water resources can be more wisely utilized without sacrificing yields and profitability
Illustrate concepts of “appropriate technologies” with examples from local adaptations and innovations in agricultural practices	Provides students with an overview of workable, affordable technologies available to farmers within developing countries

Examine global and regional conservation issues related to agricultural, forestry and fisheries production systems	Increases awareness of global and regional issues and the solutions being pursued at local and international levels
Interact with farmers, researchers, extension workers and administrators to explore collaborations with our universities that may later result in full-scale projects that may assist in lowering costs, increasing yields and improving environmental and social conditions	Allow to students to consider, plan and participate in longer-term relationships with commitments to development and cooperation

SECTION II

5. Course Content and Scope

5.1. Outline of Topics

The following are included within the framework of the course but are not intended as limits to content. This is a proposed but relatively stable schedule. The order of topic presentation is subject to change and new topics may be introduced relative to situations and opportunities encountered during the course time. The exact times for activities and the destinations of field sites are subject to change given weather, logistics and other considerations.

Pre-trip Meeting 1 (approximately mid-February with first fee payment due)

3:00 pm - First pre-trip meeting attended in person by all campus-based students and attended by internet conferencing by all off-campus students, including students from university branches, other universities in the states and any students participating from Belizean universities. This session will include:

- Personal introductions of all participants, students, faculty and field course assistants
- General description of the course, travel plans, project
- Rapid review of the syllabus
- Discussion of issues that need to be resolved prior to departure, ensuring that passports have been procured, fees paid, forms filed on time
- Review of health, safety and phytosanitary protocols before, during, and after the trip
- Review of the packing list, what to bring and what NOT to bring
- Creating a single Field Team and several squads -- we are all dependent on one another
- Direct students to reading and A/V materials on Belize history, geography, agriculture, languages, cultures, etc. (e.g. Mennonite settlements, Creole linguistics, Mayan pre-history, Garifuna music, *Belize Ag Report* current topics, jaguar corridors, duendes in folklore, etc.)
- **Lecture/Discussion 1.** Course introduction
- **Assignment 1** -- Write and post your personal biography with recent photograph on the social media page set up for the course.
- **Assignment 2** -- Submit one-page "pre-trip reflections" on personal objectives for trip, including why you are interested in Belize, what you hope to learn and experience, and how you expect this experience to help your career.

Pre-trip Meeting 2 (approximately mid-March with second fee payment due; book flights)

3:00 pm - Second pre-trip meeting attended face to face or electronically by all students. This session will include:

- Update of course status, student components that are missing and need to be submitted immediately
- Discussion of flight plans, time of flight and departure by students from campus to the airport and travel plans of students in remote campuses
- Discussion of any issues students may have concerning final form submission, packing, project activities, travel arrangements, vaccinations and other relevant business
- **Lecture/Discussion 2** -- Keeping a field log, recording observations, keeping track of details, making sketches
- **Assignment 3** -- Acquire a field notebook and record your personal packing list and pre-trip observations, concerns and expectations.

- **Assignment 4** -- Write a 4-6 page "macro-analysis" of some political, economic, cultural, social, agricultural, ecological, technological or historical aspect of the country or some region, district, market, landscape, ecosystem, watershed, habitat, or biome in it.

Pre-trip Meeting 3 (Late April, with final fee payment)

3:00 pm - Third pre-trip meeting attended face to face or electronically by all students. This session will include:

- Update of course status and finalization of pre-course details, including final run-down of travel arrangements.
- **Lecture/Discussion 3** -- Overview of Belize, its history (with an agricultural and natural resource production perspective) and cultural diversity as a gateway country between the Caribbean and Latin America.
- Reminder for all students concerning departure schedules for the travel day.

In-country DAY 1. Saturday, May 11, 2013- *The Departure Day*

11:30 to 1:00 pm - Arrive in Belize, claim luggage, clear Customs, meet in-country service provider team outside airport
 1:30 pm - Lunch at Cheers
 2:00 to 4:00 pm - guided tour of the Belize Zoo
 4:30 pm - Arrive at Central Farm and check into guest houses
 6:00 pm - Dinner at Hode's in San Ignacio
 7:30 pm - Lecture on pre-history and ecology of Belize

In-country DAY 2. Sunday, May 12, 2013

7:30 - Breakfast
 8:30 - Travel to El Pilar and become introduced to Ancient Maya agricultural systems and to the forest garden concept, tour the archaeological site, noting many of the native plants in the area that had economic significance to the Ancient Maya. Consider data requirements for estimating the food production necessary to support the city in its time.
 12:00 - Lunch
 1:00 - Float down the Macal River, noting agricultural practices by present day farmers and the interaction of farmers and villagers with the river system, including erosion, buffers, riverine ecosystems, hydrology, and working riparian forests. The float will continue through the afternoon.
 5:30 - Dinner at Central Farm Cafeteria
 7:00 - Return to Central Farm, Summarize the day's activities, tying together these components into our collective experience. Presentation of the general geography, geology, soils and agriculture of Belize and the immediate region.

