

ABSTRACT

GRECHO, APRIL STEPHANIE. Determining Criteria and Indicators for Success in Higher Education Programs Focused on Environmental Sustainability. (Under the direction of Gary B. Blank.)

An increasing number of colleges and universities in the United States are restructuring courses and research programs to focus on long-term use and maintenance of our natural resources and protecting these resources for future generations. Previous research and assessment on environmental sustainability and higher education has focused on the role of the university in sustainable development, improving environmental track records of institutions, and environmental conservation and sustainability on campus. The purpose of this study was to develop a framework for evaluation, using criteria and indicators, for academic programs in higher education that are focused on environmental sustainability. An evaluation framework is necessary if academic programs are focused on the issue of environmental sustainability is to remain viable into the next century. The first objective, to develop a framework for evaluation, was met through a participatory process involving academic program stakeholders. The second objective, to test the applicability of the framework for evaluation, investigated a diversity of academic programs through nine case studies of land grant, regional, and private colleges and universities across the U.S. This study demonstrated that educational stakeholders are aware of the need and interested in evaluating success of academic programs aimed at addressing the issue of environmental sustainability.

Specifically, five criteria categories (Maintenance and Enhancement of Academic Program, Curriculum Appropriate to Goals of Environmental Sustainability, Activities and Experiential Hands-on Learning Opportunities, Community Engagement, Institutional Commitment to Environmental Sustainability) and the associated strategic indicators were determined and used as a framework for academic program evaluation. These criteria and indicators serve a number of purposes by providing a set of key terms that can be used in future educational program evaluation or assessment, a framework against which programs can evaluate their effectiveness, and a means for making changes and adapting, or to resolving areas of weakness.

Determining Criteria and Indicators for Success in Higher Education Programs Focused
on Environmental Sustainability

by
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Dedication

Dave,
for your friendship, support, strength, and love.
Thank you.

Biography

April Stephanie Grecho grew up on a small dairy farm outside of Cooperstown, NY. Her love for the environment and outdoors comes from the many days she and her twin brother Raymond spent roaming, exploring, and searching for adventure across rivers, through pastures, woods, and swamps of the farm and surrounding countryside.

April began her undergraduate work at the University of New Hampshire majoring in Anthropology and later added a minor in Environmental Conservation because of her desire to better understand how different cultures utilize their unique and sometimes limited resources.

After leaving UNH she embarked on a fortuitous road trip that ended in Phoenix, AZ. Remembering a letter she had received from the graduate program in environmental resources at Arizona State University she paid a visit to the department head and instantly made a connection due to their shared agricultural background. As a result of an undergraduate general education science requirement she had developed an interest in soils and pursued this interest through research focused on Carbon storage in the agricultural and urban landscapes of the Sonoran Desert ecosystem. While in Arizona, April also spent time volunteering with the Forest Service and National Park Service. Additionally, she worked with an international sports program to organize and coach a girls' soccer team to participate in an exchange program and exhibition tournaments in Australia.

After completing her MS in Environmental Resources she travelled back to the east coast to work as a Soil Conservationist with the Natural Resources Conservation Service in Presque Isle, Maine. Through lively dinner and card game conversations with colleagues she grew to realize she was not done learning and participating in the give and take of the on-going learning process found in academia. This meant back to school and

brought April to Raleigh, NC and the Department of Forestry and Environmental Resources at NC State.

April has grand ideas that combine her many interests and eventually was able to narrow down a “do-able” topic based on her passion for education and addressing the issues of environmental sustainability that led to the reality of this research project.

After passing her preliminary exams, circumstances provided April with the opportunity to take a position as a full time lecturer at The University of Texas at Brownsville. Although this stalled the research process it was a great experience that proved she is on the right career path. She did, however, choose to return to NC the following year to focus on completing her PhD in a timely manner.

April’s next big adventure, with Dave, will be farming and putting into practice all that she has learned and advocates.

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Chapter 1: Introduction

No issue is more important than the maintenance of our natural resources, water, food supplies, cultural values and way of life. Almost two decades have passed since the World Commission on Environment and Development's Brundtland Report (1987) challenged society to maintain healthy ecosystems to provide for present and future generations. Given that agriculture and forestry are essential to our economy and well-being and that conservation of natural resources is essential to environmental quality, we must ask; *"how can both needs, for resource use and resource conservation, be fulfilled?"* The starting point is education. To assure the long term maintenance of the resource base and the continued well-being of society, educational success is a high priority. The challenges to becoming a more sustainable society are not insurmountable but they are daunting. Educators will need to understand more about the pathways that will lead to this change and how to accelerate this pace (Jenks-Jay, 2004).

Our institutions of higher education are essential to the goal of environmental sustainability. David Orr (1992), Chair of Environmental Studies at Oberlin College, states "No institutions in modern society are better able to catalyze the necessary transition to a sustainable world than universities. They have access to the leaders of tomorrow and the leaders of today...Consequently, what they do matters to the wider public." Higher education can play a pivotal role in turning society toward sustainability, and never has the opportunity to create the foundation for a sustainable future been greater. Studies by Gerstenberger et al., (2004) and Bruyere (2008) found that a college-level environmental education experience has a positive impact on individuals' environmental attitudes and many of their environmental behaviors become more frequent. Thus, participants in higher education have a very large responsibility. They inform and socialize young adults to take crucial positions as future leaders.

The growing emphasis on environmental sustainability in education programs is due to a cultural move toward "green living," in part because the issues of global

warming, species extinction and collapsing ecosystems have become increasingly difficult to ignore. The knowledge students take away from their educational programs will be fundamental in managing the challenges associated with these issues in today's society. My research identifies some of the most important criteria and indicators for evaluating success of academic programs at institutions of higher education that are addressing the issue of environmental sustainability.

Measuring and assessing the success of educational programs is increasingly important given the rapid growth of sustainability initiatives at institutions of higher education. An increasing number of colleges and universities in the United States are restructuring courses and research programs to focus on long-term use and maintenance of natural resources in order to meet basic human needs while protecting resources for future generations (Corcoran and Wals, 2004). Such academic programs can be found under a variety of titles (Environmental Studies, Ecological Agriculture, Natural Resource Management, Environmental and Sustainable Resources), all sharing the goal of teaching environmental sustainability. By 2006, at least 22 institutions of higher education launched sustainability-themed degrees, certificates or academic programs (AASHE, 2006). If these academic programs are to remain viable into the next century, environmental sustainability education must reflect the current reality and trends in the natural environment, society, and economy.

1.1 Background

The purpose of this study was to develop a framework of criteria and indicators for successful programs in higher education focused on environmental sustainability. The first objective, to develop a framework for evaluation, was met through a participatory process involving academic program stakeholders. The second objective, to test the applicability of the framework for evaluation, investigated a diversity of academic

programs through nine case studies of land grant, regional, and private colleges and universities across the U.S.

The idea for this research project was first proposed at the biannual meeting for University Education in Natural Resources in March 2006. This meeting is aimed at faculty and administrators interested in national trends in curricular issues and innovative teaching methods in natural resource fields. Participants in a discussion indicated interest in a study to determine standards to measure efficacy of environmental sustainability education programs. The need for the framework was again supported throughout the research process, as indicated by comments like the following:

“We don't really have a strong framework for assessment in place, and it would be great to develop and implement one.”

Some institutions currently perform program and institutional review assessments to meet the requirements of accrediting agencies or governing bodies. Others need to address the demands of external stakeholders, while some institutions need to ascertain and demonstrate that limited instructional resources are being effectively and efficiently deployed (Haessig et al., 2004). However, no framework of criteria and indicators for evaluation currently exists that defines the likelihood of success for education programs focused on environmental sustainability. Research to date has focused on the role of the university in sustainable development, improving the environmental track record of educational institutions, and campus based environmental conservation and sustainability (Townsend 2005; Filho, 2000). Much of this literature and research provides views and perspectives, and several provide examples of action at various fronts of administration, planning, teaching, extension, and research. To fill this gap, I developed a framework of criteria and associated indicators for evaluation of higher education programs focused on environmental sustainability.

Once we accepted that the concept of criteria and indicators was an appropriate framework for evaluating the success of academic programs focused on environmental sustainability, I then focused on identifying criteria and determining the basic set of indicators to fulfill the criteria. I invited participation from educational program stakeholders in a variety of disciplines related to environmental conservation, sustainable forestry and agriculture, and natural resources management to provide their perceptions of important criteria and indicators for academic program success.

The resulting framework is primarily composed of strategic indicators for academic program success. Strategic indicators focus on the approaches or strategies that academic programs and institutions are using to meet the developed individual criterion within the framework. These indicators are helpful in improving quality of operations, identifying processes or areas that are weak, defining opportunities for improvement, setting priorities, and allocating resources (von Loon et al., 2005).

This framework of criteria and indicators will aid in developing a picture of progress and success and provide a means by which information can be presented to stakeholders and the general public in a simplified and highly visible form. My research is significant because of the importance of providing future citizens the education and skills necessary to achieve sustainable environments and societies and because evaluation and assessment are critical to maintaining vital academic programs.

