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SUSTAINABILITY REPORT



UNIVERSITY OF GEORGIA
Costa Rica Campus





UGA COSTA RICA'S SUSTAINABILITY MISSION STATEMENT

UGA Costa Rica Campus operations aspire to attain the strictest standards of social, economic and environmental sustainability as well as disseminate these ideals to all who visit and work on the campus.

Compiled, written and edited in the summer and fall of 2010, the UGA Costa Rica 2010 Sustainability Report aims to highlight sustainability initiatives of the UGA Costa Rica campus, spread awareness of the importance of sustainable campus operations to the greater UGA community and beyond, and serve as an impetus for future advancements in campus sustainability at UGA Costa Rica.

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This report is produced in collaboration with the UGA Office of Sustainability.





TABLE OF CONTENTS

LETTER FROM THE PRESIDENT	4
LETTER FROM THE ASSOCIATE PROVOST FOR INTERNATIONAL EDUCATION	5
LETTER FROM THE UGA OFFICE OF SUSTAINABILITY	6
FOREWORD FROM THE UGA COSTA RICA DIRECTOR	7
INTRODUCTION Sustainable Tourism	10
LAND USE Forest Conservation Agriculture Botanical Garden	14
PLANNING / FACILITIES	18
ENERGY	20
WATER	22
SOLID WASTE	24
PURCHASING Food Housekeeping Maintenance	26
TRANSPORTATION	28
EDUCATION Staff Training Resident Naturalist Program Education Abroad Programs Service-Learning Research	30
COMMUNITY OUTREACH ESOL Internship Program Community Clean-ups	36
VISION	40
SOURCES & THANKS	42



The University of Georgia

Office of the President

December 2010

A Message from the President:

UGA's Costa Rica Campus is one of the real jewels of this institution, and the work highlighted in this report is focused on maintaining it for decades to come.

I have had the pleasure of visiting this campus on several occasions, and every time I find it to be a place of incredible beauty, of amazing opportunity and of a broad array of very good work and study. The most important feature of this place is the commitment to sustainability and the stewardship practices that not only have been put in place here but are part of the culture of UGA's Costa Rica presence.

Sustainability is much more than a buzzword – it is a way of thinking that acknowledges first and foremost that we have a responsibility to the Earth and to each other. I am fully committed to sustainability wherever UGA has a physical presence, from my office to the borders of the Athens Campus and beyond, to our international facilities.

We have a legacy, as America's first state-chartered university, to honor and protect both the natural and built landscape. As you will read in this report, UGA people are doing just that, in innovative and remarkable ways, deep in the forests of Costa Rica.

Michael F. Adams



The University of Georgia

Office of the Associate Provost for International Education

December 20, 2010

UGA Costa Rica
Sustainability Report

It is with great pride that I note the release of UGA Costa Rica 2010 Campus Sustainability Report. It represents yet another important marker for the Costa Rica campus and underscores the maturing of UGA's internationalization agenda.

Since its inception, the UGA Costa Rica campus has built its programs on the notion of interconnectedness -- interconnectedness between the physical environment and human activity, between the classroom and the field, between the UGA community and the Costa Rican community. This has created an extraordinary learning environment that transcends the traditional boundaries between instruction, research, and outreach and service and instead draws attention to the how all three mesh together in ensuring sustainability of the environment and of our place in the delicate balance.

On my first trip there soon after returning to UGA as Associate Provost of International Education I was impressed by the many firsthand ways in which students engage the concept of sustainability. They learn about biodiversity in the laboratory provided by the region's forest reserves, rivers, volcanoes, and coastlines. They study the ways in which this environment has shaped human activity in the region and how, in turn, human activity is transforming the physical landscape. Students work on service learning projects with local agriculturalists many of whom serve as host families during home stays. Through these and many other activities, UGA Costa Rica allows students to become active players in learning about and creating sustainable environments.

Beyond the campus, UGA Costa Rica has also worked to develop strong partnerships with local institutions. Costa Rican faculty participate in our academic programs as guest lecturers in classes and as experts leading field trips. The campus assists UGA faculty in developing research collaborations with Costa Rican university, government, and non-governmental partners. The UGA Costa Rica campus also serves as a home base for faculty and graduate students engaged in research projects that involve fieldwork in the greater Monteverde region. These activities mark the next phase of development for the campus and are represent the sort of collaborations that are expanding as part of UGA's maturing internationalization agenda.

As we reflect on the unique opportunity that the UGA Costa Rica campus provides to learn about sustainability, it is incumbent on us to assess our own impact on the local environment and community. The annual report on the sustainability of the Costa Rica campus will allow us to monitor, assess, and ultimately minimize our ecological footprint in this most extraordinary region in Costa Rica. We look forward to your comments and your participation in the important work of UGA Costa Rica.

Kavita Pandit
Associate Provost for International Education



The University of Georgia

Office of Sustainability

December 21, 2010

UGA Costa Rica
2010 Sustainability Report

The University of Georgia Costa Rica campus is a model for sustainable development. From its inception, the campus has grown harmoniously within the natural and social systems of which it is part. The UGA Costa Rica 2010 Sustainability Report underscores its continued pursuit of a transformational integration of human culture and ecological principles.

Thoughtfully sited within the verdant and biodiverse Monteverde region of Costa Rica, the UGA Costa Rica campus is planned, designed, constructed, operated and maintained in pursuit of ecological, social and economic sustainability. Visitors to the campus enjoy opportunities for observation and interaction through formal academic offerings and hands-on learning by doing. Whether researching the myriad flora and fauna endemic to the area, harvesting foods to contribute to daily meals, meeting the local farmers who produce the shade-grown coffee served on campus and abroad, or simply observing the daily work habits of campus staff, UGA Costa Rica broadens understanding of the complex and interwoven natural and cultural systems in which we live.

The underlying and tangible commitment to sustainability at UGA Costa Rica is accentuated by its pursuit of third-party verification and transparent self-reporting. The program has repeatedly undergone the process of third-party review and maintains certification with high marks from the rigorous Certification for Sustainable Tourism (CST) program. Completion of the UGA Costa Rica 2010 Sustainability Report further demonstrates a commitment to self-evaluation and continuous improvement toward integrated sustainability. This report will not only prove effective for current and future practices at UGA Costa Rica, but provides an example for others in the University of Georgia community and beyond to actively conserve resources and thoughtfully consider the impact of our actions on the environments and communities in which we live.

Pura Vida,

Kevin Kirsche, LEED AP
Director, Office of Sustainability



FOREWORD

A critical basis for change and consensus is to find a way to introduce and discuss ecological principles in society in a manner that draws people together, rather than repelling or deterring them. This step is crucial, because within ecological principles reside not only the problems and challenges that face us, but also the solutions that can be used to transform our economy and society.

— Paul Hawken, *The Ecology of Commerce*, p. 203

Aspiration for sustainability has been integral to the management of the UGA Costa Rica campus since even before the property was purchased by UGA. Treading lightly on the landscape and developing strong social bonds within the community were and remain to be characteristics evident in the operation, even as it has grown in size and scope. From the time I began working with UGA Costa Rica five years ago, I have observed a shared vision for developing and running the UGA Costa Rica campus in a way that is sensitive to both surrounding environment as well as the community of San Luis.

Just as our annual financial audits by Deloitte and Touche assure that we are following sound financial management and accounting practices and help us to understand areas in which we can improve, UGA Costa Rica's commitment to maintain the sustainable tourism certification assures guests to our campus that we are deemed, by a third-party auditor, to be operating at a certain degree of sustainability according to their established guidelines. CST

certification demonstrates institutional commitment to sustainable social and ecological management practices and assurance that UGA Costa Rica is doing what we say we're doing in terms of sustainability. We often speak to individuals of the myriad initiatives that demonstrate how UGA Costa Rica strives to move further toward sustainability, however we lacked a document that put all of the pieces together in a format that would not only help us share about what we're doing but also serve as a measurement tool to help guide us into the future. This UGA Costa Rica campus sustainability report offers a baseline self-reflection of where UGA Costa Rica stands as of 2010, and establishes initial target goals for where we hope to be in the next five years.

Coincidentally, this internship and report coincided nicely with the establishment of the Office of Sustainability at The University of Georgia. This outward demonstration of UGA's commitment to integrate the impressive sustainability efforts already going on in schools, colleges, departments and other units around the Athens campus provides added momentum and support for UGA Costa Rica to release our first annual sustainability report. We are grateful to the Office of Sustainability Director, Kevin Kirsche, for his support and encouragement as we have embarked on this initiative. We are proud to offer this report to the broader UGA community as a reflection of the commitment of the Office of

Since sustainability is a cultural process, it depends on the everyday actions of ordinary people. ... Bringing sustainability home is about growing a culture of sustainability that is suited to the particularities of place.

— Sim van der Ryn and Stuart Cowan, *Ecological Design*, p.63

Sustainability to helping all divisions of the University of Georgia in their quests to define, measure, and achieve their sustainability goals.

Preparing the Report

Being an academic institution, I felt the most appropriate way to develop this report was by setting up a student internship. Based on faculty recommendations, two UGA undergraduate student interns were selected during the fall semester in 2009.

During the course of the Spring 2010 semester, the interns and I met to discuss how we would measure sustainability and learn about various measurement tools and how other schools and universities measure sustainability. The interns then developed an outline for the report, and began to gather initial data and conduct interviews with faculty and students involved with UGA Costa Rica. During the course of the spring semester, a third intern—recently graduated from the Yale School of Forestry & Environmental Studies with experience in preparation of reports of this nature—was added to the team.

The three interns spent between six to eight weeks in Costa Rica during summer 2010 to observe campus operations, gather data and carry out analysis, meet with the Costa Rican Tourism Institute’s sustainable tourism certification auditors, write the first draft of the report, and develop the overall report layout and graphics. Upon return in the fall, we worked together to polish up the report with final edits and data gathering and to de-brief about the overall internship experience. Engineers from UGA’s College of Agriculture and Environmental Sciences contributed to the final report with an analysis of UGA Costa Rica’s overall carbon footprint based on data the interns collected. UGA faculty members and the Office of Sustainability also helped with final editorial review.

By forming a team of interns with diverse backgrounds and skills who shared an interest in sustainability,

preparation of this report became a challenging field experience in which students learned how to analyze sustainability and gained professional skills they might not otherwise have the chance to learn in a typical classroom setting.

Moving forward, UGA Costa Rica, in partnership with the Office of Sustainability and the Yale School of Forestry & Environmental Studies, will offer an annual internship for two UGA students and one Yale F&ES student to prepare follow-up reports that track UGA Costa Rica’s progress toward meeting sustainability goals. These reports will also help us share the ways in which UGA Costa Rica is engaging our community in the process of developing a shared culture of sustainability.

[P]erhaps the most critical social condition for sustainability is a shared commitment to community cohesion (both global and local) and a sense of collective responsibility for the future.

—Mathis Wackernagel and William Rees, *Our Ecological Footprint*, p. 137

This initial report does not consider the operations of the UGA Costa Rica Office in Athens. Nevertheless, the staff in the Athens Office maintain the same vision and desire to integrate sustainability into all that we do, and we hope to include the UGA Costa Rica Athens Office in future reports.

Quint Newcomer
Director, UGA Costa Rica

December 2010



Odum School of Ecology professor Jim Porter leading ecology students in a butterfly collecting lab. Collections from UGA Costa Rica are donated to the National Biodiversity Institute and have made significant contributions to increasing the documented species list for the region.



Finca La Bella resident Alvaro Vega explains about sustainable agriculture and traditional farming practices for UGA Costa Rica students and faculty.



Students learn about the coffee harvest process by picking coffee at neighboring shade-grown farms.

INTRODUCTION

The University of Georgia Costa Rica campus sits on 62.8 contiguous hectares (155 acres) in Los Altos de San Luis de Monteverde in the Arenal-Tilarán region of the Puntarenas province. Located in close proximity to the Monteverde Cloud Forest Biological Reserve, the campus is in the premontane humid forest zone. The site is approximately 8 km (5 mi) from nearby population center of Monteverde. The total permanent population of the Monteverde area is approximately 7,500 inhabitants, whose main sources of income are agriculture, tourism and related businesses. Another major player in the local economy is the Monteverde Cheese Factory, a well-known dairy processing facility established by Quaker settlers in the 1950s.



Following small pre-Colombian settlements, the first non-indigenous inhabitants of San Luis emigrated from the Central Valley of Costa Rica in the 1920's with the purpose of finding new productive land. As the number of families in San Luis grew, the general conditions of the region improved. Initially, the populace consisted of subsistence farmers who

traveled either by foot or horse to the communities of Puntarenas and Las Juntas de Abangares to sell their agricultural products as well as buy medicine, clothing and other farm implements not available locally. Since the 1960s, two schools have served the San Luis Valley, and the improvement of regional roads has brought new opportunities for economic growth in the coffee, dairy and tourism industries. Electricity from the national grid and telephone services came to the upper San Luis valley in 1990 and 2003, respectively.