In-country DAY 3. Monday, May 13, 2013

8:00 - Breakfast
 9:00 - Welcome and orientation at Central Farm (Government of Belize Agriculture Department facility) and a presentation on biosecurity and phytosanitary precautions
 10:00 - Tour of UB Central Farm campus, Belize Agricultural Health Authority and Taiwan Agricultural Mission facilities, learning about the various research and extension activities and international cooperation on-going.
 12:00 - Lunch at the Central Farm cafeteria
 1:00 - Overview of the Belize agriculture sector with John Carr of Banana Bank Ranch and Chair of the Belize Livestock Producers Association
 3:00 - Overview of Belize agricultural policy and trade with Roberto Harrison of the Belize Trade and Investment Development Service (Beltraide). Discuss the distinction between food security and food self-sufficiency.
 5:30 - Dinner at the Central Farm cafeteria
 6:30 - Preliminary view of small-scale farming systems and appropriate technologies

In-country DAY 4. Tuesday, May 14, 2013

- 7:30 - Breakfast
- 8:30 - Tour and comparative study of small-scale farming systems (Mayan, Hispanic and Mennonite), milpa farming systems and other agriculture activities in San Antonio Village
- 12:00 - Lunch at Five Sisters Lodge
- 1:00 - Tour of El Progreso Hispanic community small-scale farming systems
- 3:00 - Tour of Upper Barton Creek Mennonite community small-scale farming systems
- 5:30 - Dinner at Central Farm cafeteria
- 7:00 - Informed review and discussion of small-scale farming systems and appropriate technologies

In-country DAY 5. Wednesday, May 15, 2013

- 8:00 - Breakfast
- 9:00 - Mechanized farming systems and agribusiness- tour of Spanish Lookout Mennonite Community
- 10:30 - Tour of poultry processing facility, grain handling facilities and the milk and dairy products production
- 12:00 - Lunch at the Golden Corral in Spanish Lookout
- 1:00 - Continued tour of Spanish Lookout agricultural facilities and support services
- 3:00 - Return to Central Farm and student discussions, evaluations and biosafety review
- 5:30 - Dinner- Maya supper at Central Farm Cafeteria
- 7:00 - Presentation on Native American History of Central America and the Maya Culture

In-country DAY 6. Thursday, May 16, 2013

- 8:00 - Breakfast
- 9:00 - Leave Central Farm and travel south, down the Hummingbird Highway
- 10:00 - Tour Marie Sharp's processing facility for hot sauces, jams and jellies, seasonings, and squashes
- 11:00 - Tour banana farm and processing center in South Stann Creek Watershed
- 12:00 - Lunch at Independence Village
- 1:00 - Tour of Royal Maya or Aquamar shrimp farms and learn about challenges, history and future of shrimp farming in Belize
- 3:00 - Visit to Maya Center and cultural exhibit
- 5:30 - Settle into accommodations (Cozy Corner in Hopkins Village) and have dinner
- 7:00 - Garifuna cultural presentation

In-country DAY 7. Friday, May 17, 2013

- 8:00 - Breakfast
- 9:00 - Tour of orange and grapefruit citrus production in Stann Creek
- 10:30 - Belize Citrus Growers Association orchard tour
- 12:00 - Lunch at Valley Restaurant
- 1:00 - Tour Citrus Products of Belize, Ltd. Juice processing facility
- 3:00 - Discuss the potential for student-led project development in Belize and the idea of institutional collaboration
- 5:30 - Dinner- Creole supper
- 7:00 - Creole cultural presentation

In-country DAY 8. Saturday, May 18, 2013

- 8:00 - Breakfast
- 9:00 - Board boat at Dangriga for Tobacco Caye
- 10:30 - Get checked into rooms on Tobacco Caye and participate in a snorkeling class in the shallow sandy area, snorkel grass beds
- 12:00 - Lunch
- 1:00 - After lunch discussion of marine life of Belize and wild-catch lobster, conch, fish and shrimp industry in Belize
- 2:00 - Snorkel the local reef with slates and record marine life identified
- 5:30 - Dinner
- 7:00 - Night walk along shoreline with rock turning and plankton sampling followed by a night snorkel for those who wish