1.2 Goals and Objectives

The goal of the research was to identify specific criteria for evaluating success of programs that claim to be demonstrating, implementing, and educating students about the principles of environmental sustainability.

To accomplish this goal, I established the following objectives:

Objective 1: To develop a framework of criteria and associated indicators for evaluating the success of existing academic programs focused on environmental sustainability.

Objective 2: To test this framework in terms of its applicability across diverse programs in answering the question: Are the programs successful in meeting criteria?

1.3 Sustainability

What is “environmental sustainability”?

The World Commission on Environment and Development (1987), better known as the “Brundtland Commission,” reintroduced the concept of sustainability to public attention with the following definition: “*Sustainability is: Meeting the needs of the present generation without compromising the ability of future generations to meet their needs.*”

David Sitarz (1998) found that in the early 1990s, “sustainability” was a concept unknown to many American citizens (including policy makers, business leaders, educators, and community leaders), beyond being a complex and multidimensional word. Most people automatically think of the environment but sustainability also involves society and the economy. Environmental sustainability is very closely tied to our economic and social concerns. There is general agreement throughout the literature that environmental sustainability integrates three main goals (Ekarius, 2007; Schroeder, 2005; von Loon et al., 2005; Corcoran and Wals, 2004, Newport et al., 2003):

- (1) Environmental health – issues surrounding the long-term maintenance and health of the world’s ecosystems

- (2) Economic profitability – industrial forestry, agriculture, cultural, and service enterprises in which humans are involved (land, labor, capital)

- (3) Society and economic equity - social goods are based on culture and religion (human history shows these will vary over time and from place to place)

Institutional Commitments to Sustainability

In 1990, the Association of University Leaders for a Sustainable Future (ULSF) was formed with representatives from 200 institutions in 40 nations. The mission of the ULSF is to support sustainability as a critical focus of teaching, research, operations and outreach at colleges and universities worldwide through publications, research, and assessment. The ULSF is also the Secretariat for signatories of the Talloires Declaration, a ten-point action plan committing institutions to sustainability and environmental literacy in teaching and practice, which has been signed by 141 presidents and chancellors in the United States. As of June 3, 2008 there were a total of 375 signatories worldwide (ULSF, 2008).

In 2006, the Association for Advancement of Sustainability in Higher Education (AASHE) was founded as an association of colleges and universities in the U.S. and Canada working to create a sustainable future (AASHE, 2008). The mission of AASHE is to promote sustainability in all sectors of higher education - from governance and operations to curriculum and outreach - through education, communication, research and professional development. One of AASHE's initiatives is the American College & University Presidents Climate Commitment. Building on the growing momentum for leadership and action on climate change, the Presidents Climate Commitment provides a framework and support for America's colleges and universities to go climate neutral (ACUPCC, 2008). The Commitment recognizes the unique responsibility that institutions

of higher education have as role models for their communities and in training the people who will develop the social, economic and technological solutions to reverse global warming. Presidents signing the Commitment pledge to take immediate steps to reduce greenhouse gas emissions, integrate sustainability into the curriculum, and make the action plan, inventory and progress reports publicly available. The Commitment was initiated in late 2006 with 354 charter signatories and in March 2008 had surpassed 500 signatories.

Environmental Sustainability Education

There are a growing number of environmental sustainability focused academic programs across the U.S. The universities and colleges offering these programs have similar goals: to develop innovative and collaborative programs of teaching and research in agricultural and natural resource systems and related areas, and to inspire environmentally positive activities and ways of thinking that aim to change one's behavior through knowledge. Faculty leaders from a range of disciplines are developing curriculum changes around sustainability in their own programs on their campuses (Corcoran and Wals, 2004). Additionally, interdisciplinary faculty groups are making efforts to incorporate environmental sustainability issues into university courses with the ultimate goal of providing future citizens the education and skills necessary to achieve sustainable communities and societies (Sterling, 2004).

A few examples of institutions in the U.S. with curricula illustrating these developments include Arizona State University, Berea College, Michigan State University, and Maharishi University of Management. In 2007, Arizona State University established the School of Sustainability. The mission of the School is to bring together multiple disciplines and leaders to create and share knowledge, train a new generation of scholars and practitioners, and develop practical solutions to some of the most pressing environmental, economic, and social challenges of sustainability, especially as they relate

to urban areas (ASU, 2008). The Sustainability and Environmental Studies Program at Berea College emphasizes the application of ecological design to the development of sustainable communities. In addition, the College has restructured its traditional agriculture program into a model Agriculture and Natural Resources program that focuses on sustainable agriculture and small-scale farming (Berea, 2008). The Department of Community, Agriculture, Recreation, and Resource Studies at Michigan State University aims to assist in the development of sustainable communities through its research, teaching and outreach in community, food and agriculture, natural resources, land use, and the environment (CARRS, 2006). The Maharishi University of Management offers the first Sustainable Living degree program in the U.S. that covers areas such as renewable energy, sustainable agriculture, green business and entrepreneurship (MUM, 2008).

This sample of programs raises some questions: What commonalities cross program types? Which criteria for success apply to all programs? What differences are essential to the unique character of the schools or their programs? Clearly, an evaluation framework must evolve from knowledge of the subjects of assessment.

1.4 Evaluation and Assessment

All academic programs need periodic reviews to ensure their evolution in response to advances in technology, changing societal needs, and an overall increased state of knowledge (Madewell et al., 2003). Periodic evaluation or assessment of program goals, outcomes, and success is important to maintaining quality academic programs. Program evaluation can provide a framework for focusing faculty attention on student learning and for provoking meaningful discussions of program objectives, curricular organization, pedagogy, and student development (Allen, 2004). One of the first assessments of a college curriculum, in an attempt to meet the needs of the students, was an investigation on the improvement of college teaching vocational subjects in 1920.

This investigation was conducted by the Committee on Instruction in Agriculture, Home Economics, and Mechanic Arts. The Association found that the course of instruction and methods of teaching had been largely developed with reference to interests of instructors and without sufficient regard to the needs, capabilities, and aims of the students and beneficiaries (True, 1929). More than sixty years would pass before academic assessment became a common practice across the campus landscape to determine the impact or effectiveness of an activity, session, class, or academic program (Hutchings et al., 1991).

Evaluation and assessment are needed in higher education to provide accountability for funds, to ensure a well trained work force (in this case, effective decision makers in resource use) and to improve the overall success of our academic programs (Suskie, 2006; Walker et al., 2004; Miller et al., 1998). Suskie (2006) states that there is one fundamental question that assessment seeks to answer: “*How well are we achieving what we aim to do?*” Evaluation enables educational programs to focus on their mission and the extent to which reality matches their aspirations (Hernon and Dugan, 2004). The results of evaluations and assessments are valuable in gauging department strengths, allowing for better communication and appeal to prospective students, providing useful information for policy development, and important data for funding programs and potential funding groups (Table 1.1) (Walker et al., 2004; Walvoord, 2004).

Table 1.1: Purpose for Assessment by Audience

Who?	Needs to know what?	For what?
Institution/ Department	How well do our strategies for <i>student learning</i> work? What can we do to improve?	Make improvements
Assessment Committee	What assessment strategies do we have in place? What do we need/ plan for successful assessment in the future?	Recommend changes for improvement of assessment
Prospective Students	How good is the institution in helping me reach my learning, professional and personal education goals?	Enrollment
Donors	How well is this institution doing by objective measures and external reviewers?	Giving

(Adapted from Walvoord, 2002)

1.5 Summary

As environmental issues become more prominent and as society's needs and demands change, it is important for academic programs concentrating on the goals of environmental sustainability to establish and maintain a practice of evaluation. Evaluation practices will allow academic programs to evolve with changing environmental and societal needs and our own increasing knowledge on the problems we are faced with to address environmental sustainability.

The framework resulting from this research project identifies common criteria and indicators that both existing and newly developing environmental sustainability programs will find useful for maintaining active and up to date academic programs.

Methods for developing the framework are presented in the following chapter and discussed in two parts addressing each of the objectives separately.

Results are presented in the third chapter and have been divided into four sections. The first presents results of the questionnaire process to gather information for subsequent steps in the methods. The survey and interview results are then presented, followed by the framework of criteria and their associated indicators. Finally, the results of nine case studies used to test the developed framework are presented in the following order: research and land grant institutions, public regional institutions, and private institutions, followed by a comparison summary of the institutional category results.

The fourth chapter discusses the results and conclusions reached by the research project with specific conclusions provided in the final chapter along with recommendations for continued research.

Chapter 2: Methods

Research for this dissertation involved a two phase process designed to address the two objectives. During the first phase, I identified academic programs for participation in the research project to develop the framework of criteria and indicators for success in higher education programs that focus on environmental sustainability. The academic program stakeholders contributed to the design of the evaluation by providing input and suggestions for criteria and indicators of program success.

The second phase consisted of testing and analyzing the framework. Evaluation of academic programs and the analysis were not restricted to a single discipline or discipline-bound methods. A mixed methods approach, described by Creswell (2003), employing both qualitative and quantitative data was used to provide for more opportunities to cross check and increase the validity of the findings. The qualitative research methods focused on analyzing the perspectives of those involved in an attempt to define what program elements were most advantageous to success.