The land that makes up the UGA Costa Rica campus was once a privately owned shade-grown coffee plantation and dairy farm. In 1995, the Ecolodge San Luis & Biological Station was established by resident biologists, Milton and Diana Lieberman, as a site to conduct research and host ecology field programs. For seven years, the Ecolodge operated as a working farm with a private forest reserve, rustic ecotourism facilities, and provided tropical ecology educational programs for students and faculty from several universities, including the University of Georgia.

In 2002, the University of Georgia Foundation purchased the operation for the University of Georgia with the goal of developing the property as an international satellite campus that serves students and faculty from multiple disciplines in the arts, sciences, humanities and professional schools from across the University. A major renovation and new construction effort was undertaken to build student dorms, faculty housing, classrooms, laboratories, and buildings providing various supporting services. Going into the 2010-2011 academic year, UGA Costa Rica has developed 23 study abroad programs spanning all academic terms and including courses in 28 disciplines.

With the intention of developing a model for educational tourism in Costa Rica, the University of Georgia continues to operate the 12-room Ecolodge



UGA Costa Rica provides educational facilities and opportunities that:

- serve as a model for sustainability, educational tourism, conservation, and stewardship;
- maintain the architectural vernacular, cultural, and aesthetic qualities of the community;
- encourage interaction and integration with the people of the San Luis Valley through outreach, employment, and partnerships;
- minimize environmental impact; and
- provide comfort, convenience, and security for students, faculty, and guests.

San Luis as an integrated component of the Costa Rica Campus. Guests take advantage of a wide range of educational and nature-based activities at the campus and in the local community of San Luis and throughout the Monteverde region. UGA Costa Rica's Resident Naturalist program offers students, faculty and tourists the opportunity to participate in educational activities dedicated to the study of the flora, fauna, and ecology of the area.

In addition to students, faculty and researchers who came to UGA Costa Rica during the year, between July 2009 and June 2010, 347 tourists stayed at the UGA Costa Rica campus and engaged in nature-based educational tourism activities offered by UGA Costa Rica.

SUSTAINABLE TOURISM

UGA Costa Rica is proud to be one of 140 hotel operations in Costa Rica to take part

INTRODUCTION

in the Certification for Sustainable Tourism (CST - Certificación para la Sostenibilidad Turística) program. CST is administered by the Costa Rican Tourism Institute (ICT - Instituto Costarricense de Turismo), and was designed to differentiate tourism sector businesses based on the degree to which they comply with a sustainable model of natural, cultural and social resource management.

In 1998, ICT awarded the Ecolodge San Luís & Biological Station as well as eight other businesses throughout Costa Rica with Three Leaves (out of five possible) for its sustainability initiatives. This was the highest rating ICT awarded that year. The Ecolodge San Luís & Biological Station maintained its rating in 1999.

In 2007, UGA Costa Rica was evaluated by ICT's CST Program and was again awarded Three Leaves. Examining this score, it is noteworthy that UGA Costa Rica received scores of 87% for impact on the surrounding biophysical environment, 97% for the education about sustainability offered to guests, and 88% for factors relating to employee and community

relations. The score of 74% in the area of physical infrastructure reflects that at the time, meters had not been installed to measure water use and some of the existing infrastructure had not yet been upgraded to better measure and reduce water and electric consumption. The final rating (number of leaves) is based on the lowest score of these four areas. UGA Costa Rica was re-evaluated in April 2010 and, based on multiple improvements made in 2008-2010, has appealed ICT's downgrading of the operation to Two Leaves. UGA Costa Rica will undergo re-certification in 2011 as part of this appeal.

AWARDS

THREE LEAVES from the Costa Rican Tourism Institute's Certification for Sustainable Tourism for its sustainable model of natural, cultural and social resource management

November 2007

BUSINESS OF THE MONTH from the Rainforest Alliance's Eco-Index of Sustainable Tourism for UGA Costa Rica's outstanding efforts to conserve natural resources and improve livelihoods in local communities

December 2007, March 2010

CST CORE MANAGEMENT ASPECTS

1. Physical-biological parameters: the interaction between the company and its surrounding natural habitat
UGA CR Score: 87%

2. Infrastructure and services: the management policies and the operational systems within the company and it's infrastructure
UGA CR Score: 74%

3. External clients: the interaction of the company with it's clients in terms of how much it allows and invites the client to be an active contributor to the company's policies of sustainability
UGA CR Score: 97%

4. Socio-economic environment: the interaction of the company with the local communities and population in general
UGA CR Score: 88%



Carbon Offset Purchase Certificate

UGA Costa Rica sincerely thanks and commends

for making a voluntary carbon purchase to help offset the climate change impact of air and ground transportation related to their educational travel experience in Costa Rica. 100% of each carbon purchase through the UGA Costa Rica Carbon Offset Program is used for reforestation in the Pájaro Campana Biological Corridor.

Quint Newcomer, PhD
Director

Fabricio Camacho Céspedes, MSc
General Manager



New forests planted through the UGA Costa Rica Carbon Offset Program have multiple benefits:

- Forests capture carbon from the atmosphere, thus helping to reduce the concentration of atmospheric CO₂
- New forests restore lost habitat for migratory birds and other animals, including threatened species within the Pájaro Campana Biological Corridor
- Forests help protect the integrity of local streams, rivers, and springs
- Forests enhance recreational opportunities

These new forests are establishing long-term research sites for scientists studying the effects of climate change and many other aspects of the Pájaro Campana Biological Corridor.

This carbon purchase leaves a lasting legacy for future generations and makes a statement about your dedicated stewardship to our shared Planet Earth.



Each participant in the UGA Costa Rica Carbon Offset Program receives this certificate.

The 62.8 ha (155 acre) UGA Costa Rica campus is situated in the heart of the premontane humid forest zone, one of the most biologically rich ecological zones in the world. Elevation on site ranges from 718 m to 1,435 m (2,355-4,709 ft) above sea level and the area annually receives around 2,500 mm (100 in) of precipitation. Temperature varies between 10 and 25 degrees Celsius (45-75 degrees Fahrenheit).

Sixty percent of the property, 37 ha (91 acres), is managed as a protected forest reserve. This forested land is accessible by a 4 km (2.5 mi) network of trails and is home to hundreds of animal and plant species, among them is the endangered Three-Wattled Bellbird (*Procnias tricarunculata*).

Thirty percent of the campus, 19 ha (47 acres), is used for small-scale sustainable agriculture. The organic farm provides food for visitors to the campus as well as research and work opportunities to students and researchers.

The remaining ten percent, 6 ha (15 acres), includes the main campus buildings, with facilities for academic instruction, research, food service, residence, recreation, maintenance, and housekeeping. In close proximity to the main campus area, the 12-room Ecolodge San Luis and the 1.5 ha (3.75 acre) San Luis Botanical Garden and Faculty House are included within this “built” space.

FOREST CONSERVATION

The UGA Costa Rica campus is part of Costa Rica’s National Network of Private Forest Reserves (Red Costarricense de Reservas Naturales), which has 230 affiliates that share the common goal of conservation and protection of the forest and oversee 140,000 hectares (346,000 acres) of land across Costa Rica. Through meetings, activism, and training sessions, this organization helps raise awareness and support for protection of forest lands for their rich

biodiversity, as a source of fresh water, as a fixer of carbon and for their natural beauty.

In addition, the UGA Costa Rica campus is located within the Three-Wattled Bellbird Biological Corridor (Corredor Biológico Pájaro Campana), part of Costa Rica’s National Network of Biological Corridors and, more broadly, the Mesoamerican Biological Corridor that extends from southern Mexico through Panama. According to Costa Rica’s National System of Conservation Areas (SINAC - Sistema Nacional de Áreas de Conservación), the establishment of biological corridors promotes the sustainability of existing biodiversity as well as the production of nature-friendly goods and services, ultimately benefiting both the natural environment and the socioeconomic outlook of the local communities. Hence, the mission of the Pájaro Campana Biological Corridor is “to reestablish the ecological integrity of the environment and encourage the well-being of communities within the corridor.” Forest management at UGA Costa Rica aligns with this vision, and the Bellbird’s presence is celebrated on campus.

AGRICULTURE

Taking advantage of the physical facilities of the UGA Costa Rica Campus, a long-term integrated farming operation program is currently under development. It is hoped that, in addition to providing food on campus, this initiative will serve education, research and community outreach goals.

Presently, approximately 19 ha (47 acres) of campus are used for organic agricultural production of meat, dairy, fruits, and vegetables. A series of terraced plots at a site above the main campus are planted with a variety of vegetables and tree crops. A composting shed is also located at this site and provides fertile soil for the vegetable gardens. Pigs consume food waste from the dining hall and produce waste that



CARBON OFFSET PROGRAM

In addition to protecting the already forested parts of campus, UGA Costa Rica is working on active reforestation of degraded lands throughout the region. The UGA Costa Rica Carbon Offset Program was launched in January 2008 as a means to not only offer carbon-neutral study abroad programs, but also as a mechanism to engage students in the offset process through presentations and reforestation activities, to develop a long-term research program, and to contribute to forest regeneration within the Bellbird Biological Corridor. Reforestation occurs primarily on degraded pasturelands where tropical forests stood a mere 70 years ago. The trees planted are native species chosen for their forest-specific characteristics as well as their importance for wildlife habitat and stand connectivity. One tropical tree fixes an average of 2.2 tonnes of CO₂ during its growth span (approximately 25 years) and a minimum of 1 ton of CO₂ during the same period. UGA Costa Rica uses the minimum sequestration rate and an 8 1/3 year schedule. Thus, 4 trees are planted per person (3 trees to fix 1 ton of CO₂ in 8 1/3 years and 1 tree to cover an estimated 25% mortality).



In 2009, UGA Costa Rica partnered with the Costa Rican Conservation Foundation (FCC) and developed a new tree nursery at the campus. To date, approximately 4,000 trees have been planted by the UGA Costa Rica Carbon Offset Program. The UGA CR / FCC nursery held over 15,000 seedlings which will be planted in the coming years.

Local landowners are engaged to have trees planted on their farms, and commit to maintaining these trees for at least 15 years. In this way, local landowners become part of the larger climate change solution. This also is an avenue to open up dialogue and educate landowners about market-based incentive programs and the possibility of earning income for reforesting degenerated pastures and protecting existing forests on their farms. This approach helps keep farmers on their farms by generating new sources of income they can earn from the ecosystem services they produce from their land. Ultimately it is believed that this type of program can contribute to keeping rural families and communities together, and will help reduce outward migration toward the cities and abroad while building sustainable rural economies.

UGA Costa Rica is supported in this initiative by the FCC, the Tropical Science Center (CCT), the Monteverde Conservation League (MCL), the Monteverde Institute (MVI), the National System of Conservation Areas (SINAC), and the Ministry of Environment, Energy & Telecommunications (MINAET), among others. Faculty from UGA's Warnell School of Forestry and Natural Resources and Odum School of Ecology provide technical guidance for the UGA Costa Rica Carbon Offset Program.

LAND USE

can be captured and used for fertilizer. Dairy cows graze in rotational pastures and provide milk for the kitchen. Among the foods provided on-site are pork, beef, milk, lettuce, carrots, onions, papaya, tomatoes, tubers and numerous varieties of banana and plantain. Currently, about 8% of the food consumed at UGA Costa Rica comes from this on-site production.