In-country DAY 9. Sunday, May 9, 2013

- 8:00 - Breakfast
- 9:00 - Discussion of mangrove, grass bed, coral reef ecology and watershed interconnectivity
- 10:30 - Possible snorkel over spur and groove with drop-off in deep blue, conditions allowing, or alternate back reef site
- 12:00 - Lunch at
- 1:00 - Short discussion on marine conservation in Belize and the Western Caribbean
- 2:00 - Two snorkeling sites visited, one reef site and one mangrove site
- 5:30 - Dinner
- 7:00 - Night walk and night snorkel opportunities for those who wish

In-country DAY 10. Monday, May 10, 2013- *The Return Day*

- 7:00 - Breakfast
- 8:00 - Depart Tobacco Caye
- 9:30 - Catch small plane from Dangriga to International Airport
- 11:56 - Depart Belize for the United States

Post-trip Meetings (dates to be arranged)

Assignment 5 --Type up and submit 3 of your most favorite field notebook entries (including date, time, and location).

Re-assess packing list: what did you need that you did not bring?; what did you bring that you did not need?

Assignment 6 -- Post-trip reflections:

- What did you get out of this trip?
- How was the trip similar to or different from your expectations?

Assignment 7 -- Submit project proposals identifying opportunities for continuing relationships among institutions, internship opportunities and exchange potential

5.2 Text and Reference Materials

There is no particular textbook recommended for this course, but it is recommended that you:

- look up information about Belize on the internet, particularly items relevant to your interests
- check out some of the information your professor has on Belize
- review a good general book on Belize, such as the *Lonely Planet: Belize*, by Vorhees and Brown, to get a general idea of geographical, cultural and biological diversity of the country, and
- study maps of Belize and trace the movement of the itinerary, as described above, from the international airport, to west central Belize, to the southern coastal part of the country, and then back to the international airport

5.3. Field Activities

The field experiences are necessary components of the course. Field efforts will involve hiking, swimming, snorkeling and canoeing. Travel may be by foot, vehicle and boat. Health and safety concerns will override all other issues on field trips and each participant is expected to abide by the policies of their instructors, hosts and our respective institutions. The primary project will cover five to six days and will focus on the interrelations between agricultural and natural ecosystems. Your participation is required and will affect your grade. During the planning, preparation and execution of field trips each participant is expected to make observations, ask questions, take notes, record data, work instruments, collect samples, document conditions and have fun.

6. Methods of Evaluation:

Each student will receive project grades based on three components: assignments, participation and peer evaluations. Reports must be written in the format given in your course packet. Assignments must be submitted on paper and electronically. You must ensure that electronic submissions are virus-free.

Grades will be based on the following performance measures and weights:

Assignments	70 %
Participation	20%

Peer Evaluations 10%

Note that **plagiarism**, such as downloading text from the web and claiming it as your own words, is not tolerated and you may be penalized for such actions. Always use your own words unless those words are contained in quotation marks. Always give references for any work used, quoted or unquoted.

9. Methods of Instruction

Various methods of instruction will be used throughout the course. Conventional lectures and class discussions will provide the primary mode of information transfer during the pre-trip meetings, and during field project time, usually in the early morning and before or after dinner. Hands-on demonstration in the field and laboratory will be conducted in small groups. Aerial photographs, charts, maps, overhead projections and computer images will be used. Field activities will include demonstrations, lectures and discoveries as small groups. We will be interacting with terrestrial and aquatic environments firsthand and collecting data and recording observations that will be analyzed, discussed in field or lab settings and incorporated in assignments.

10. Required Supplies and Activities

You will need a notebook for taking notes in class and on field trips. You will also need at least one computer disk or flash drive and access to a computer and the Internet. For the field trips, you may need tennis shoes or boots for the "bush", swimwear, change of clothes, tooth brush, snacks and water bottle depending on where we go and how long we stay there. Personal dive masks and snorkels, and other outdoor gear (e.g. flashlights, binoculars, camera, etc.) may be advised for the field portions of the course. An extensive list of personal, community and professional materials and equipment will be provided and discussed.

11. Course Evaluations

This course is constantly changing to keep up with new information and improve in quality. You will be asked to evaluate the course content, delivery, instructors' performance and other aspects. This is not just a privilege, but also a responsibility. Such feedback from students helps the instructors make adjustments where required as the course evolves. Your input (comments, suggestions, criticisms, insights, collections, maps, charts, reports and other project deliverables) will help make this a better course as it strives to more effectively meet the needs of the students, the university and the nation. Take time to fill out evaluations completely -- not just checking off boxes, but writing down your comments.