2.1 Objective One: Framework Development

Phase one began with a process to engage program stakeholders in a cooperative learning experience for evaluating college and university programs dedicated to the education, demonstration and implementation of environmental sustainability principles. The design used for this study is similar to the research and evaluation process used by the World Wide Fund for Nature's (WWF) participatory evaluation process (Blakeley, 2004). It also used a grounded theory approach where the data collected at one step led to generation of questions for the next step of data collection and identification of the criteria for academic program success.

Due to the growth and general efficiency of electronic communications, an email survey instrument was used to determine stakeholder perceptions regarding criteria for

success in higher education degree programs focused on environmental sustainability and the indicators related to them. Electronic mail and internet surveys are useful in eliminating paper, postage, and data entry costs, and the time required for survey implementation is greatly reduced (Dillman, 2007; Doherty, 2006). Questionnaire and survey design followed guidelines outlined in Dillman (2007), Gray (2004) and Diem (2002). These methods provided a structure for data collection that was easily collected, coded and entered into a database for analysis.

The questionnaire was designed to gather preliminary data for use in the subsequent survey and to assess interest in project participation. This initial questionnaire was sent to program or department heads or chairs as well as other faculty whose information indicated an interest in the project (Appendix A). Pre-notification emails, recommended by Dillman (2007), were sent as individual messages to help avoid recipients' deleting the message containing the embedded questionnaire. The questionnaire covered information such as goals, definitions, and program components. Most of the questions were simple check off with a few open ended questions. Validity of responses was confirmed by targeting key informants interested in and informed on the topic.

The questionnaire results were used to set up the following survey to identify and rank appropriate criteria and indicators for the framework (Appendix B). This survey was sent to administrators, faculty and staff identified through the previous questionnaire and website research of programs. These individuals were then asked to forward the survey to students and community partners associated with their academic programs.

The survey instrument contained questions related to stakeholder role, institution type, and program learning goals. Likert-scale questions were used for stakeholders to indicate importance values of program and institutional relationships, criterion indicators, learning opportunities, and teaching strategies. The survey contained ranking questions through which stakeholders were able to rank the relevant criteria ordinally with an option to include unlisted criteria. Reliability of responses was tested by using

redundancy in the survey; some items on the same topic were repeated or rephrased and again addressed in interviews to capture consistency of responses. The survey was left open for one month and then follow up emails were sent to increase the response rate (Appendix C).

The primary data collected from the questionnaire, survey, and interviews, and a review of secondary literature and web resources identified the criteria and indicators that define program success to be used in the framework for evaluation (section 3.3).

Population

The target population was stakeholders of four-year higher education programs focused on environmental sustainability. These programs included, but were not limited to, sustainable agriculture, forest conservation, ecological agriculture, environmental studies, and natural resources management. Key stakeholders were administrators, faculty, students, staff/ operations managers, and members of the communities surrounding the educational institution. As suggested by Blakeley (2004), partnership approaches to evaluation allow stakeholders to remain interested in and “own” results. By inviting stakeholder participation in the process to develop the framework for evaluation, the resulting framework should be more meaningful and provide useful information that stakeholders will more readily accept.

Sample Selection

As there are no rules or recommended sample size for a purposeful, non-probability sample, I chose academic programs focused on environmental sustainability in agriculture, forestry, and natural resources using sources such as the USDA National Agriculture Library’s directory of Colleges and Universities for Education and Training Opportunities in Sustainable Agriculture (Thompson, 2006), the Sustainable Agriculture

Research and Education program (SARE), the Association for the Advancement of Sustainability in Higher Education (AASHE), and other organizations associated with sustainable agriculture, sustainable forestry, and natural resource or environmental education. I then employed a snowball sampling method (Gray, 2004), based on suggestions provided by colleagues and the initial questionnaire participants.

The sample population, used for the initial questionnaire to invite participation in the project and preliminary data gathering, consisted of 34 research and land grant universities, 11 public regional colleges and universities, and 12 private institutions (Table 2.1).

Table 2.1: Identified Institutions for Invitation to Participate in Research Project

Category	Institution	Program
Land Grant	California State Polytechnic University	Land Stewardship, Sustainable Agriculture (Dept. of Horticulture, Plant, & Soil Sciences)
Land Grant	Clemson University	Agroecology Program/ Sustainable Forestry
Land Grant	Colorado State University	Interdisciplinary Program in Organic Agriculture
Land Grant	Cornell University	Environmental Studies (Dept. of Natural Resources)
Land Grant	Iowa State University	Agroecology (Dept. of Agronomy)
Land Grant	Kansas State University	Natural Resource and Environmental Science Program
Land Grant	Michigan State University	Environmental Studies & Applications (Community Agriculture, Recreation, & Resource Studies)
Land Grant	Montana State University	Agroecology (Land Resources and Environmental Sciences Dept.)
Land Grant	New Mexico State University	Environmental & Resource Mgt (Dept of Plant & Environmental Sciences)
Land Grant	North Carolina State University	Environmental Sciences & Natural Resources Academic Programs
Land Grant	Ohio State University	Natural Resources Mgt (School of Environment and Natural Resources)
Land Grant	Oregon State University	Natural Resources Program (College of Forestry)
Land Grant	Pennsylvania State University	Agroecology, Environmental Resource Mgt (College of Agricultural Sciences)
Land Grant	Rutgers, The State University of New Jersey	Ecology and Natural Resources Program
Land Grant	Southwestern Indian Polytechnic Institute	Natural Resources Program
Land Grant	Texas A&M University	Environmental Studies (College of Agriculture & Life Sciences)
Land Grant	Tuskegee University	Forestry, Natural Resources, or Wildlife Mgt
Land Grant	University of Alaska - Fairbanks	Sustainable Agriculture, Land Reclamation (School of Natural Resources and Agricultural Sciences)
Land Grant	University of Arizona	Natural Resources Program (College of Agriculture & Life Sciences)
Land Grant	University of Arkansas - Fayetteville	Ecological Agriculture (College of Agriculture, Food, and Life Sciences)
Land Grant	University of California - Davis	Sustainable Agriculture (College of Agricultural and Environmental Sciences)
Land Grant	University of California - Santa Cruz	Department of Environmental Studies
Land Grant	University of Connecticut	Natural Resources Mgt & Engineering
Land Grant	University of Florida	Agroecology (School of Natural Resources and Environment)

Table 2.1: (Continued)

Land Grant	University of Hawaii - Hilo	Agroecology, Environmental Quality (College of Agriculture, Forestry, & Natural Resource Mgt)
Land Grant	University of Maine	Sustainable Agriculture (Dept. of Plant, Soil, and Environmental Sciences)
Land Grant	University of Maryland	Agroecology (Dept. of Natural Resource Sciences & Landscape Architecture)
Land Grant	University of Missouri	Sustainable Agriculture (College of Agriculture, Food, and Natural Resources)
Land Grant	University of Nebraska	Environmental Studies (School of Natural Resources)
Land Grant	University of New Hampshire	Environmental Conservation Studies (Dept. of Natural Resources)
Land Grant	University of Vermont	Ecological Agriculture (College of Agriculture and Life Sciences)
Land Grant	Utah State University	Ecological Agriculture, focus on systems with animals
Land Grant	Washington State University	Sustainable Agriculture (College of Agriculture, Human, & Natural Resource Sciences)
Land Grant	West Virginia University	Agriculture and Natural Resources Program
Public Regional	Alfred State College	Sustainable Development Program (Dept. of Agriculture and Horticulture)
Public Regional	Appalachian State University	Sustainable Development Program (Interdisciplinary Studies Dept.)
Public Regional	Arizona State University	Bachelor of Science in Sustainability (School of Sustainability)
Public Regional	California State University	Agroecology (College of Agriculture)
Public Regional	Evergreen State College	Sustainable Agriculture, Ecological Agriculture
Public Regional	Humboldt State University	Environmental & Natural Resource Sciences Programs
Public Regional	Sonoma State University	Conservation & Restoration (Dept. of Environmental Studies and Planning)
Public Regional	Southern Arkansas University	Agriculture (College of Science and Technology)
Public Regional	University of Louisiana - Lafayette	Sustainable Agriculture (Dept. of Renewable Resources)
Public Regional	University of Montana	Environmental Studies Program, Agroecology option (College of Arts & Sciences)
Public Regional	University of Wisconsin - Platteville	Reclamation, Environment, and Conservation (School of Agriculture)

Table 2.1: (Continued)

Private	Berea College	Sustainable Systems (Dept. of Agriculture and Natural Resources)
Private	College of the Atlantic	Environmental Sciences
Private	Dartmouth College	Environmental Studies Program
Private	Green Mountain College	Natural Resource Mgt
Private	Hampshire College	Sustainable Agriculture
Private	Middlebury College	Environmental Studies Program
Private	Oberlin College	Environmental Studies Program
Private	Pitzer College	Department of Environmental Studies
Private	Prescott College	Environmental Studies Program/ Agroecology
Private	Sterling College	Sustainable Agriculture Program
Private	Warren Wilson College	Sustainable Agriculture (Dept. of Environmental Studies)
Private	Wilson College	Richard Alsina Fulton Center for Sustainable Living

Research and land grant universities are those that are members of the National Association of State Universities and Land Grant Colleges or Association of American Universities. Public regional colleges and universities are those eligible for membership in the American Association of State Colleges and Universities (Taylor et al., 1993). These education programs, having similar environmental sustainability initiatives, can be found throughout the US at varying scales of institutions (large and medium size universities to small colleges).