On-site agricultural production also serves educational programs, provides opportunities for field research and internships, and supports



UGA Costa Rica will increase on-site food production from 8% to 33% by 2015.

community outreach to local farmers, including participatory action research. Students and visitors to the campus can work on the farm and help with the daily milking, enjoying the fruits of their labors at mealtimes. Research is currently underway to investigate organic composting strategies and there are plans to study improved pasture management as part of the integrated farming systems program. Researchers also make the most of the neighboring farming community, for example, reaching out to

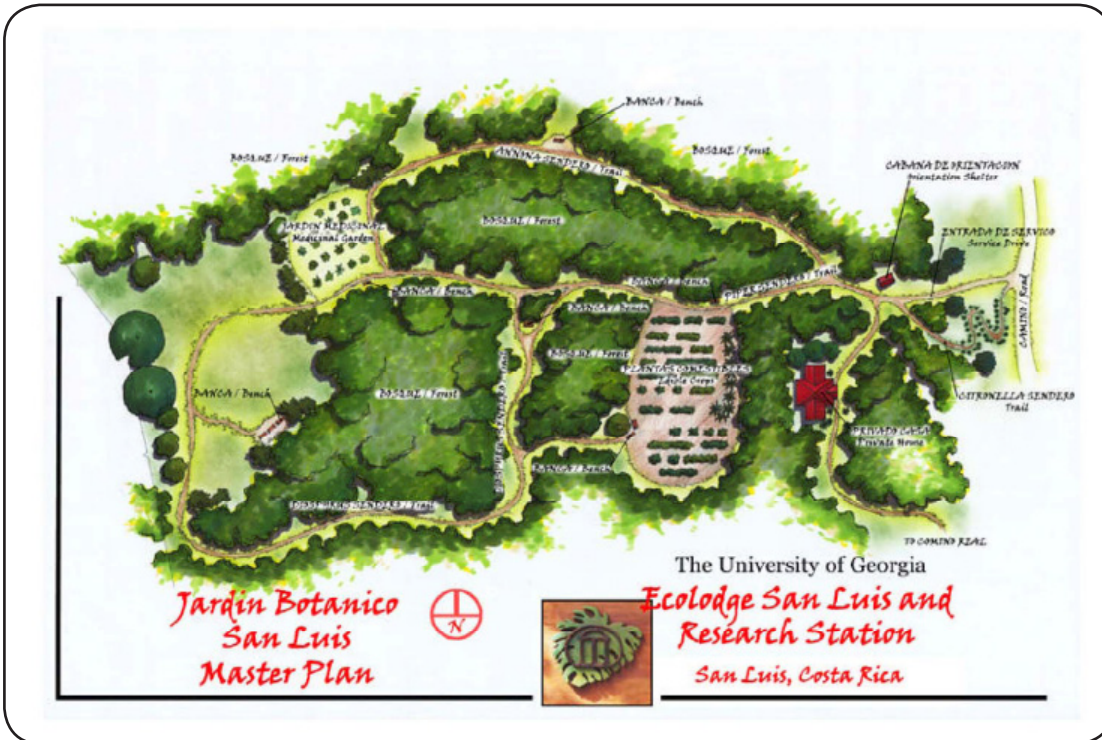
residents of Finca la Bella and using these small family farms as sites for field studies.

The UGA Costa Rica campus will continue to evolve as a model for diversified sustainable food



"The UGA Costa Rica campus is a model for responsible, low-impact development in Costa Rica. The property successfully integrates a lively campus, a productive farm and protected natural areas in a way that responds to the natural character of the cloud forest landscape. The UGA campus is a wonderful place to visit and learn; every time that I have taken students there, we all arrive impressed and leave inspired."

Alfie Vick
Associate Professor
College of Environment & Design



environmental impact.

The 1.5 ha (3.75 acre) garden includes a collection of some 75 medicinal plants commonly used in the region, an edible crops demonstration garden that includes coffee, multiple species of plantains and bananas, sugar cane, pineapple, and various root vegetables, as well as several arboretum trails. Photometal labels prepared at the Georgia

production, energy generation, resource production, and waste treatment.

BOTANICAL GARDEN

Designed in the summer of 2003 by six UGA landscape architecture students and their professor, the San Luis Botanical Garden (Jardín Botánico San Luis) began as an interdisciplinary, international collaborative effort between the University of Georgia and El Colegio de la Frontera Sur in Chiapas, Mexico, and was inaugurated during a Latin American sister gardens conference UGA Costa Rica hosted in 2004. The initial group of UGA landscape architecture students generated the concept for the garden and spent about a week on-site implementing the garden's master plan under the guidance of UGA's College of Environment and Design Professor Gregg Coyle. Their vision was to develop an ecologically sustainable design that featured native plants, culturally significant medicinal plants, and trails that would minimize negative

State Botanical Garden and illustrated posters help visitors identify plants in the collections and along the trails. The UGA Costa Rica library includes a bi-lingual guide to the gardens' flowering plants and butterflies that was developed as a high-school senior community service project by San Luis' own Beatriz Mata.

With funding from the Stanley Smith Horticultural Trust, UGA Costa Rica, the State Botanical Garden of Georgia, and the Monteverde-based non-governmental organization ProNativas have partnered to promote the use of native plants in ornamental gardens throughout Costa Rica. In 2010, this support allowed ProNativas to host a conference that resulted in development of a national network of organizations and professionals promoting native species landscaping.

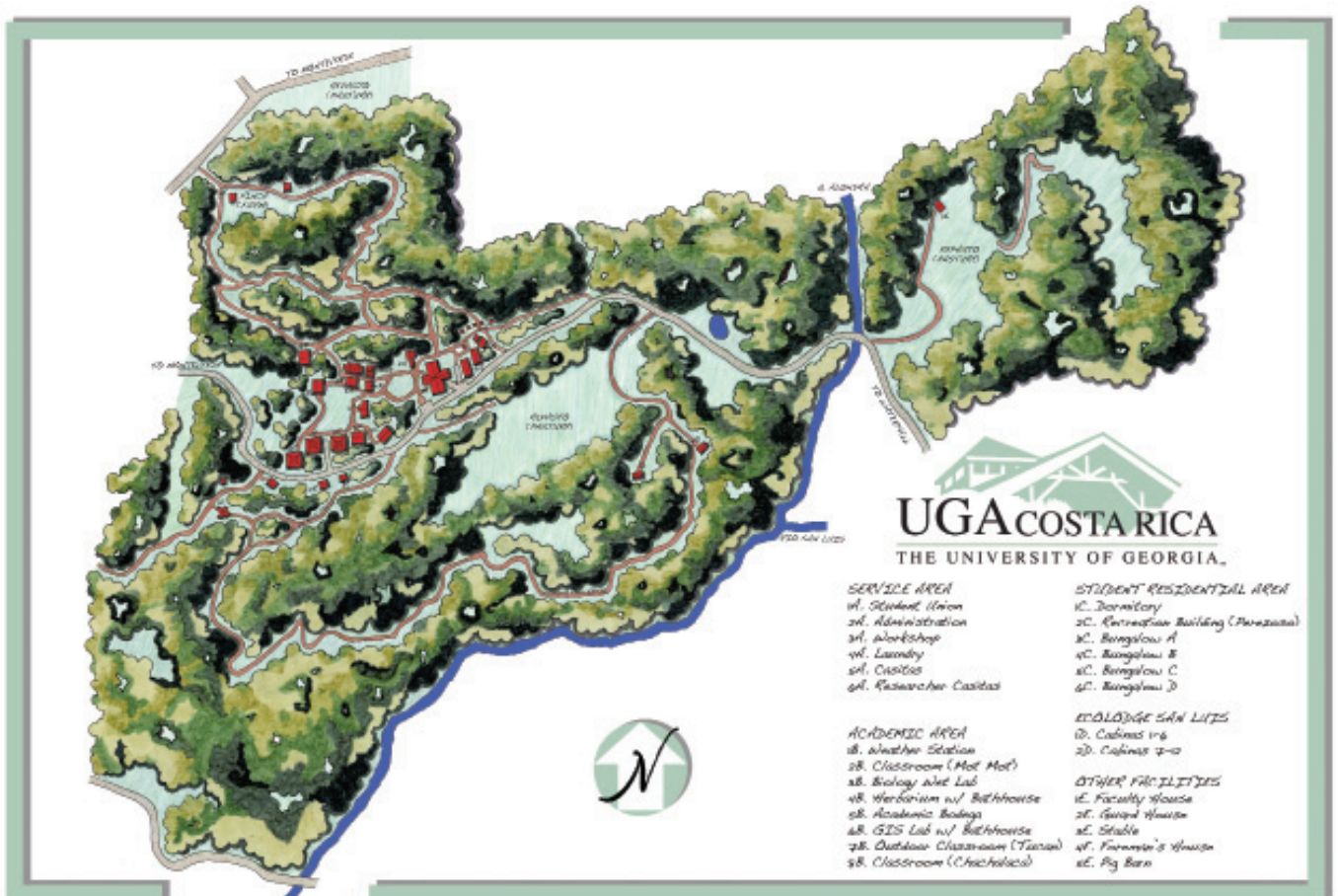
PLANNING / FACILITIES

The main campus is nested within ten percent of the total 62.8 ha (155 acre) property. The structures on campus serve residential, academic, administrative, and maintenance purposes. The intention has been to maintain the local vernacular architecture and to “harmoniously integrate the buildings into their natural surroundings” within the unique constraints of the site topography, prevailing winds, solar orientation and natural habitat. It has been a continuous goal of the campus planners to have as little negative impact as possible on the environment.

The campus layout minimizes the footprint of UGA’s operations and the effects of development on the local watershed and ecosystems. Buildings are concentrated in clusters spread across the grounds, with the main academic and administrative buildings

forming a larger central cluster, and a smaller cluster of cabins to the east. Apart from the buildings, which consist of 3,259 m² (35,080 ft²) total or 0.5% of the total campus area, there are no impervious surfaces. All circulation on the main area of campus – including parking areas – occurs on crushed stone paths. This mitigates the impact of foot traffic between the buildings while allowing for infiltration of rainwater and minimization of runoff. The remaining trails are low impact, unimproved dirt footpaths with stone steps in areas of steep incline. The main access road is a dirt-gravel mix (*lastre*), and highly vegetated on the shoulders.

Since temperatures stay generally warm throughout the year, buildings are constructed with light materials and good ventilation, allowing them to cool faster. Maintaining the surrounding forests and plant





life also helps minimize heat gain while large roof overhangs reduce sun exposure to windows. These passive solar and cooling methods, along with basic fans, effectively eliminate the need for mechanical HVAC systems. There are only five air-conditioning units on campus, installed in areas containing preserved specimens and technical equipment to decrease the effects of humidity. Operable windows funnel cool breezes through the buildings and allow the passage of natural light. Having a significant amount of glazing also helps reduce the need for artificial lighting. As for exterior lighting, virtually none exists because guests and staff utilize flashlights and headlamps. Efforts are being made to replace low-efficiency lighting with high-efficiency, low-energy alternatives. CFLs and light-emitting diodes (LEDs) can greatly reduce energy consumption and lead to significant economic savings. Steps are being made to implement this technology across the campus. However, concerns still exist over disposal of CFLs since they contain mercury; therefore more environmentally-sound options are being explored.

To the extent possible without sacrificing performance quality or construction timelines, it is a goal of UGA Costa Rica to utilize construction materials that are harvested sustainably, made from recyclable, recycled, or reclaimed materials, and manufactured in Costa Rica. Since 2005, the policy has been to purchase only plantation-grown teak or gmelina for

construction projects. Fast-growing, sustainably-harvested teak and gmelina are good alternatives to using wood originating from Costa Rica's old-growth native forests. Both teak and gmelina flourish in the local climate, and plantation forestry provides income to regional farmers. When the UGA Costa Rica campus switched to teak and gmelina in 2005, the decision was also made to switch from using oil-based stains and varnishes to a low VOC water-based stain. All buildings constructed and renovated since 2003 have incorporated enhanced metal roofing that has extended useful life by approximately 25 years. The reduction in required maintenance will also save costs on labor and material waste.

"I teach a law course that compares/contrasts the U.S. and Costa Rica laws related to biodiversity - primarily water management, endangered species protection and land conservation. I am able to integrate so much of the campus and surrounding community into my course - everything from the certification of the facility to the proposed ecotourism trail from San Luis to the sea to agricultural practices of the nearby coffee and dairy operations. As campus becomes even more sustainable, more teaching opportunities arise for me!"

*Laurie Fowler
Associate Dean, Odum School of Ecology*

Energy production and consumption form a large part of any institution's environmental impact. Consumption at UGA Costa Rica can be divided into three main categories: electricity for lights and appliances, propane for water heating and cooking, and gasoline or diesel for vehicles and heavy maintenance equipment.

Costa Rica is a leader in Latin America, if not the world, regarding sustainable electricity policy, generation, and delivery. As of 2007, 98% of the country had access to electricity and 92% of electrical production came from renewables (81% hydroelectric, 8% wind, 3% geothermal). Even so, currently Costa Rica is only using 20% of hydroelectric potential, 60% of geothermal potential, and 25% of wind potential. The country's largest hydroelectric installation is located in close proximity to the UGA Costa Rica Campus. In operation since 1978, the three generators at Arenal produce 1,370 GWh of power per year.

UGA Costa Rica will complete a detailed feasibility and cost/financing analysis for alternative energy generation on campus by 2015.