Institutional Review Board

According to federal regulations and North Carolina State University policy, a proper review and approval of all research studies that involve human subjects was required to conduct the research project in order to protect the rights of those participating in the research project. In compliance with the policy, this project received the proper review and was granted exempt status in accordance with the Code of Federal Regulations Exemption: 46:101.b.2 and was assigned the following IRB# 43-07-2 (Appendix D).

Data Collection

The internet survey software *SurveyMonkey* was used as a platform for the questionnaire and survey used for this research project. This software also allowed ease and timeliness of data collection and analysis, and provided anonymity of responses. The *SurveyMonkey* program provided the option to randomize the order of choices for questions to help minimize "ordering bias." A web-link to the separate questionnaire and survey instruments was sent via email to program stakeholders and participants. Respondents were able to click on the link and go directly to the questionnaire or survey. Participant responses were immediately viewable through this collection method.

Data Coding and Analysis

Participant responses were coded with descriptive labels identifying categories of themes and patterns. Data coding and categorization methods were modeled after Leahy's (2004) and Taylor-Powell and Renner's (2003) methods for categorizing, coding, and analyzing qualitative data. Data analysis was conducted by converting the descriptive statistics into indices that summarized or characterized the datasets to show percentages, frequency distributions and measures of central tendency (Hernon, 2006 and Taylor-Powell, 1996). The frequency data were used to show how often a given answer occurred and the percentage of total respondents that provided the same answer. The frequency data indicate how important a certain activity or criterion was rated and how many responses, such as program activities focus, fit into particular categories. The use of the percentage data demonstrates the relationships between the categories of respondents and between categories of responses. Using methods described by Leahy (2004), I summarized the data collected into charts, tables, and lists (found in the Results chapter) in order to provide a visual view of the findings and show patterns that evolved from the data.

2.2 Objective Two: Testing the Framework

To meet the second research objective, methods comparable to those used for descriptive case studies described by Yin (2003) and Ary, Jacobs, and Razavieh (2002), were used to provide a summary of the background and setting for each educational program used to test the evaluation framework. Case studies are considered an appropriate strategy for answering questions about how and why or to illustrate a phenomenon, such as proving the criteria for program effectiveness. Additionally, any

negative outcomes will provide a vital contribution to the final analysis as well (Ary et al., 2002).

Selection for academic programs to test the evaluation framework was by situational non-probability sampling (Ary et al., 2002; Hernon, 2006). The academic programs utilized for testing the framework were determined by participant responses to the initial questionnaire. Nine programs, three representing each institutional category, were used for testing the evaluation framework to meet the second objective. Categories of institutions were research and land grant, public regional, and private of varying sizes and regions. By performing evaluations of a few sample programs I was able to establish validity of the developed framework for program success from these in-depth queries of a few representative programs rather than gathering standardized information from a random sample of all existing programs.

Framework testing was performed through the use of email and telephone correspondence and a short questionnaire (Appendix E) of contacts with program chairs or directors, their administrative support, institutional research offices, and review of publicly available information that could be found using library and internet resources.

Once the outcomes of the evaluation were reviewed, a descriptive study in the form of a systems analysis model was employed to determine the success of programs in meeting the criteria identified in the framework. Each program was examined in a systematic method (Boulmetis and Dutwin, 2000) by studying the input (institution, facilities, resources), and throughput (activities, student involvement, adequacy of resources) for the program's achievement of goals. A numerical rating scale (Figure 2.1) commonly used for evaluations, as described by Arreola (2000), was used to determine which programs were successfully meeting indicators. Results of framework tests will be shared directly with the individual institutions that participated in the project.

Fully meets	=	4
Mostly meets	=	3
Partially meets	=	2
Does not meet	=	1
Not known or unclear	=	0

Figure 2.1: Rating Scale for Indicators

Chapter 3: Results

The initial questionnaire consisted of 28 questions and gathered data about current activities and strategies programs are using to meet their goals. The questionnaire was also used to generate and establish interest in the participatory effort to identify the criteria and indicators for the evaluation framework. The survey, to gather stakeholder opinions and perceptions of the criteria and indicators for successful programs in higher education focused on environmental sustainability, consisted of 20 questions with five stakeholder categories from the three institutional categories responding. Due to the variety of categories and ways in which the responses from categories of the two instruments can be broken-out, data presentation is multifaceted. The presentation of results for the first objective is in the following order: questionnaire, survey, and presentation of the resulting criteria and indicators.

3.1 Questionnaire Results

The questionnaire drew a total response of 42.1 percent; 24 institutions out of the 57 contacted participated in the online questionnaire (Table 3.1).

Table 3.1: Responses to Initial Questionnaire by Institution Category

	Sent	Responded	Response	Percent of Sample
Land Grant	34	15	44.1%	59.6%
Public Regional	11	6	54.5%	19.3%
Private	12	3	25.0%	21.1%
Total	57	24	42.1%	100.0%

The questionnaire respondents demonstrated several similar trends in concentrations from Natural Resource, Agricultural, Forestry and Environmental programs (Appendix F). The most frequently reported curriculum concentrations were:

- Environmental or Natural Resource Management (n=6)
- Agroecology/ Ecological Agriculture (n=4)
- Environmental or Resource Policy (n=4)
- Sustainable Agriculture (n=4)
- Environmental Science (n=3)
- Forest Science (n=3)

Current Activities at Respondent Programs

Seventy percent of questionnaire participants (n=17) responded “yes” to having a required course on issues related to the environment or sustainability. Three program respondents did indicate that although sustainability is not a formal course in their programs the concepts, practices, and approaches are included in coursework.

Responses regarding selected components of teaching strategies within programs (how the campus functions within its local ecosystem, the program’s contribution to a sustainable local economy, and instilling a sense of place within the students regarding the natural features, history, culture, and biota of their surrounding community) are summarized in Figure 3.1. Two of the responding land grant programs indicated that none of these teaching strategies were elements of their instruction on a formal basis. However, 60 percent of the land grant responding programs (n=9) indicated “a sense of place” was most often incorporated in their program’s teaching. The majority of regional

and private respondents indicated they had some level of focus on all options. Additional teaching strategies were provided by a land grant respondent indicating a focus on the interaction of agriculture and the environment, and by a private program respondent indicating a focus on the global environment.

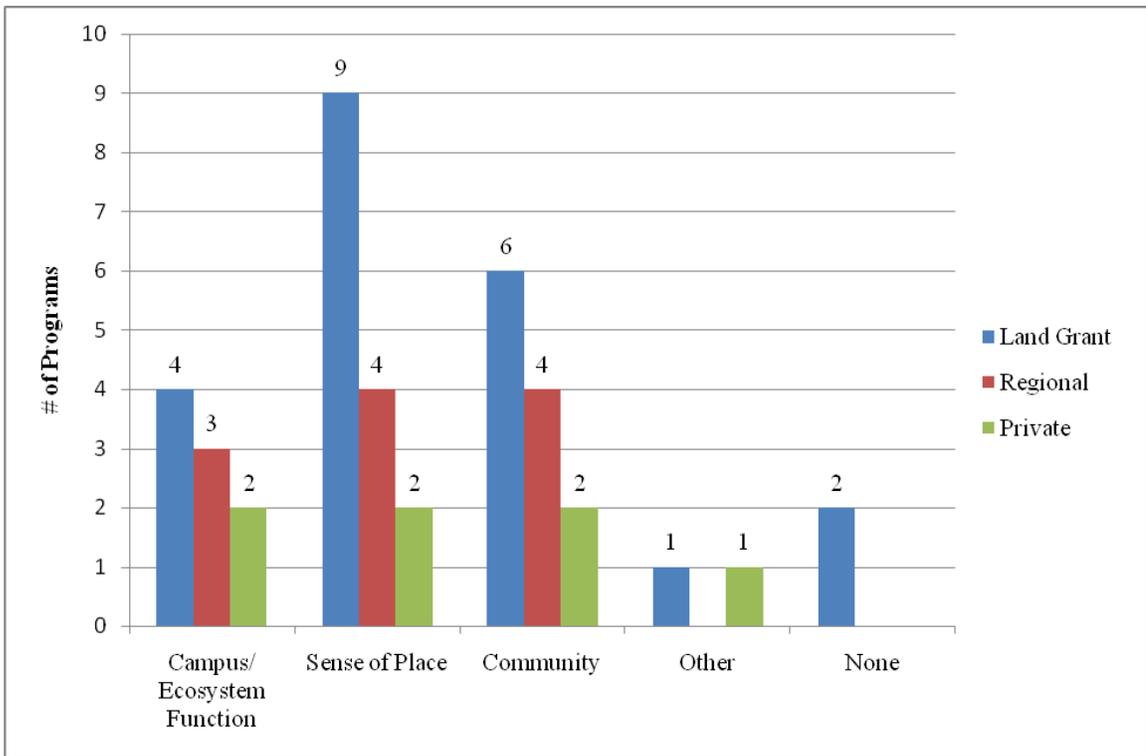


Figure 3.1: Teaching Components

Seventy-five percent of all program respondents (n=18) indicated that their institution had interdisciplinary or multidisciplinary structures for research, education, and policy development on agricultural, environmental, or sustainability issues. Three land grant respondents reported that these structures are being used at the graduate level. Two programs, one private and one land grant, reported that the program itself served the function of these structures by providing environmental information, learning opportunities, and support for campus projects from the interdisciplinary focus of their programs.