Electricity is used for numerous applications on the UGA Costa Rica Campus. The most prominent uses are lighting for the various campus buildings and providing power for the laundry facility and maintenance workshop. As much of the campus is maintained in forest reserve, there is a conscious lack of major exterior lighting installations, which avoids both needless energy consumption and light pollution on campus. Of all the light bulbs on campus, 70% are incandescents, 16% are CFLs, and 14% are fluorescent tubes. Electricity also feeds a number of computers and other office equipment on campus. The Ecolodge San Luis rooms, guardhouse and faculty house are equipped with refrigerators

and coffee makers, and the guardhouse and faculty house each have stovetop ovens, however none of the rooms have televisions.

As part of the CST certification process, and to improve operations on campus, an energy savings plan was developed in 2007. Included in this are consumption goals, energy-saving policies, and specific steps that will be taken to ensure that goals are met.

Electricity consumption goals are 9,000 kWh per month in the high season (December-July) and 6,000 kWh per month in the low season (August-November). Between June 2006 and June 2010, consumption goals were met in 20 out of the 27 months for which data is available. For the seven months in which the consumption goals were not met there were only two months in which electricity use was more than 10% higher than the goal. Conversely, when consumption goals were met, electricity use was more than 10% lower than the goal for 9 of the 20 months.

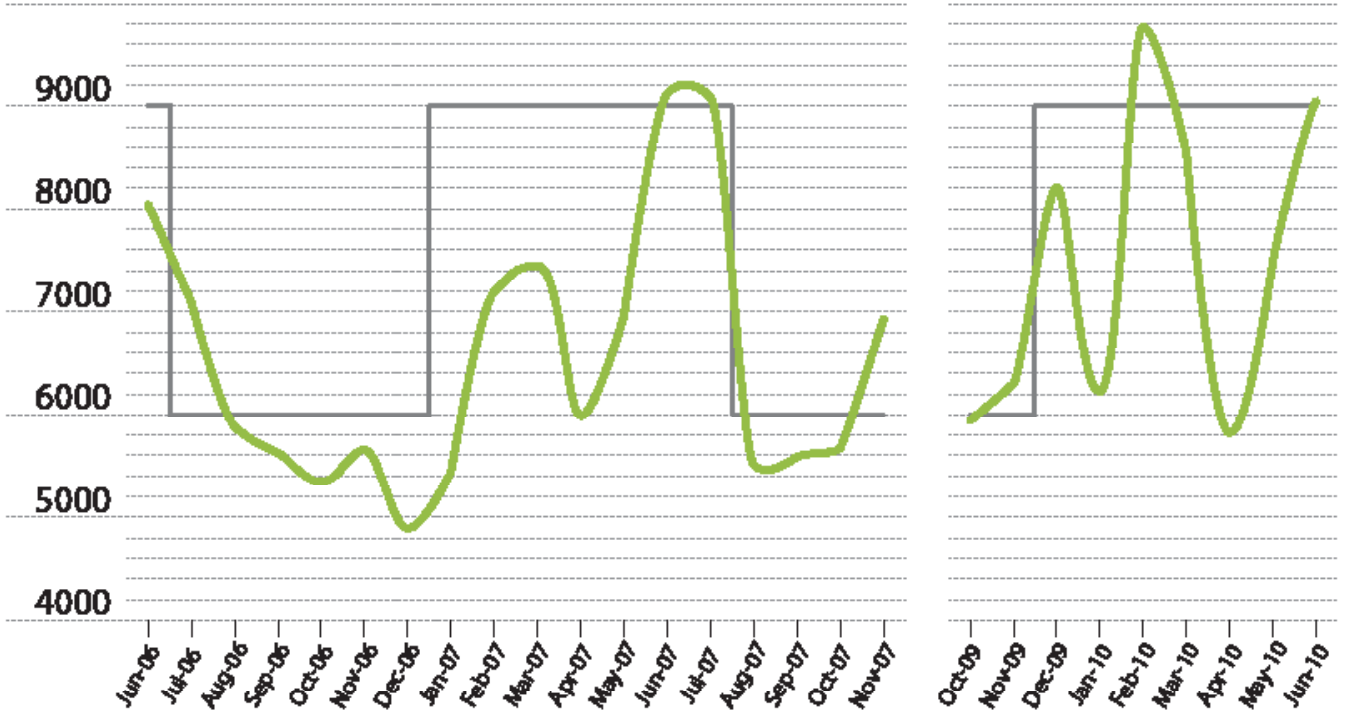
ENERGY SAVING POLICIES

- Maximize the use of natural light.
- Avoid turning on lights that are not necessary for the task at hand.
- Turn off lights and equipment at night when they are not being used.
- Dry clothing using a combination of solar and electric energy. Every load of clothes must hang for eight hours in the solarium before being placed in an electric dryer (if necessary).
- Promote preventative maintenance of electrical equipment.



Electricity Use

10000 kWh

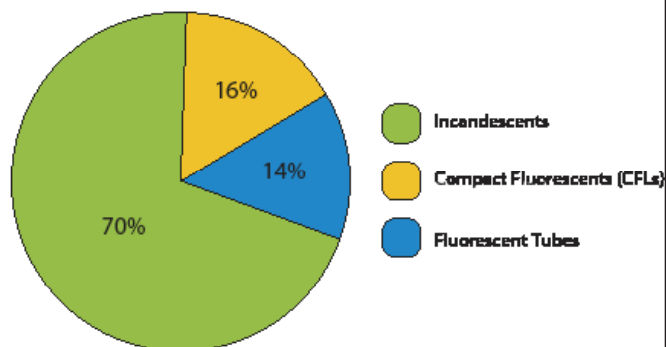


Propane is primarily used in the kitchen and for water heating on the UGA Costa Rica Campus. Although there is not a protocol for monthly monitoring of consumption, the total amount used can be determined from sales receipts. Using this method, it was found that UGA Costa Rica consumed 12.4 m³ (438 ft³) from the beginning of July 2009 through the end of May 2010. This results in a monthly average of

1.13 m³ (39.8 ft³) of propane use.

Gasoline and diesel consumption, while not formally monitored, also can be calculated from sales receipts. In this way, it was determined that UGA Costa Rica used 2,570 liters (679 gal) of fuel from the beginning of July 2009 through the first week in June 2010. The average monthly fuel consumption for campus vehicles is thus approximately 228 liters (60 gal).

Light Bulb Breakdown



Estimating Electric Emissions

Annual emissions from electricity usage were 5,674 kg of CO₂ equivalent (kgCO₂e) for the period August 2009 to July 2010. This is based on an emissions factor of 0.06107 kgCO₂e per kWh calculated from IEA data for Costa Rica. Because data was missing, the July 2010 usage number was estimated based on July 2007 consumption data.

The UGA Costa Rica Campus is located in the Rio San Luis watershed, part of the larger Rio Guacimal watershed that flows from the protected springs within the Monteverde Cloudforest Reserve and drains into the Gulf of Nicoya. Monthly precipitation ranges from 250-550 mm (10-22 in) during the rainy season, May through October. A transitional period from November through January sees monthly rainfall in the 150-200 mm (6-8 in) range. During the dry season, February through April, monthly rainfall is between 30 and 50 mm (1-2 in). Significant amounts of moisture (up to 22% of total precipitation) come into the system when clouds make direct contact with vegetation, condense on the leaves and drip to the ground. While overall volumes of water are large, conservation becomes a much more pressing concern in the dry season when flows are lower.

In 2010, the community of San Luis installed a new aqueduct system for the entire San Luis Valley, and UGA Costa Rica will receive water from this system, which takes water from a spring located in the mountains above the campus, across from the neighboring farming community of Finca la Bella. As of August 2010, the system was not yet functional, and water for the UGA Costa Rica campus continues to be primarily supplied by a spring located in the same vicinity as the spring supplying the community aqueduct system. Water now flows from the spring into a primary tank (approximately 90 m³ or 23,700 gal) located adjacent to the organic vegetable gardens. Water then flows to a secondary set of tanks with a combined volume of approximately 13 m³ (3,400 gal) located just above the resident naturalists' casitas. These tanks supply the main campus, although some buildings have direct lines to the main tank. A secondary spring, located to the east of the main campus, supplies the pig barn, and is connected by pipes to the main campus as a backup water supply.

Non-agricultural water consumption is split between

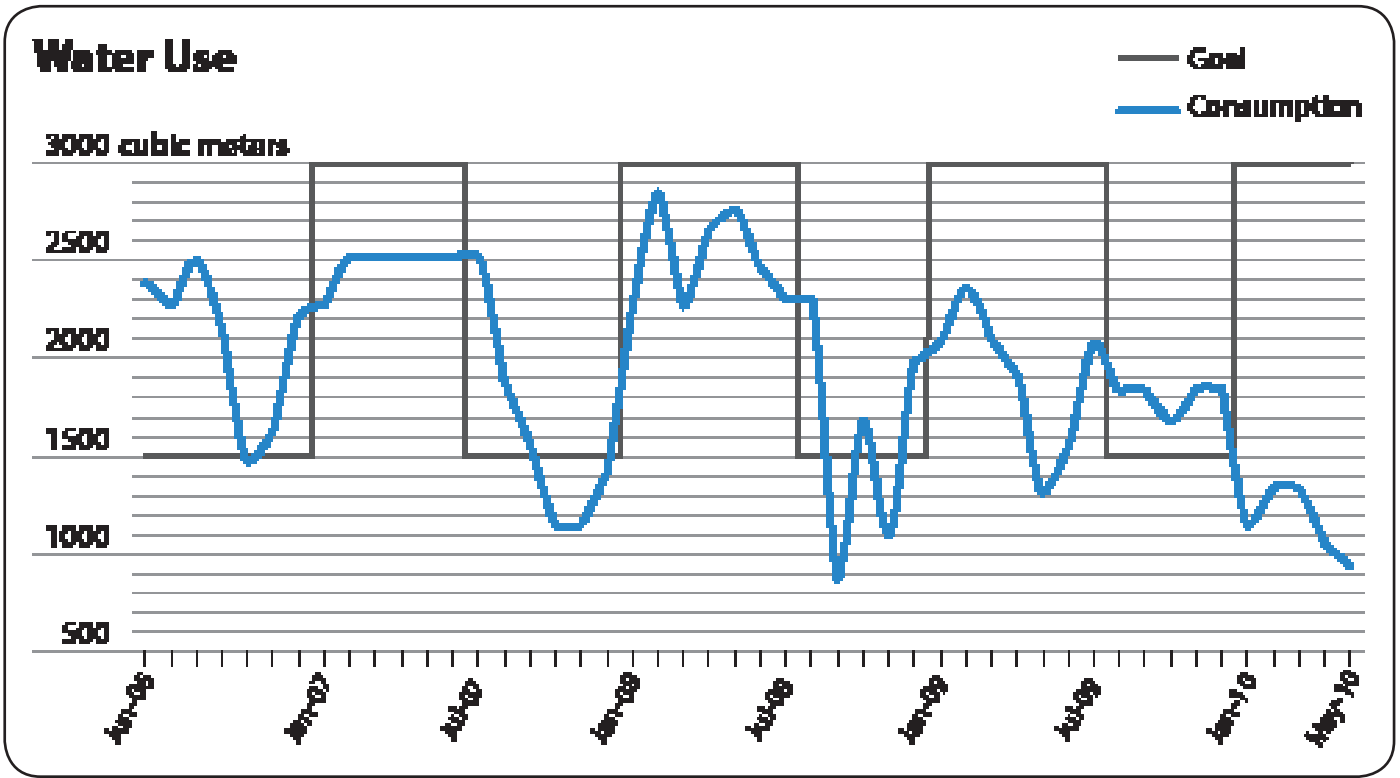
the main campus and Ecolodge. Water is used primarily in the kitchen and bathrooms. On campus, there are 79 sinks/washbasins, 45 toilets, and 42 showers connected to the water supply. In July 2010, the showers were all replaced with low-flow shower fixtures, saving an estimated 1,400,000 liters (369,840 gal) of water per year, plus reduced hot water costs. In addition, there are five washing machines and one commercial dishwasher.

The organic farm uses water for irrigation from the primary 90 m³ tank, which mainly takes place during the peak of the dry season and in El Niño years that see less rainfall. Actual consumption varies considerably based on occupancy and season.

As part of the certification process for the CST program, and to decrease water consumption on campus, a water management plan was implemented in 2007. Included in this are water consumption goals, water-saving policies, and specific steps that will be taken to ensure that the plan is carried out and goals are met.

Water consumption goals were set at 3,000 m³ (792,500 gal) per month during the high season (January to July) and 1,500 m³ (396,250 gal) per month in the low season (August to December). These goals were met in 31 out of 48 months between June 2006 and May 2010. Historically, water usage measurements show that goals have generally been met in June and July when occupancy is highest during the North American summer season.