Seventy-nine percent (n=19) of respondents indicated use of web-links for program promotion due to ease of use, accessibility, and time. Of the private institution respondents, one respondent listed admissions documents, campus tours, and posters in areas on campus as alternative methods for promotion of the academic program. Sixty-seven percent of regional institution respondents (n=4) favored the use of web-links, with bulletins and announcements being equally represented at 33%, and freshman programs indicated by 50% of regional respondents. Eighty-seven percent of land grant institution respondents (n=13) stated that they rely on web-links for program promotion, followed by 80% using announcements, 60% relying on the bulletin in combination with other forms, and 47% including freshman programs in their promotions. Other promotion avenues provided by respondents included student interaction, high school recruiting, fliers, newsletters, and direct mail. A summary of institutional category and program promotion is provided in Figure 3.2.

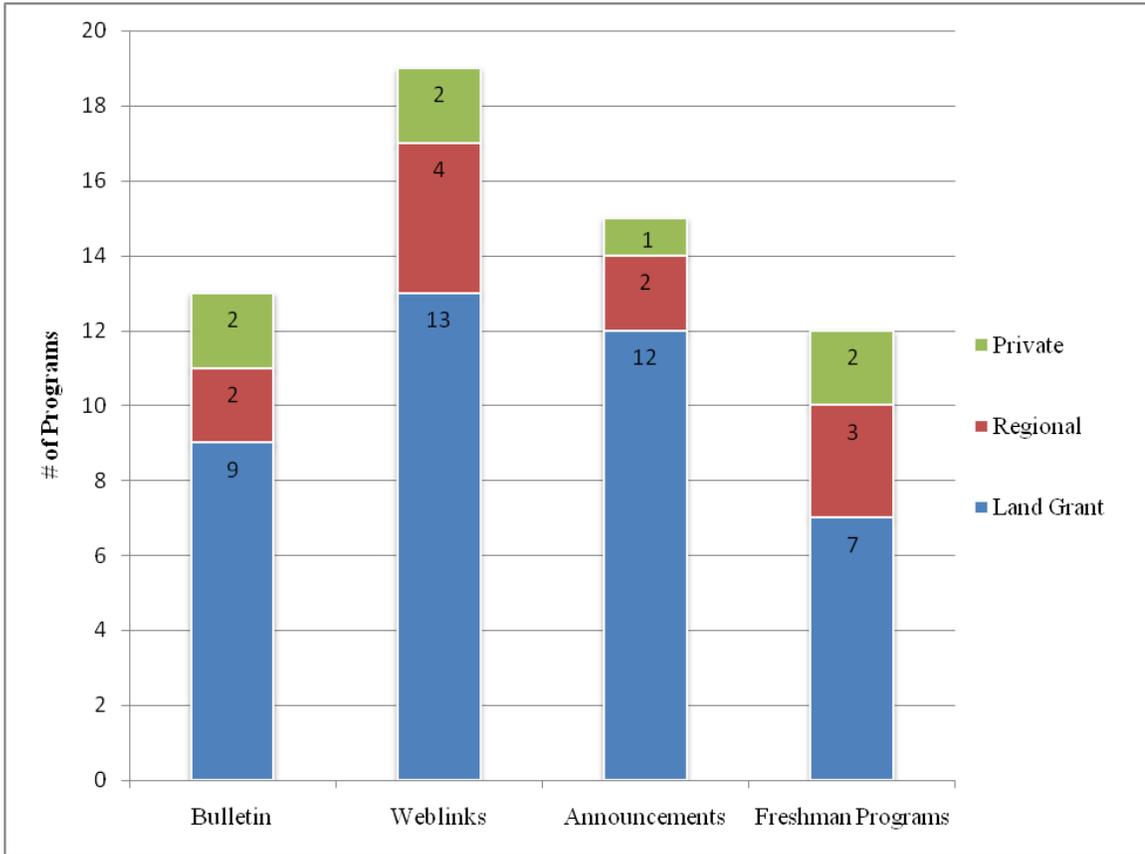
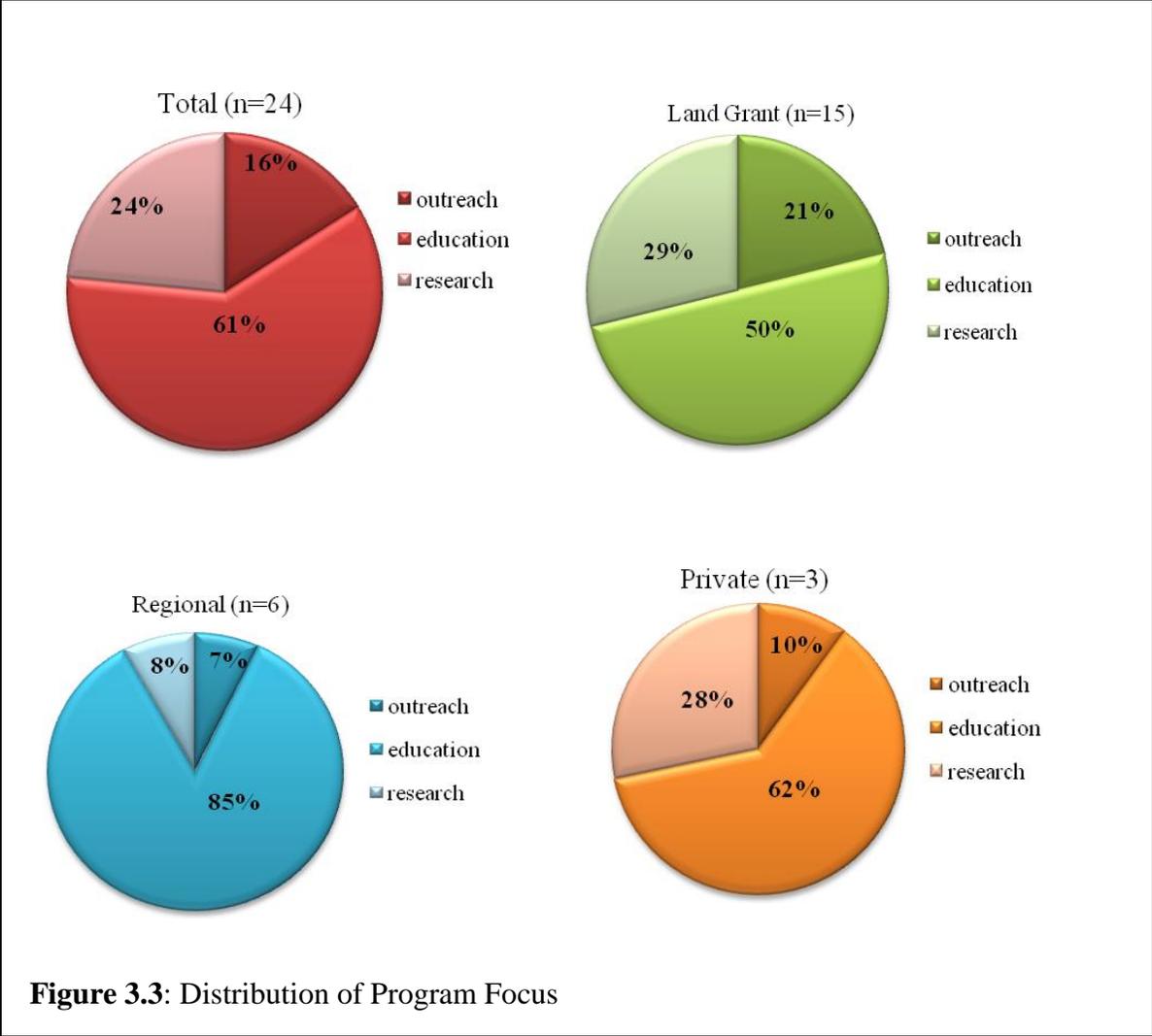


Figure 3.2: Program Promotion

Respondents reported varied distributions for program focus on teaching, research, and outreach, depending on the specific program (Figure 3.3). I expected that teaching would receive the greater percentage of focus for all programs. Regional program responses focused on teaching, with no response below a 75 percent focus and only a 1 percent difference between research and outreach for the remainder of the distribution. Although the private program response rate was low, those provided were more heavily focused on teaching, followed by research, then outreach. The land grant respondents indicated a greater focus on outreach among the institutional categories.