According to the water management protocol, the following actions will be taken to reduce consumption: Water supply lines will be checked and leaks repaired monthly. Water saving fixtures will be installed wherever possible. Water and ice will be analyzed for pollutants and overall quality. Information on water savings and conservation policies will be made available to internal and external clients.



Beginning in 2008, low-flow showerheads were used in annual maintenance to replace broken showerheads. In 2010, all low-flow showerheads have been installed throughout campus. The new flow rates in the showerheads will lower both energy and water consumption.

Liquid waste is also a concern for this area because of the potential for contamination of local waterways. Studies in the Rio Guacimal watershed have demonstrated that development adversely affects water quality, increasing the concentration of a number of pollutants. Scientific investigation has also called into question the effectiveness of local septic systems due to higher fecal coliform counts in area streams during the wet season. Although UGA Costa

Rica currently employs a standard septic system to treat wastewater, preliminary work has been done on development of a comprehensive wastewater treatment system as part of the integrated farm.

WATER SAVING POLICIES

- Guests are asked to reuse towels and reminders are posted in the bathrooms.
- Sheets on beds are changed every other day.
- Only full loads of clothes are washed in the laundry facility.
- Steps are taken to avoid wasting water during cleaning, kitchen work, and on the farm.
- The landscaping and cultivated areas are only watered during the dry season as necessary.

UGA Costa Rica will earn Bandera Azul Ecológica status for the campus by 2015.

SOLID WASTE

Solid waste is of particular concern at UGA Costa Rica. This is in part due to the high potential for contamination of the surrounding streams and forest, but also due to the remote location of the campus. Waste and recyclable materials that cannot be reused on campus must be trucked out to a landfill in the coastal region of Puntarenas province or to recycling centers in the Central Valley. Thus UGA Costa Rica has cultivated a culture of reuse and waste minimization both among staff and visitors to the campus.

Reusable containers are purchased whenever possible. For example, all Coca-Cola products sold at the campus store are in glass bottles that can be sent back to the factory for refilling. The same system is used by Florex to reuse detergent bottles. Rather than using disposable fuel containers in the kitchen, refillable propane tanks keep food warm in the buffet line.

Recycling bins are located in each guest room as well as in the common buildings and administrative offices. One of the obstacles facing the campus' recycling program is a lack of local businesses and facilities that can accept recyclables. Items such as spent light bulbs must be sent to landfill rather than recycled because there are no regional recycling facilities that take those materials.

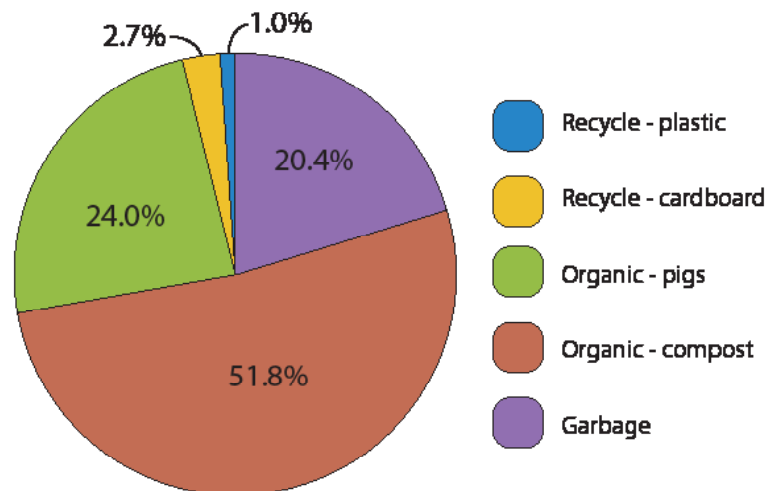
The presence of the integrated farm on campus is a major asset when it comes to utilizing waste produced by the campus and cycling nutrients back into the ecosystem. The kitchen generates a majority of the solid waste produced on campus. However, this part of the waste stream is completely diverted from the landfill as scraps from cooking and leftovers from meals are either composted or fed to the pigs. By keeping this organic waste on site, production of

methane in the anaerobic environment of the landfill is avoided. In addition, the campus benefits from the valuable resources of compost and pork.

A waste audit was conducted at UGA Costa Rica during a six-day period representative of regular high-season occupancy. Each day, solid waste produced on campus was separated, bagged, and weighed. A total of 493 kg (1,087 lbs) of waste was produced during this interval. Over these six days, UGA Costa Rica recorded 336 bed-nights (# of people x # of nights). Thus, per capita waste generation averaged 1.5 kg/day (3.2 lbs/day). According to the audit, 76% of the waste generated on campus is organic matter. Another 20% of the waste is sent to a landfill as trash, and the remaining 4% is stored for delivery to a recycling facility. Not included in these numbers are glass drink bottles that are set aside for reuse. These are not collected on a daily basis since shipment to the factory occurs once a crate is full of empties. It was thus not possible to determine the daily weight of glass set aside for recycling.

Efforts are also being made to minimize the impact of solid waste that cannot be composted or recycled. As an example, all trash bags, toilet paper, soap, detergent

Solid Waste Breakdown



Based on July 2010 waste audit - 6 days - 493kg (1087lbs) total waste



and disinfectant purchased by housekeeping are biodegradable. Old sheets and towels are purged once a year and reincorporated into maintenance and cleaning supplies wherever possible.

UGA Costa Rica maintains a materials reclamation policy for all facilities that are demolished. In the

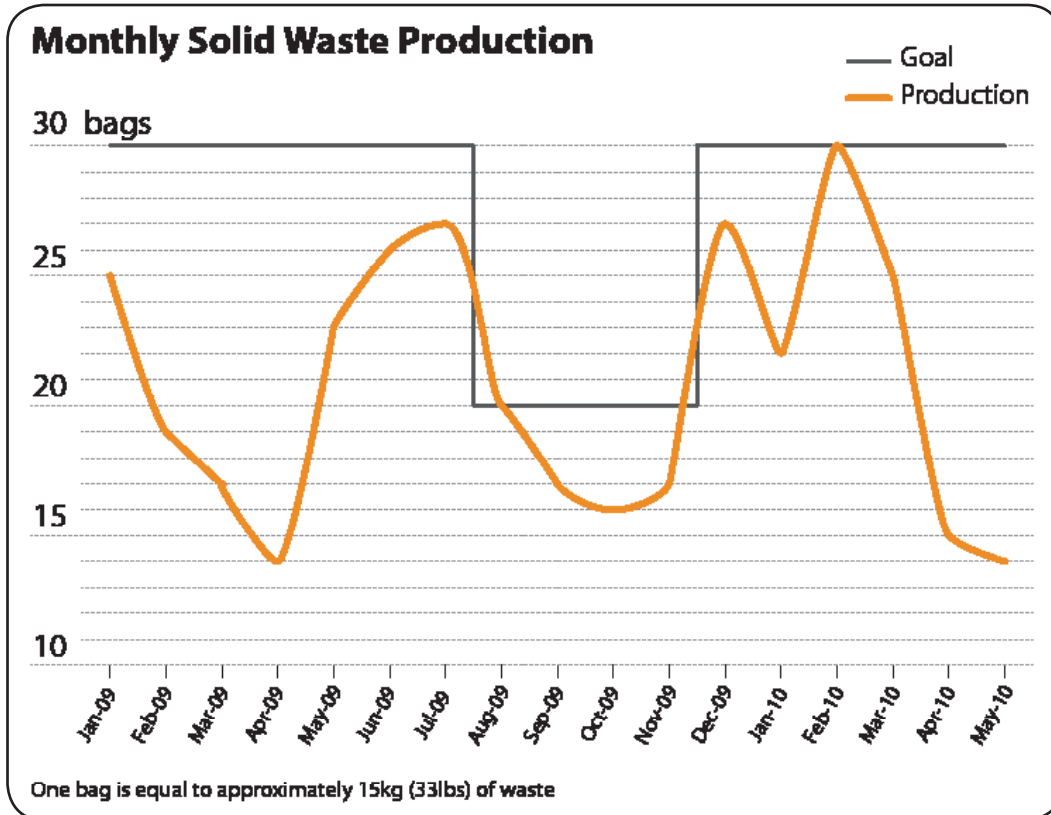


maintenance department, all construction materials are assessed for potential reuse on other projects. For example, the greenhouse/nursery built for the Carbon Offset Program and San Luis Botanical Garden was made with 80% reclaimed materials from older buildings that had been taken down. Generally, in new construction projects extra wood and metal scraps are either sold back to the contractor or sold at a low cost to local residents.

In Fall 2010, UGA Costa Rica began working with HOPE Proyectos Ambientales, a Costa Rican company specializing in environmentally-sound electronics recycling, in order to dispose of electronic equipment no longer in use. As well, batteries brought to Costa Rica for hand-held radios are returned to Athens and recycled.

Estimating Solid Waste Emissions

Solid waste emissions are based on the number of bags discarded between June 2009 and May 2010, and assumes each bag is an average of 15 kg. To calculate the expected landfill emissions, an EPA calculator was used with numbers for mixed MSW. This emissions calculation is based on factors for the U.S.; actual emissions may be somewhat different for San Luis, Costa Rica. Solid waste emissions calculated are 1,133 kgCO₂e.



PURCHASING

UGA Costa Rica is a major economic supporter of the San Luis community and Costa Rica. Due to both the limited means of access to where the campus is located and UGA Costa Rica's commitment to the San Luis community, many of the goods purchased are local from San Luis or Monteverde. It is both economically and environmentally sustainable for the campus to utilize local businesses. As much as possible, goods bought non-locally are bought in bulk in Puntarenas, about 80 km (50 mi) from San Luis, and originate from this region of Costa Rica. Consumption of packaged goods is largely avoided in order to reduce the amount of synthetic packaging that leaves the campus as waste.

FOOD

The campus farm currently supplies approximately 8% of the total food served on campus. This includes milk, vegetables, fruit, and occasional meats for the daily meals. Meals are served buffet-style or family-style, depending on occupancy, and disposable products (plates, cups, utensils) are not used. Soft drinks are sold only in glass bottles, which are returned to Coca-Cola for refilling. All the coffee is local, fair-trade coffee purchased directly from San Luis farmers, and up to 40% of the food is purchased

from local farms.

HOUSEKEEPING

The UGA Costa Rica housekeeping department strives to use products that are safe for both the people and the environment. All disinfectants, laundry detergents, and trash bags are Florex biodegradable products. Florex is a Costa Rican manufacturer of eco-friendly, biodegradable housekeeping products.

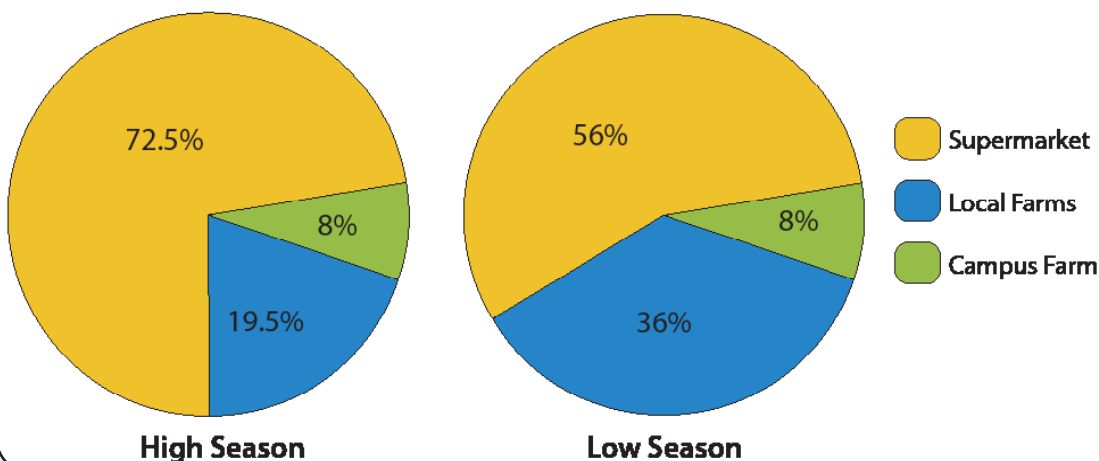
UGA Costa Rica will increase locally purchased food plus food produced on-site to 50% during high season and 67% during low-season by 2015.

Florex has received a level three certification from Bandera Azul, a third-party verification program, for its manufacturing processes, infrastructure and design of their products to be environmentally friendly. In addition, housekeeping staff have been trained and certified on the proper use of biodegradable Florex products during a 2008 workshop held by the Florex Corporation. The housekeeping department, which in other operations will typically consume

high amounts of toxic chemicals, has been trained specifically about proper dilutions of biodegradable products, using the lowest necessary concentrations.

All toilet paper products are biodegradable as well. Nevax is the SCA brand

Food Purchasing Breakdown





of paper products used by housekeeping. SCA is a globally recognized sustainable corporation and, for the past nine consecutive years, has been listed in the FTSE4Good, a market index which measures the performance of companies that meet globally recognized corporate responsibility standards.

The Monteverde Natural Soap Company supplies some of the complimentary soaps offered in the guest rooms. Ingredients are local, natural ingredients hand crafted by a local family of San Luis. Even the packaging is natural and biodegradable. The soaps do not contain chemical preservatives, synthetic additives, artificial fragrances or colorings, animal testing or animal fats, plastic or petroleum products.

MAINTENANCE

During 2009-2010, UGA Costa Rica built 247 m² (2,659 ft²) of new facilities. These new buildings incorporate materials that are sustainable in that the materials are not toxic, require less maintenance in future years, come from the local area, and are

renewable resources.

A contractor from the Puntarenas area was hired for the building of the new facilities. In his contract, it was required that a majority of his builders were hired from the local community of San Luis. Since 2005, all wood in the new facilities is either teak or gmelina. Both are fast-growing wood harvested on a plantation in the Guanacaste region, an alternative to rainforest deforestation. The wood protector used by maintenance is water-based Protecto and Lanco brands, which require less maintenance, produce less waste and contain less toxic chemicals compared to oil-based varnishes. The roofs of the new facilities are a Metalco brand. Though more expensive than the roofs on the older facilities, the roofs have a longer lifespan guarantee, meaning less waste from replacing old roofs.

As per CST certification guidelines, all cleaners, paints and varnishes, gasoline and diesel, and other chemicals used by the maintenance department are stored in clearly marked containers in designated locations within the maintenance building.

In 2005, UGA Costa Rica adopted a purchasing policy to only buy plantation teak and gmelina. These woods are considered a renewable resource because of their durability and reasonably short growth period. Also, typical growing conditions in Costa Rica's tropical climate allow plantation teak and gmelina to be grown without artificial fertilizers and irrigation. Teak's natural water-resistant qualities, resistance to pests, and striking wood grain make it an ideal choice for construction projects on campus.

TRANSPORTATION

Due to the close proximity of local fieldtrips, inconsistent demand for transportation to and from the campus, the high cost and staffing requirements for vehicle fleet maintenance, and a general policy to support local small businesses, UGA Costa Rica does not provide in-house transportation services to students or tourists. Instead, UGA Costa Rica contracts with small Costa Rican-owned transportation companies and local taxi drivers to provide transportation for class and extracurricular activities in areas not within walking distance of the campus. The UGA Costa Rica campus provides much of the business for a number of local taxi drivers.

For long-distance transport of larger groups, UGA Costa Rica has developed a relationship with a Central Valley based company, Coach Costa Rica. For non-program transfers around the country, including airport transfers to Monteverde, UGA Costa Rica recommends travelers use Interbus, a 100% Carbon Offset company certified by the National Forest Financing Fund (FONAFIFO - Fondo Nacional de Financiamiento Forestal), a government organization

dedicated to forest restoration and conservation on privately-owned lands in Costa Rica. Program-related transportation is accounted for in carbon offset calculations for UGA Costa Rica education abroad programs.

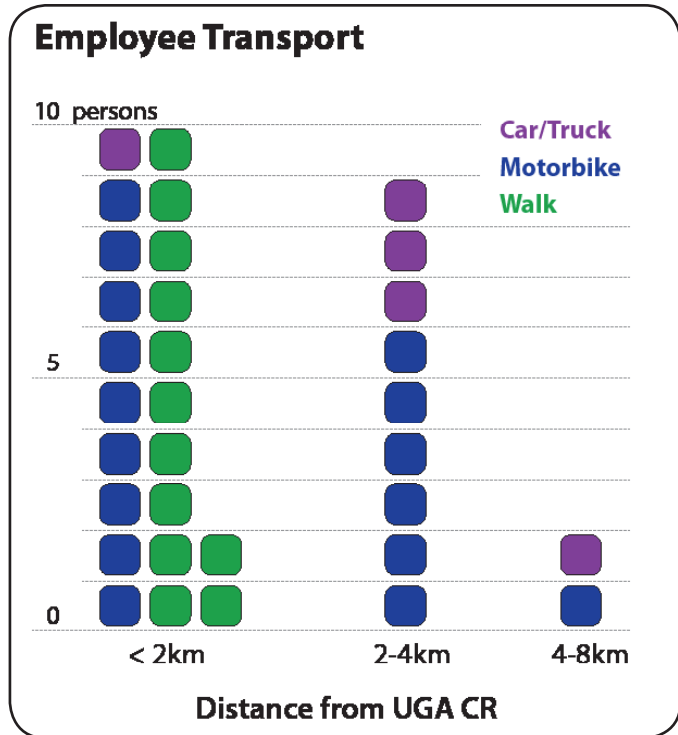
Para mi es el mayor ingreso. Está muy bien. Pero es un problema (tambien) porque uno se hace amigos y luego, cuando se van, le duele a uno. Y otro beneficio es el inglés, que se habla mucho.

For me, it is the largest portion of my business. It is very good. But it is a problem as well because one becomes friends (with the visitors) and then, when they leave, it is sad. Another benefit is the English, which is spoken often (with them).

*Alex Jimenez Venegas
Santa Elena Taxi Driver
[Translated by Kyle W. Williams]*

UGA Costa Rica owns three Toyota HiLux pickup trucks, a front-end loader, and an ATV four-wheeler. These vehicles are used strictly for administrative, maintenance and research purposes. All five vehicles have passed the strict emission tests set by the Revisión Técnica Vehicular (RTV).

The UGA Costa Rica campus maintains only gravel parking lots and there are no plans for any paved parking areas in the future. All Costa Rican employees live within 8 km (5 mi) of the campus, and 36% of the employees walk to work regularly. In fact, only 15% of the employees use a private car as their mode of transportation. As part of the campus' effort to maintain jobs in the local community, UGA Costa Rica will continue to hire local employees who can easily commute by alternative transportation to work, and when necessary, utilize local transportation providers





for travel to and from campus. Other opportunities to improve the transportation operations of the UGA Costa Rica campus will be explored in the near future—including the use of biodiesel and other alternative fuels for campus vehicles.



To date, approximately 4,000 native tree species have been planted by UGA students and other participants in the Carbon Offset Program.



Students in the May 2010 Art & Culture education abroad program painted a mural at the grade school in Bajo San Luis and offered local students painting and drawing workshops.

STAFF TRAINING

Education of the campus employees about sustainability principles and initiatives is a critical piece of UGA Costa Rica's overall sustainability effort. Since 2008, two meetings were held with all campus employees to establish and disseminate information regarding campus sustainability principles. The first of these introduced the concepts of sustainability, and the second went more into detail of the campus' operations and where individual departments and employees play a role. The head of each department receives specific training on sustainable practices to ensure that each department functions in a manner consistent with the principles and norms of environmental responsibility. In addition, the General Manager attended off campus sustainability workshops at EARTH University to learn best practices and how to integrate them into the protocol

for campus operations and maintenance.

RESIDENT NATURALIST PROGRAM

The UGA Costa Rica Resident Naturalist program provides a unique opportunity for professional development in the field of natural history education. UGA Costa Rica offers three to six Resident Naturalist positions, depending on occupancy, and requires a minimum six-month commitment. UGA Costa Rica provides on-site room and board and training by local professionals in various aspects of cloudforest natural history, medicinal plant use, cultural history of the region, and how to effectively deliver a variety of educational tours and activities in San Luis and Monteverde. The Resident Naturalists then lead educational activities for UGA Costa Rica academic programs and tourists seeking nature-based, educational experiences.

Fabricio Camacho Céspedes – General Manager

"Sustainability is a modus operandi that allows this operation to be efficient in the use of resources. Efficiency generates savings while reducing our environmental impact."

Fabricio first became involved with the Ecolodge San Luis & Biological Station in 2000, attending a tropical biology course with Mission College. After earning a Bachelors in Forestry and Natural Resource Management at the National University of Costa Rica, Fabricio returned to the Ecolodge in 2001 as a Resident Naturalist and the next year was promoted to Assistant Manager when UGA acquired the property. He has been the campus General Manager since 2005. In 2010, Fabricio earned a Masters in Environmental Leadership and Management. His thesis provided UGA Costa Rica a detailed feasibility analysis for implementation of an integrated sustainable agriculture program for the campus.

As General Manager, Fabricio oversees the day-to-day operations of the UGA Costa Rica campus. Central to these duties is implementation of the UGA Costa Rica sustainability plan which is integrated into all aspects of campus operations and is used to guide decision making.

The UGA Costa Rica sustainability plan includes educating campus employees about sustainability. It is ultimately the responsibility of all campus employees to implement specific practices in order to meet established sustainability goals. As an additional benefit, the principles learned on campus carry into the community as employees return to their homes and follow similar practices.



EDUCATION ABROAD PROGRAMS

During the 2009-2010 academic year, the UGA Costa Rica campus hosted a combined 18 study abroad programs and international seminars from the University of Georgia. Each year, a variety of courses are offered at UGA Costa Rica that take advantage of the location of the campus and the San Luis community to enrich course curricula. Subject areas include agricultural leadership, agroecology, anthropology, art, biology, ecology, education, English and English as a second language, entomology, geography, international affairs, landscape architecture, Latin American and Caribbean studies, linguistics, music, ornithology, Spanish, and speech communication.

Courses related to sustainability are particularly relevant at the UGA Costa Rica campus given Costa Rica's emphasis on sustainable tourism and natural resource conservation as a path towards economic development. Some of the course offerings which explicitly address sustainability-related topics include:

- *Applied Landscape Ecology*: Explains the concept and functioning of ecosystems and how this understanding can be applied in environmental design. Students review adverse impacts that can result from failure to apply sound ecological principles to design problems.
- *Communities, Conservation & Development on Costa Rica's Pacific Coast*: Evaluates the effects of conservation and development in coastal Guanacaste Province. Course assignments focus on integrating what students are learning experientially with literature on the political ecology of conservation and development.
- *Comparative Biodiversity and Land Conservation Policy*: Compares and evaluates land conservation and biodiversity policies in Costa Rica and the United States. Leading Costa Rican attorneys, policy makers, and economists in the field of biodiversity and land

conservation policy lead seminar discussions with students throughout the course.

- *Conservation Biology*: The scientific study of the phenomena that affect the maintenance, loss, and restoration of biological diversity.
- *Culture & Ecology of Costa Rica*: Addresses current topics and issues in Costa Rica, including the Earth Charter Initiative.
- *Ecological Basis of Environmental Issues*: Teaches ecological concepts that form the basis for understanding environmental issues such as population growth, loss of diversity, resource limitation, pollution, and global climate change.
- *Ecology*: Teaches population structure and dynamics, organization and classification of communities, and nutrient and energy flows in ecosystems.
- *Field Ornithology*: Familiarizes students with the biology of Neotropical birds, including taxonomy, behavior, ecology, evolution, and conservation. Much of the course involves field exercises and emphasizes taxonomy and identification of Neotropical birds. Additional exercises emphasize habitat associations and effects of land use on birds, as well as avian ecology and behavior.
- *Insect Natural History*: Teaches insect biology, with emphasis on factors that have made insects one of the most abundant and successful animal groups. Topics include the behavior, ecology, and evolution of the major insect groups.
- *Special Problems in Entomology*: Students obtain a meaningful tropical field experience to enhance their global awareness of environmental and cultural issues by learning about insect natural history.
- *Tropical Field Ecology*: An interdisciplinary field course that explores and compares tropical environments, their natural history, their biological wealth, and the ecological patterns, processes, and interactions that characterize tropical systems.
- *Watershed Management*: This interdisciplinary course examines the scientific, legal and socio-economic considerations associated with the management of water resources. The course exhibits

hands-on field and classroom discussion components from a diverse team of water resource experts.

While some UGA Costa Rica education abroad programs include such courses explicitly addressing sustainability issues, all UGA Costa Rica programs immerse students in the natural surroundings via myriad activities, including guided walks with local experts through forest reserves and national parks, sustainable agriculture tours with local farmers at Finca La Bella, and participation in UGA Costa Rica's Carbon Offset Program (see p. 15). Thus, no matter what subject they come to Costa Rica to study, participants in UGA Costa Rica's education abroad programs come away with a deeper appreciation for the importance of efforts to restore, protect, and preserve Costa Rica's natural resources.