Learning Opportunities and Other Activities

Questionnaire respondents provided information regarding a number of collaborative program activities with local landowners (Table 3.2). Sixty-seven percent of land grant respondents (n=10) indicated participation at some level in research, education, demonstration, and community farm days or tours. An individual comment indicated that more activities were available at the graduate than undergraduate level.

All regional respondents participated in demonstration projects with local landowners and sixty percent of regional respondents indicated collaboration on both research and education programs. One program responded that it relies on service learning opportunities provided by local landowners.

Research and education were the focus for private program respondents. One respondent did not select any of the given options given but provided information that local farms host student tours and interns and local farmers serve as guest lecturers in the classroom.

Table 3.2: Collaborative Activities with Local Landowners

	Total (n)	Research	Education Programs	Demonstration Projects	Community Farm Days
Land Grant	12	83.3%	83.3%	66.7%	66.7%
Regional	5	60.0%	60.0%	100.0%	40.0%
Private	3	66.7%	66.7%	33.3%	33.3%

Only 58.3 percent of questionnaire respondents (n=14) addressed the question regarding participation in community programs. Land grant programs were more likely to participate in local Community Supported Agriculture programs and Food Banks. All responding programs provided a variety of other responses about participation in other outreach or community service programs: undergraduate work with local 4-H group, Clean Up days, hosting a community garden, community service with local food production and marketing groups, and school gardening programs.

Land grant responses confirmed an established history with Cooperative Extension Service (CES), and work with local USDA Natural Resources Conservation Service (NRCS) and Soil and Water Conservation District (SWCD) offices. Land Grant respondents also indicated that they are working with different levels of local governments, Chambers of Commerce, other universities and colleges, state department of natural resources, state agricultural and forestry agencies, National Park Service, Fish and Wildlife Service, state parks, and local conservation organizations. The regional program respondents are involved with at least one of the organization options but did not provide any other sources of cooperation or work partnerships. Private respondents indicated more work with local or regional environmental and agricultural organizations. These reported relationships are summarized in Table 3.3.

Table 3.3: Cooperative Work with Local Agencies or Organizations

	Total (n)	CES ¹	NRCS ²	SWCD ³	Other
Land Grant	12	91.7%	66.7%	58.3%	25.0%
Regional	4	100%	75.0%	75.0%	0
Private	3	0	0	33.3%	66.7%

1 CES: Cooperative Extension Service

2 NRCS: Natural Resources Conservation Service

3 SWCD: Soil and Water Conservation Districts

For all respondents, the area of greatest program participation in environmental sustainability research or scholarship was Ecological Economics; followed by Renewable Energy, Waste Management, and Environmental Quality (Figure 3.4). Other areas listed by respondents were in areas emphasizing forestry, organic food systems production, climate change, environmental policy, and political ecology.

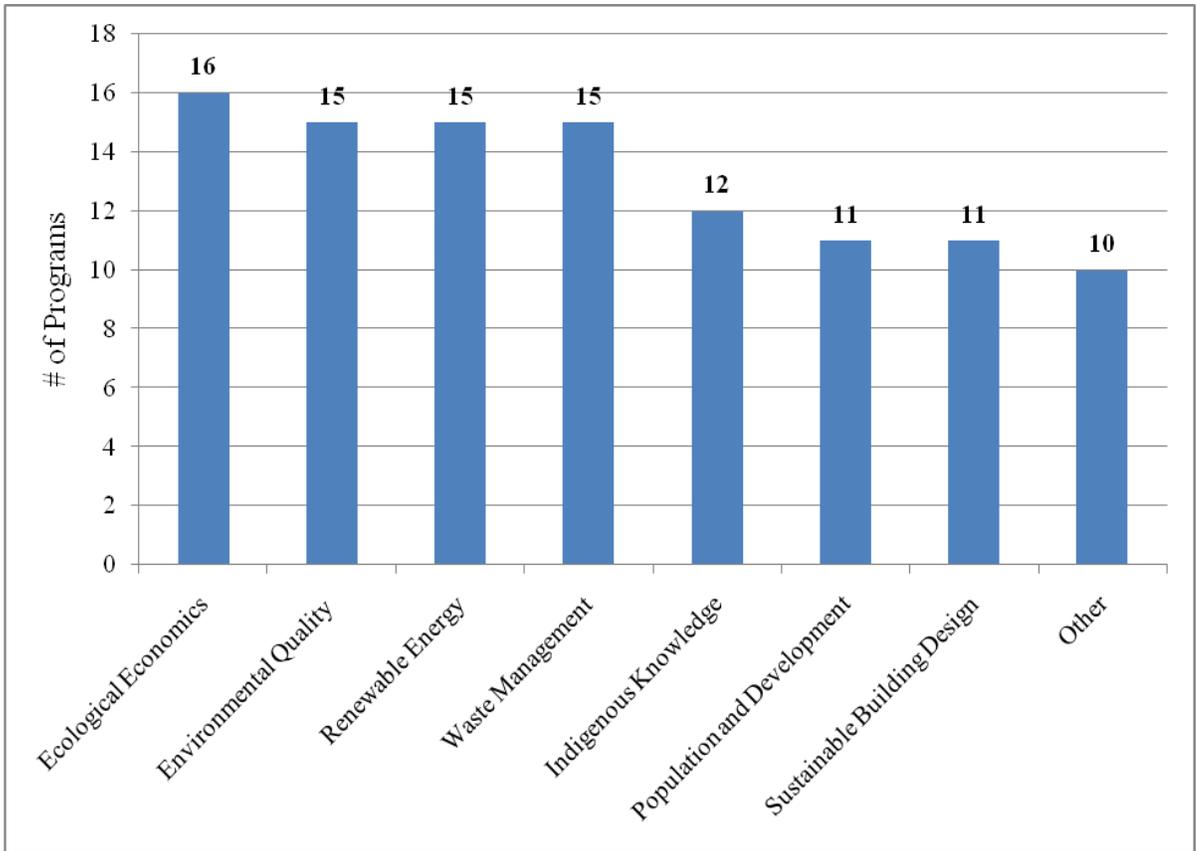


Figure 3.4: Sustainability Research and Scholarship Focus Areas

Seventy-nine percent of questionnaire respondents (n=19) indicated the presence of a farm unit for research and experiential hands-on learning opportunities directly associated with the education program. All private respondents indicated presence of a farm component while one regional and two land grant respondents indicated not having a farm unit.

Information regarding additional experiential learning opportunities such as community service, service learning, or internship as part of program learning opportunities was provided by seventy-nine percent of respondents (n=19). Information regarding specific opportunities provided by respondents included:

- Sustainable farm/ service learning projects
- Course credit given to those who intern with state and federal agencies and industries involved in natural resource management
- Student run farm, campus landscaping projects using recycled landscape and manure waste
- Formal and informal internships with government agencies, farmers, non profits
- Work with elementary school children programs
- Restoration and management of local habitat projects with communities, individuals, and organizations

Evidence of Commitment to and Promotion of Environmental Sustainability

Common responses to the question “What do you see when you walk around your campus that tells you the institution is committed to the sustainability of our natural resources?” ranged from smaller efforts of paper or drink container recycling to larger efforts through construction options. The following is a list of responses occurring more than once and listed in order of most often reported:

1. Evidence of recycling encompassing campus (n=6)
2. Composting - food and landscape materials (n=3)
3. Green building design and green roof projects (n=3)
4. LEED construction - informed by signage (n=3)
5. Alternative fuel transportation (n=2)
6. Native plant and drought tolerant landscaping (n=2)
7. Solar energy (n=2)
8. Recycled water use (n=2)

Fifty-eight percent of questionnaire respondents (n=14) provided information regarding campus events that brought visibility to their programs. Earth Day activities were most often reported by respondents (n=6). Other events listed were panel discussions and a High School Natural Resource Contest. Three programs indicated that they believe their programs are invisible or no activities in the past year occurred on their campuses that would have highlighted the education program.

Invitation to Participate

Additionally, the questionnaire addressed continued participation in additional surveys or interviews for the development of the draft framework for evaluation. Respondents showed a stronger interest in testing of the framework than in the collaborative phase. Of programs that responded to the questionnaire (n=24), 50 percent addressed the questions regarding participation in the project (Table 3.4). Only four respondents indicated preference to participate in future surveys to provide perceptions of criteria and indicators for an evaluation framework, while eight preferred to see their programs used to test the developed framework. Seven of these were land grant institutions. Follow up correspondence was used to encourage several of these

responding programs, as well as non-respondents, to participate in the following survey instrument used to identify and rank criteria and indicators. This tactic was also employed on additional regional and private institutions for use in testing the framework.