SERVICE-LEARNING

Increasing student and faculty interest in service-learning opportunities and the need to develop guidelines for service-learning education abroad programming led Warnell School of Forestry and Natural Resources faculty Kris Irwin to seek a Scholarship of Engagement grant award to develop a Service-Learning Protocol for faculty interested in developing service-learning coursework with UGA Costa Rica. Professor Irwin subsequently was named as a Service-Learning Fellow for this work. This protocol serves as a guide to assist faculty in the process of incorporating a service-learning component into their study abroad program, along with resources for use in their courses. Professor Irwin and UGA Costa Rica are working closely with the UGA Office of Service Learning on this project.

UGA Costa Rica education abroad programs incorporating service-learning include:

- *Art & Culture in Latin America*: Students participate with local community members in community-identified mural projects, and offer art workshops in

the local grade schools.

- *Conservation Medicine*: Veterinary medicine students and faculty engage in hands-on activities at ZooAve wildlife rescue and rehabilitation center, Goldring Marine Laboratory sea turtle research, and offer a spay-neuter clinic based at the UGA Costa Rica campus and serving the regional community. They also participate in a long-term wildlife disease ecology research project in San Luis.

- *Insect & Bird Natural History International Service-Learning*: The Insect and Bird Natural History in Costa Rica program has partnered with UGA GIFT (Georgia Intern Fellowships for Teachers) and annually hosts 2-4 teachers from across Georgia to accompany the study abroad participants to Costa Rica. While abroad, the K-12 teachers increase their content knowledge; develop inquiry-based teaching strategies; experience new technologies; and share ideas with the study abroad participants. This service-learning program seeks to offer the teacher a real-world experience that justifies the material taught in the classroom, engages the teachers first-hand in lessons they teach in the classroom, and gives meaning to theory through an international lens. Teachers return to the classroom with new purpose and a renewed interest in science. To date 12 teachers have participated in the Insect and Bird Natural History program in Costa Rica.

- *Language & Culture Service Learning*: Students provide “camp” activities for local school children and tutor local residents in English using a variety of place-based activities.

- *Nature & Environmental Design Service-Learning*: Service-learning studio course addresses community-identified design problems, provides support for local small businesses, and provides plans for the UGA Costa Rica campus. The San Luis Botanical Garden and the overall UGA Costa Rica campus master plan were developed from student projects on this program.

- *Spring Semester Program*: Students taking the College of Education Field Experience service-



Steven Bell
James Mann
Andrew White
Lara Browning
Yang-Chin Yang
Lizbeth Agel
Tammy Parker
Frank Murphy
Kristen Carroll
Andrew Huse
John Fein
Rob Beach

Café Connections: A Service-Learning Education Abroad Program

During summer 2009, public service associates from UGA's Fanning Institute and faculty from the College of Environment & Design led the annual Nature and Environmental Design Service-Learning program. Using a community-based asset development protocol, eleven graduate and undergraduate landscape

architecture students provided design assistance to three families in the San Luis community who were seeking to increase eco-tourism on their farms.

Students created new resources such as pamphlets, maps and landscape designs to help increase tourism on each farm through improved way finding, inexpensive publicity and simple, cost-effective site improvements. In addition, a bilingual website (www.fincalabella.org) was constructed to tell the story of these three families and their farms, which are part of the Finca La Bella project in San Luis. While these products may seem to be fairly simple tools, they were created in response to the needs and requests of the Finca la Bella farmers: the students listened to what the farmers needed and responded.

This example of the integration of service-learning at the UGA Costa Rica campus allowed students to gain a unique and important experience transforming the way they use their individual skills and apply their academic training.



learning course support the local grade school teachers with classroom and after-school activities.

SYMPOSIA, CONFERENCES AND WORKSHOPS

In addition to traditional study abroad programming, UGA Costa Rica also collaborates with other UGA offices and departments to offer symposia, conferences and workshops that incorporate different aspects of sustainability presented through a variety of nature-based, educational activities. Examples include:

CURO International Research Symposium (in partnership with the UGA Honor's Program Center for Undergraduate Research and the University of Costa Rica): Held in both 2007 and 2008 and scheduled for 2011, the CURO International Research Symposium brings UGA and UCR undergraduate students together at the UGA Costa Rica campus to present their research findings. As well, students engage in *tertulia* sessions discussing Aldo Leopold's Land Ethic and, in 2008, produced a National Issues Forum briefing paper on the topic of water resource management. Participants helped the UGA Costa Rica Carbon Offset Program plant trees and worked with local students at the Alto San Luis grade school

to plant a garden.

International CREATE Conference (in partnership with UGA's Torrance Center): CREATE, Costa Rican Educational Adventure in Creativity Theory and Empiricism, is an international conference that has been held at the University of Georgia Costa Rica Campus in both 2008 and 2010. The conference emphasizes multicultural, multidisciplinary views of creativity shared in a community of scholars. Theoretical, empirical and applied presentations are shared and displayed during the conference. Participants engage in a variety of nature-based activities during the conference.

International Watershed Management Research Symposium (in partnership with the UGA River Basin Center and University of Costa Rica's Integrated Environmental Management Program): This symposium provided an opportunity for students and faculty from both institutions to share their expertise in a specific scientific, methodological or programmatic sub-field of water resources management at the watershed level. The key focus of the presentations were how each university works to provide tangible management tools to local communities, governments and institutions in order to address surface and groundwater resource issues. Further emphasis was placed on how such mechanisms may be transferable between watersheds of varying characteristics and even between countries with different cultures and governmental structures.

RESEARCH

The UGA Costa Rica campus welcomes research projects from undergraduate students, graduate students, and interested faculty. Research is a major priority to UGA Costa Rica, as the Ecolodge San Luis was initially established as a research center. The campus provides high-quality infrastructure with lab space, lodging, and logistical support, to facilitate

ongoing field research programs. During 2010, six research projects were underway on the campus. Each project sheds light in its own unique way on the ecological inner-workings of the area's biodiversity as the researchers work closely with local naturalists to advance the preservation of the Costa Rican environment and culture.

Current Research Projects

Dispersal and establishment processes of epiphytic orchids and bromeliads in fragmented habitats at multiple spatial scales. Tyler Kartzinel, graduate student, Odum School of Ecology, University of Georgia.

This research is intended to improve scientific understanding of how forest fragmentation affects the biodiverse communities of tropical epiphytic plants. Hopefully, new awareness about the variation in response to habitat fragmentation stemming from this research will enable better management of the dynamic and biodiverse tropical forest canopies.

Lepidoptera, Diptera and Hymenoptera response to the experimental planting of steady-state flora resources in shade grown coffee plantations. Valerie Peters, Ph.D. dissertation, Odum School of Ecology, University of Georgia.

Steady-state floral resources or plants that produce few flowers over an extended flowering season can be important resources for pollinating insects in the tropics. During this research project, approximately 12 shrubs of steady-state floral resource were planted in three small, shade-grown coffee plantations. If steady-state floral resources contribute to pollinator abundance and diversity in coffee plantations, then perhaps management practice can be incorporated to increase pollinator visits to coffee flowers during coffee bloom periods.

*Monarch butterfly ecology and interactions with the protozoan parasite, *Ophryocystis elektroscirrha*.* Sonia



Altizer, Ph.D., Professor, Odum School of Ecology, University of Georgia.

This study focuses on understanding variation in parasitism by the neogregarine protozoan *Ophryocystis elektroscirrha* (OE) in wild populations of monarch butterflies *Danaus plexippus* and other members of *Danainae* (milkweed butterflies). This work will help to determine current prevalence of infection in 6 species of milkweed butterflies in Costa Rica and will be used to evaluate geographic differences in rates of parasitism in wild monarchs.

Plant responses to fragmentation in Costa Rican premontane tropical forest. Luanna Prevost, Ph.D. candidate, Department of Plant Biology, University of Georgia.

The impact of habitat fragmentation on plant diversity in premontane forests in Costa Rica is investigated by examining the relationship between species richness and fragment size in premontane forests in the areas of San Lu s de Monteverde and San Vito, in central and southern Costa Rica. The findings will contribute to conservation programs such as reserve design and corridor building proposed for the San Lu s and San Vito areas.

*Reproductive adaptations of the plant *Witheringia solanacea*. Judy Stone, Ph.D., Professor of Biology, Colby College.*

In large populations with many pollinators, plants of the “sulfatillo”, or *Witheringia solanacea* species normally have a functioning self-incompatibility (SI) mechanism, whereby they can recognize and reject self-pollen, and thereby produce outbred progeny. At the Monteverde Reserve, where pollinators are scarce, most individuals still have a functioning SI mechanism, even though it would be beneficial to them to self-fertilize. By investigating this curious situation, this project addresses a central question in population biology, the extent to which gene flow counteracts natural selection.

The ecosystem service of pest control by birds in shade grown coffee plantations. Valerie Peters, Ph.D., Odum School of Ecology, University of Georgia.

This research project focuses on how bird species respond to modification of the availability of fruit resources in shade-grown coffee plantations, and whether this response influences the ecosystem service of pest control on coffee plants. This study could demonstrate to farmers that coffee production increases through the conservation efforts to promote birds in their coffee farms, leading to a more environmentally sustainable coffee production system.

*Home range size and habitat use of premontane rainforests by Long-tailed Manakins (*Chiroxiphia linearis*). Ryan Malloy, M.S. thesis, Warnell School of Forestry and Natural Resources, University of Georgia.*

This study examined habitat selection in a mixed-use landscape by a frugivorous neotropical resident songbird, the Long-tailed Manakin (*Chiroxiphia linearis*) at several spatial scales. While forest habitat was selected most, results indicated that low-intensity cattle ranching, which makes use of forested windbreaks and hedgerows, may provide some of the necessary habitat structure and function for forest birds such as Long-tailed Manakins.

*“Monteverde is the only historical locality for the golden toad (*Bufo periglenes*), an amphibian now extinct due to the chytrid fungus. Reasons for the spread of the chytrid fungus could include climate change, disease or pollution. This should serve as a lesson to us of the consequences of ignoring sustainability. Loss of biodiversity, ecosystem function and integrity are unacceptable consequences.”*

Andrew Durso
M.S. Candidate
Department of Biological Sciences
Eastern Illinois University

San Luis is a small farming town that has based its life and growth on values such as family and community solidarity, but the rising tourism industry poses some threats to the local culture. UGA Costa Rica attempts to conserve community values while promoting environmental conservation and sensible ecotourism in the region.

UGA Costa Rica plays a major role as a provider of jobs and business activity within the local community of San Luis. 81% of the UGA Costa Rica staff were born in the San Luis community, and only 6% of the staff are from outside the Monteverde region. UGA Costa Rica offers benefits to the local economy by purchasing products from neighboring farmers and supporting vital development projects. Many stay-at-home mothers are able to provide income to the family by selling arts and crafts to students and tourists. Home-stays are also organized with local families for students and guests who want to be more fully immersed into the culture while practicing their Spanish. This integration is financially beneficial for locals and promotes cultural exchange between students and their host families.

As an academic institution, one of UGA Costa Rica's goals for the campus is to provide educational opportunities for local citizens. UGA Costa Rica employees have opportunities to take part in annual sustainability workshops and other campus initiatives. In addition, UGA Costa Rica has developed an English and computer literacy program for the staff, community, and local schools, where interns teach these two very important subjects.

ESOL INTERNSHIP PROGRAM

Beginning in 2006, UGA Costa Rica established a volunteer internship position for an ESOL instructor to serve the campus staff as well as the broader local community. UGA Costa Rica provides room and board on campus for the intern, who

commits to a five to seven month position leading ESOL outreach in the community. This is a free service to the community. The program is supervised by Dr. Paula Mellom, faculty director for UGA Costa Rica's summer Language and Culture Service-Learning study abroad program. ESOL interns also receive direct logistical support and guidance from the campus Academic Programs Manager. In addition to the ESOL internship, a retired ESOL instructor annually spends three months in Monteverde and offers free English classes to UGA Costa Rica campus staff during her stay. This is coordinated to begin as the ESOL internship position wraps up in order to provide additional continuity for staff taking English classes.

In 2010, the ESOL outreach program served 79 people in the San Luis community. In 2007, UGA New Media Institute student Kiley Dorton received a grant and brought 12 XO laptop computers to the Alto San Luis grade school. These were the first computers the school owned, and continue to be used by local students. Several UGA Costa Rica ESOL interns and other volunteers have subsequently offered computer classes for the students.

In addition to pursuing Bandera Azul Ecologica status for the campus, UGA Costa Rica will assist local schools and the San Luis community with also obtaining Bandera Azul Ecologica status by 2015.

COMMUNITY CLEANUPS

Disposal of solid waste is an expensive prospect in the San Luis Valley. As there is no municipal trash collection or dump in close proximity, solid waste must be hauled off to the nearest provincial dumpsite, located about an hour drive from San Luis.



As a result, local residents tend to store bulky items, including appliances and equipment that are beyond repair. UGA Costa Rica has taken a leadership role to coordinate community trash collection activities where UGA Costa Rica employees and other community members helped pull trash from local rivers and other public spaces in addition to bringing

out their own stored household waste. A community cleanup in 2008 yielded two large dumptrucks full of waste that were taken to the Puntarenas dump.

In addition to trash collection, UGA Costa Rica has made multiple contributions to community beautification, including the annual Art and Culture



“We try to make the greatest impact with the smallest amount of resources.”

As a master’s and PhD student at UGA’s Odum School of Ecology, Lindsay Stallcup was drawn to the nature and people of Costa Rica, so much so that she decided to make San Luis her home. Having had extensive experience participating in and working for UGA Tropical Ecology study abroad programs as well as conducting her own field research, and being fluent in Spanish, Lindsay was a perfect fit to take on the Academic Programs Manager position at UGA Costa Rica.

As Academic Programs Manager, Lindsay Stallcup oversees logistics and reservations for all academic programs, and supervises the Resident Naturalist program. In addition, one of Lindsay’s critical roles is to serve as the campus liaison between students and visitors on campus and members of the local community.

One of the most meaningful outreach projects for her has been interacting with schools in the community. The town of San Luis is faced with limited resources in education; both upper and lower San Luis elementary schools teach students ranging from first to sixth grade with only one or two teachers servicing all levels. With limited staff and resources, teachers struggle just to cover core material such as reading, writing, social studies and arithmetic. There is little time and virtually no additional resources or training for teachers to provide English instruction, art, music and physical education.

ESOL intern Samantha Haggard helped fill this gap from August 2009 to February 2010. Lindsay helped Samantha get started working at the Upper San Luis Elementary School located less than a mile from campus. Samantha used her background in English education and art to support the local teachers and provide supplementary instruction for students at Upper San Luis Elementary. Samantha’s work received a positive response from students, parents, and teachers alike. After the semester ended, Lindsay and Samantha worked with parents from the community to create a summer camp. Students met twice weekly for two months to participate in extra-curricular activities, such as medicinal plant and insect workshops; art projects; tree planting; and a coffee tour. At the closing activity held on UGA’s campus, over sixty students and parents attended to take part in face painting, karaoke, sports and a talent show featuring a folkloric dance presentation by students.

COMMUNITY OUTREACH

Maymester program painting murals for the community health center (2008) and local schools (2007, 2009, 2010). In 2009 and 2010, UGA art students and faculty also led watercolor and drawing workshops for students at the local grade schools. With support from the Classic City Rotary Club of Athens and Rotary International, bathrooms and sinks were built at the local cemetery, and a bridge was built over the Rio Socorro, allowing local residents to safely cross during the rainy season.



ESOL Intern Samantha Haggard offering English instruction at a local school.

SOCIO-ECONOMIC SUSTAINABILITY GOALS AND ACTIONS OF THE CAMPUS

Ensure that local residents get direct economic benefits:

- Contract 95% local staff for campus operations
- Contract educational tour services with local farmers
- Purchase locally-produced food
- Contract local families for home-stay services
- Contract local transportation services
- Sell locally-made goods in gift shop
- Support community dances, sporting events, and other fundraisers

Contribute to the local social development:

- Facilitate resident participation in local workshops and lectures
- Facilitate campus classrooms for other local organizations, meetings and workshops
- Develop service-learning programming to support community-identified needs

Contribute to the community infrastructure development and maintenance of public service facilities:

- Support the San Luis Water Association project to provide community-wide potable water service
- Provide electricity service for neighboring farm not on electric grid
- Provide financial administration services and project management for community projects funded by outside donors
- Support local cemetery, health clinic, and roads maintenance
- Develop service-learning programming to support locally-identified needs



This is a design challenge like no other. It is not about making greener widgets but how to make decent communities that fit their places with elegant frugality. ... The problem is not how to produce ecologically benign products for the consumer economy, but how to make decent communities in which people grow to be responsible citizens and whole people.

—David Orr, *The Nature of Design*, pp. 11-12



Local students participate in "summer camp" activities hosted by UGA Costa Rica and led by campus staff.

UGA ha aportado mucho trabajo a San Luis. Si no estuviera, San Luis no sería tan próspero. Son muy buenas personas también. [El director] Quint siempre trae visitantes a mi finca y también facilitó que un grupo de estudiantes nos hiciera un sitio web.

UGA has created a lot of work in San Luis. If UGA were not here, San Luis would not be as prosperous as it is. They are good people as well. [The director] Quint always brings visitors to my coffee farm and he even arranged for a group of students to create a website for us.

*Victor Ramirez Badilla
Owner of Café San Luis
[Translated by Kyle W. Williams]*

VISION 2015: THE ROAD TO SUSTAINABILITY

UGA Costa Rica's sustainability goals for 2015 fall within six categories: Resource Efficiency, Carbon Neutrality, Sustainable Agriculture, Education and Training, General Operations, and External Certifications.

Resource Efficiency

- 1) Complete alternative energy generation potential and cost-benefit analysis, with recommendations for prioritized implementation by 2015.
- 2) Switch all high-use outdoor bulbs to LED bulbs by 2015 to reduce energy consumption.
- 3) Install low-flow shower heads and aerators to all campus sinks and showers by 2011.

Carbon Neutrality

- 4) Complete a thorough carbon footprint analysis for the UGA Costa Rica campus by 2011. Based on this analysis, develop strategic plan to achieve carbon neutrality by 2015.
- 5) Grow the carbon offset program and reforestation partnership with Fundacion Costarricense Conservacionista to reach a total of 60,000 trees planted in the Pajaro Campana Biological Corridor by 2015.

Sustainable Agriculture

- 6) Increase on-site food production to 33% and increasing on-site + locally-purchased to 50% during high season (January - July) and 67% during low season (August - December) by 2015.

Education and Training

- 7) Develop and implement a sustainability training program for the UGA Costa Rica campus staff by 2011.
- 8) Develop talks, activities and written materials and make these accessible to diverse audiences to teach

about UGA Costa Rica sustainability initiatives, challenges, and opportunities for involvement.

General Operations

- 8) With assistance from the Office of Sustainability and UGA Physical Plant, conduct a baseline sustainability analysis and develop a five-year sustainability plan for the UGA Costa Rica Athens Office in 2011.

External Certifications

- 9) Renew CST certification with a goal of achieving 4 leaves by 2011.
- 10) Earn Bandera Azul Ecologica status for our campus by 2015. Based on expressed interest from the community of San Luis, assist local schools and San Luis community with also obtaining Bandera Azul Ecologica status by 2015.

If we turn our ecological accounting to the resource flows—electricity, water, food, and so on—necessary to maintain a building, campus, or community, we grow more sensitive to the systems supporting our lives.

— Sim van der Ryn and Stuart Cowan, *Ecological Design*, p.96

Monitoring and moving toward more efficient resource use and pursuing opportunities for renewable energy supplies are important goals for continually moving UGA Costa Rica's operations toward greater economic and ecological sustainability. At the same time, we will continue to work with the communities of which we are a part, striving to contribute to building enduring social foundations grounded in the principles of the Earth Charter.



UGA NON-DISCRIMINATION POLICY

Consistent with applicable law and University policy, the University of Georgia restates its commitment to the concepts of affirmative action and equal opportunity.

“Neither employment nor study, nor institutional services, programs, and activities should be hindered by such prohibited bias factors as race, color, religion, national origin, sex, sexual orientation, age, veteran

status, or disability. Prohibited bias factors will not be permitted to have an adverse influence upon decisions regarding students, employees, applicants for admission, applicants for employment, contractors, or participants in and/or users of institutional programs, services, and activities. The University of Georgia will continue in its efforts to maintain an institutional environment free of such bias and restates its policy prohibiting the interference of such bias factors in institutional processes.”

SOURCES & THANKS

UGA COSTA RICA

<http://www.ugacostarica.com>

INTRODUCTION

Certification for Sustainable Tourism (CST) Report

<http://www.turismo-sostenible.co.cr/>

LAND USE

Costa Rican Network of Private Nature Reserves

<http://reservasprivadascr.org/>

National Biological Corridors Program

<http://www.corredoresbiologicos.go.cr/corredores.html>

Monteverde Friends School

<http://www.mfschool.org/community/history.htm>

Tropical Science Center

http://www.cct.or.cr/english/reserva_monteverde/reserva_monteverde2.php

ENERGY

Iberoamerican Association of Energy Regulating Entities

<http://www.ariae.org>

Power Plants around the World: Hydroelectric Plants in Costa Rica

<http://www.industcards.com/hydro-costa-rica.htm>

ICE Group

http://www.grupoice.com/esp/ele/infobase/pla_hid.htm#4

Certified Sustainable Tourism (CST) Report to Costa Rican Tourism Institute, UGA Costa Rica, 2010

Electricity Emission Factors, US Department of Energy

http://www.eia.doe.gov/oiaf/1605/pdf/Appendix%20F_r071023.pdf

US Environmental Protection Agency Office Carbon Footprint Tool

<http://www.epa.gov/epawaste/partnerships/wastewise/carboncalc.htm>

WATER

Certification for Sustainable Tourism (CST)

<http://www.turismo-sostenible.co.cr/es/>

Water Resources of the Upper Rio Guacimal, Justin Welch, 2008

UGA Costa Rica Water Resources Analysis, Justin Welch, 2007

PURCHASING

Florex Costa Rica

<http://www.florexcr.com>

Bandera Azul Program

<http://www.blueflag.org/Menu/Programa/Menu/Programa+Bandera+Azul>

Monteverde Natural Soap Company brochure

EcoLux Low-flow Fixtures

<http://www.ecoluxuryshowers.com/environmental.htm>

EDUCATION

Café Connections, Fanning Institute and UGA Costa Rica, 2009

APPENDICES

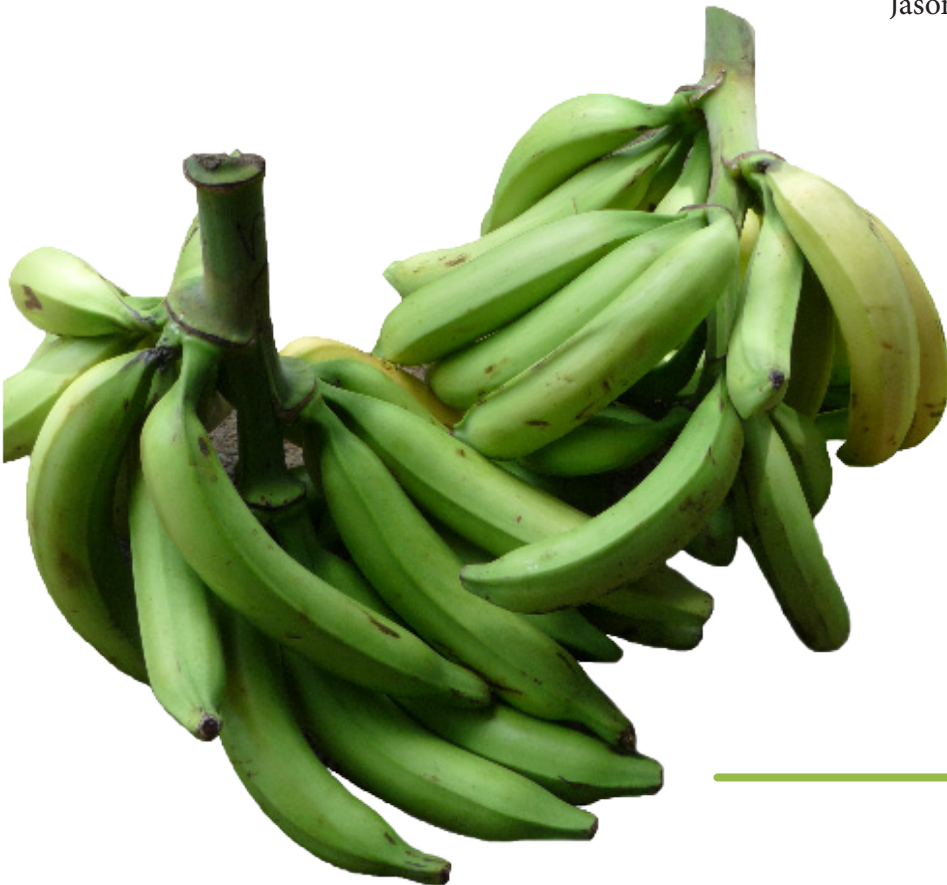
UGA Non-discrimination Policy

<http://www.uga.edu/eoo/pdfs/NDAH.pdf>

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