Table 3.4: Results of Invitation to Participate in Framework Development

	Sent	Resp ¹	Dev ²	Test ³	Response	Percent of Sample
Land Grant	36	8	1	7	22.2%	66.7%
Regional	10	1	0	1	10.0%	8.3%
Private	11	3	3	0	27%	25.0%
Total	57	12	4	8	59.4%	100.0%

1 Resp: Participants responding to invitation to participate

2 Dev: Respondents interested in development phase

3 Test: Respondents interested in testing phase

3.2 Survey Results

The survey (Appendix B), to gather perceptions on criteria for successful programs in higher education focused on environmental sustainability, drew a total of 22 responses from 12 land grant institution participants, 6 four year public regional institution participants, and 4 private institution participants. Participants demonstrated the variation of titles that can be found in programs focused on the issues of environmental sustainability. Variation in titles included: Agro-Ecology, Environmental Conservation, Environmental Resources, Forestry, Organic Production, Renewable Resources, and Sustainable Agriculture.

Survey participants identified their stakeholder role, the number of years in that role, and their field of expertise or specialty. Data relating to stakeholder role and institutional category are summarized in Table 3.5.

Table 3.5: Survey Participant Stakeholder Role

	Land Grant	Regional	Private
Administration	1 ^a	0	1
Community Partner	0	0	0
Faculty	6	3	2
Staff	3	3	1
Student	1	0	0
Non-Response	1	0	0
Total	12	6	4

a: Respondent selected for both Administration & Faculty role.

The percentage breakdown of stakeholder representatives participating in the survey (n=22) is as follows: 54.5 percent faculty, 31.8 percent staff, 9.1 percent administration, 4.5 percent student, and 0 percent community partner representatives. One land grant respondent selected for more than one stakeholder role while another did not select for a stakeholder role. Land grant institution respondents included greater than 50 percent in faculty roles. The regional program respondents were 50 percent staff and 50 percent faculty, and private institution respondents were 50 percent faculty and 25 percent each for administration and staff. The range of years all faculty respondents were involved in programs was 2 to 32 years with an average of 13 years. Staff respondents' involvement ranged from 1 to 11 years and averaged 5 years. Administration respondents' involvement was 6 and 15 years, while the student respondent was in the third year of program studies. The responses to area of expertise or specialty demonstrated a range in the natural sciences as well as some social sciences (Appendix G).

Program Learning Goals

Survey participants responded about their programs' learning goals, if there are written learning goals, if they are well stated and appropriate, and if the respondent thought these goals were readily accessible to students and faculty. Of land grant respondents (n=12), 66.7 percent indicated that their programs had written learning goals and 50 percent of respondents thought they were well stated and readily accessible. From regional program responses (n=6), 83.3 percent indicated that there are written learning goals and that most of them are well stated and readily accessible. All but one of the private institution respondents (n=4) indicated a presence of written learning goals that are also well stated and easily accessible.

Academic Program Relationships and Promotion

Respondents provided opinions regarding institutional factors that could potentially contribute to academic program success. This question consisted of eight items that asked respondents to indicate what level of importance these items had for education programs. As shown in Table 3.6, the respondents' opinions are summarized as total response percentages.

(1) *How central the program is to the institution's mission* was rated as very important by 17.6 percent of respondents, 29.4 percent rated it important and 29.4 percent rated it as somewhat important.

(2) *Institutional promotion of program*, 29.4 percent of respondents to the question indicated it is important, while 52.9 percent indicated it is somewhat important.

(3) *Collaboration or interaction of program with campus Office of Sustainability*, 37.5 percent of respondents were not able to address the question (N/A) suggesting that there was no Office of Sustainability or Sustainability Coordinator at those institutions. 12.5 percent of respondents indicated it is important while 31.3 percent indicated it is somewhat important. Further breakdown of responses by institutional category reveals that the majority of land grant respondents found it to be not important while the majority of regional respondents found it to be somewhat important.

(4) *Evidence of campus commitment to sustainability of natural resources*: overall respondents believe this to be at least somewhat important. 18.8 percent of respondents indicated it is very important, 31.3 percent indicated it is important, and 31.3 percent indicated somewhat important. Faculty stakeholders were the majority of respondents for the regional and private institutions indicating that evidence of campus commitment is

important.

(5) *Established multidisciplinary or interdisciplinary structures*, 27.8 percent of responses to the question indicated it is very important, 33.3 percent indicated it is important, while 27.8 percent indicated that it is somewhat important to a program.

(6) *Institutional requirement for Environmental Science or Natural Resources course*, 21.1 percent of respondents to the question indicated it is very important, 15.8 percent indicated it is important, and 26.3 percent indicated it is somewhat important. The student stakeholder respondent believed it is not important, while an administrator stakeholder selected for none of the levels.

(7) *Institutional signatory to University Leaders for a Sustainable Future Talloires Declaration*, 41.2 percent of respondents to the question were unable to address the question suggesting that the respondents are not familiar with this initiative. 17.6 percent indicated it is very important and 11.8 percent indicated it is important, while 29.4 percent of respondents indicated that it is not important.

(8) *Institutional signatory to the American College and University Presidents Climate Commitment*, 27.9 percent of respondents to the question indicated it is very important, 16.7 percent indicated it is important, and 5.6 percent indicated it is somewhat important. For land grant respondents, 50 percent indicated important and 37.5 percent not important. Private respondents either believed it to be not important or were unable to address the question.

Table 3.6: Institutional Relationship to Academic Program: Level of Importance for Success

	Total (n)	Very Important	Important	Somewhat Important	Not Important	N/A
(1) How central the program is to the Institution's mission.	17	17.6%	29.4%	29.4%	23.5%	0.0%
(2) Institutional promotion of program.	17	5.9%	29.4%	52.9%	5.9%	5.9%
(3) Collaboration or interaction of program with campus Office of Sustainability.	16	0.0%	12.5%	31.3%	18.8%	37.5%
(4) Evidence of campus commitment to sustainability of natural resources.	16	18.8%	31.3%	31.3%	12.5%	6.3%
(5) Established multidisciplinary and/or interdisciplinary structures.	18	27.8%	33.3%	27.8%	5.6%	5.6%
(6) Institutional requirement for Environmental Science or Natural Resources course.	19	21.1%	15.8%	26.3%	26.3%	10.5%
(7) Signatory to University Leaders for Sustainable Future Taillores Declaration.	17	17.6%	11.8%	0.0%	29.4%	41.2%
(8) Signatory to American College & University Presidents Climate Commitment.	18	27.8%	16.7%	5.6%	27.8%	22.2%

For the question on the subject of effective sources of promotion for an academic program, 86.3 percent of survey participants (n=19) provided their opinions on what they felt were the most effective resources. Websites, web-links, or existence of a web presence were referred to by 57.9 percent of respondents; 15.8 percent felt funding and financial support is needed to effectively promote programs, and 10.5 percent referred to freshman programs. Additional comments included brochures, interaction with high school students, faculty and staff resources, and student run societies or organizations associated with the educational program.

Evidence of Commitment to Sustainability

Regarding examples of evidence of campus commitment to sustainability of natural resources, 81.8 percent of the survey respondents (n=18) provided their views on the subject. The two most often recurring responses were campus recycling programs (n=6) and an Office or Director for Campus Sustainability (n=6), followed by local food purchasing (n=4) and green building (n=3) or LEED (Leadership in Energy and Environmental Design Green Building Rating System) certification in new structures or remodels. Additionally campus farm, garden, and forest programs and energy efficiency were reported. Other individual examples included mission statement or master plans featuring sustainability, Environmental Science as a university “core” science course, composting, waste management, funding, campus purchasing guidelines, and student self assessed fees for renewable energy.

Criteria and Indicators

Asked to rank criteria categories in terms of importance, 90.9 percent of respondents (n=20) ranked the listed categories. However, of these respondents some did not rank all of the criteria listed, leaving occasional individual options blank. The resulting rankings were (1) Activities, (2) Curriculum, (3) Human, (4) Physical, (5) Financial, (6) Information, and (7) Outcomes Assessment. A few of the open ended

responses to this question include:

- “...difficult to (rank) because all play a role.”
- “...so many matter and are interrelated...put human first because it is the people that make a program.”
- “...hands-on activities and working demonstrations are important to any program...crucial for awareness and understanding...”

Open ended responses on the subject of additional criteria and indicators provided an overlooked category for ranking but addressed as an issue in the survey: Institutional Commitment. Within the institution category other indicators provided by respondents were administrative support and support from superiors; university wide / institutional commitment; and institutional organizations and interactions, all in regards to environmental sustainability education programs. Responses also provided information in regards to indicators for criteria. Several respondents indicated that integration across different units and disciplines is important, while others expressed a need for balanced science and social science content in curricula. One respondent also stated it is important that programs improve on methods of engaging non-traditional students.

The survey contained some agreement statements which 90.9 percent of respondents of the survey addressed (n=20). Ninety five percent of those responding to the question (n=19) agreed that it would be useful for programs to maintain a database of alumni contacts, and 90 percent of respondents agreed that programs should regularly survey their alumni. Eighty nine percent of respondents to this section agreed that experiential learning should be required in educational programs, and 75 percent of respondents agreed that it would be useful to track students who take an introductory course and go on to declare and/or complete the program or major.

Indicators for successful programs (Table 3.7) were all rated important at some level by respondents. Student to faculty ratios and enrollment numbers were determined to be very important. Graduate exit interviews, regular surveys of alumni, retention rates, and graduation rates were rated important, while regular surveys of employers was rated somewhat important. Sixty three percent of survey respondents provided opinions on the ideal student to faculty ratio (n=14). These responses ranged from as high as 30:1, (14.3 percent of respondents), to as low as 8:1, (again from 14.3 percent of respondents). The most reported ratio at 28.6 percent of respondents (n=4) was 20:1. The average ratio of responses was 18 students to 1 faculty.

Table 3.7: Indicators: Level of Importance for Success

	Total (n)	Very Important	Important	Somewhat Important	Not Important	N/A
Student to Faculty ratio	19	47.4%	15.8%	36.8%	0.0%	0.0%
Enrollment Numbers	18	39.9%	33.3%	22.2%	5.6%	0.0%
Graduate Exit Interviews	18	0.0%	50.0%	22.2%	22.2%	5.6%
Retention Rates	19	27.8%	50.0%	11.1%	11.1%	0.0%
Graduation Rates	18	27.8%	44.4%	11.1%	5.6%	11.1%
Regular Surveys of Alumni	18	16.7%	38.9%	38.9%	0.0%	5.6%
Regular Surveys of Employers	18	15.8%	31.6%	47.4%	5.3%	0.0%

Eighty-nine percent of respondents (n=16) considered on site/hands on learning units, associated with farms, forests or research units, to be a very important learning opportunity for program success (Table 3.8). Fifty percent of respondents also consider community partnerships to be very important. Additional activities deemed to be important to program success were community service activities, internship requirements, work study opportunities, student led organizations or groups, and collaboration or research activities with local landowners. One respondent suggested study abroad or international education opportunity as an additional source of experiential learning.

Table 3.8: Student Learning Opportunities: Level of Importance for Success

	Total (n)	Very Important	Important	Somewhat Important	Not Important	N/A
On site/ hands-on learning units – farms, forests, research stations	18	88.9%	11.1%	0.0%	0.0%	0.0%
Community partnerships	18	50.0%	38.9%	11.1%	0.0%	0.0%
Student led groups or organizations	18	16.7%	61.1%	22.2%	0.0%	0.0%
Work study opportunities	18	27.8%	50.0%	16.7%	5.6%	0.0%
Community service activities by students, faculty, and staff	18	27.8%	44.4%	22.2%	5.6%	0.0%
Internship requirement	18	33.3%	44.4%	5.6%	11.1%	5.6%
Collaboration/ Research demonstrations with local landowners	18	27.8%	44.4%	27.8%	0.0%	0.0%

Teaching Strategies

For the question regarding teaching strategies, 81.8 percent of survey respondents (n=18) provided opinions based on the options provided. Interdisciplinarity, looking at issues from a variety of viewpoints to find a synthesis was considered very important by 83.3 percent of those addressing the question (n=15). The remaining 16.7 percent also believe it is important. Fifty percent of respondents (n=9) believed that providing an understanding of socio-economic disputes is both very important and important to successful education programs. Fifty percent of respondents (n=9) felt that amount of involvement by undergraduate students in faculty research is only somewhat important.

Outcomes Assessment

Regarding outcomes assessment, 86.4 percent of survey respondents (n=19) provided their opinions, summarized in Table 3.9. All respondents were in agreement that student evaluations should include a question regarding student opinions of improvements to the program and that these evaluations should also ask the student how well they thought they achieved the learning goals of the course, versus asking them about the quality of instruction.

Table 3.9: Outcomes assessment

	Total (n)	Yes	No	Not Sure
Is it useful to have a question for students regarding improvements to the program?	19	100.0%	0.0%	0.0%
Should student evaluations include questions asking students how well they thought they achieved the learning goals of the course or academic program (versus asking them about quality of instruction)?	19	94.7%	0.0%	5.3%
Should Alumni or Graduation surveys include questions regarding the perception of their own learning?	19	89.5%	0.0%	10.5%
Should the program use focus groups for internal assessment?	18	44.4%	5.6%	50.0%
Is it useful for programs to rely on Institutional Review data for internal evaluation?	18	33.3%	22.2%	44.4%

Use of Resulting Framework

Fifty-nine percent of survey respondents (n=13) provided their feedback regarding the question of use of the evaluation framework resulting from this project. Sixty-one percent (n=8) replied that they would use a resulting framework to evaluate their own programs, 23.1 percent would prefer to spend some time reviewing the framework and to know that it fit their expectations, while 15.4 percent would use the resulting framework as a guideline or benchmark for assessment.

Telephone Interviews

Only four survey respondents chose to participate in the interview: two land grant institution respondents and two respondents from private institutions. A recurring theme among responses to the first question was that sustainability is seen as a value which involves not only the environment but the community and the economy. Additionally, one respondent would like to be sure that one group not take ownership of the term.

The most often expressed response to the second question on trends that will help shape the future success of higher education programs in environmental sustainability over the next generation was a focus on interdisciplinary programming and inter-institutional partnering, followed by rediscovery and reuse of techniques and practices, and a focus on climate change. Other responses that stood out include community decision making, more community engagement by students, and economics – the need to be aware of where the markets are going.

3.3 Identified Criteria and Indicators

The following five criteria and associated indicators have been identified, through the methods outlined in section 2.1 and a review of the literature on evaluation of education programs and sustainability in education, to be advantageous to the success of higher education academic programs concentrating on the issue of environmental sustainability. A sample of the framework format used for data collection is presented in Appendix I.

Criterion 1: Maintenance and Enhancement of Academic Program

- Maintenance and enhancement of academic programs includes the elements of program goals, periodic review, outcomes assessment, and visibility.
- Evidence of a comprehensive approach to continued improvement that is appropriate to the program and its goals.
- Clear goals, stakeholder involvement in decision making processes, and measurable steps toward a commitment to an assessment process that results in continuous improvement and greater chance of success.

Indicators:

Program Goals

- a. Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.
- b. Clear support for how goals will be met.

Periodic Review

- a. Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.

- b. Program review that includes student focus groups or surveys for internal evaluation or assessment practices.
- c. Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.

Outcomes Assessment

- a. Indirect measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).
- b. Use of alumni surveys to gain perception of learning for improvements to program.
- c. Program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.
- d. Program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).

Visibility

- a. Evidence of activities highlighting academic program.
- b. Evidence of visibility through a variety of avenues (web, mail, high school recruiting).

Criterion 2: Curriculum Appropriate to the Goals of Environmental Sustainability

- Broad and balanced teaching strategies, education, and research to raise awareness of environmental sustainability issues to help students fit pieces together through application of knowledge.

Indicators:

- a. Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the goals of environmental sustainability.
- b. Interdisciplinarity through integration across different units and disciplines.
- c. Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.
- d. Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).
- e. Undergraduate participation in research.
- f. Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.

Criterion 3: Activities and Experiential Hands-on Learning Opportunities

- Fundamental learning activities and encouragement of student participation in activities that will develop technical skills, leadership, and cultural awareness through active participation.

Indicators:

- a. Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).
- b. Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.
- c. Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).

- d. Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.

Criterion 4: Community Engagement

- Levels of engagement and establishing partnerships (local, regional, or global) towards understanding and addressing environmental issues that actively involve academic stakeholders and intended beneficiaries.
- Exposure of students to the respectful values, perspectives, and rights of those involved.

Indicators:

- a. Provides opportunities for partnerships with local community (collaboration with local landowners and/ or organizations in areas of research, education, and demonstration).
- b. Provides opportunities for partnerships with government partners (local, state, or federal).
- c. Provides opportunities for inter-institutional or international collaborations.

Criterion 5: Institutional Commitment to Environmental Sustainability

- Evidence of a campus commitment to environmental sustainability through a whole school approach that will survive changes in faculty, staff, or administration and complement the university or college priorities.

Indicators:

- a. Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.
- b. Campus environmental committee made up of all campus stakeholders.

- c. Campus commitment to environmental sustainability (i.e., recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape management, etc).
- d. Institutional general education requirement in areas relevant to environmental sustainability issues (Environmental or Natural Resource Conservation).
- e. Campus Office of Sustainability or Campus Sustainability Coordinator.
- f. Institutional membership in organization focused on sustainability in higher education.

3.4 Framework Test Results

With five criteria and thirty associated indicators for the evaluation framework and three different types of institutions used to test the framework, results from testing the framework for evaluation will be presented in the following order: the land grant universities, the public regional universities, and the private colleges, followed by the comparative results of the different institution types.

Nine programs with a focus on environmental sustainability were used to test the applicability of the developed framework of criteria and indicators for successful programs in higher education. These programs represented each of the following institutional categories: land grant (coded A1, A2, and A3), public regional (B1, B2, and B3) and private (C1, C2, and C3), of varying size and geographic settings. The programs investigated fell under departments or colleges that were a combination of agriculture and natural resources, forestry and agriculture, and natural resources and science. And although the project focused on just one program at these institutions, the investigation revealed that there are a variety of additional programs focusing on environmental sustainability at these institutions. These additional programs and their associated concentrations ranged from forest conservation, resource conservation, sustainable livelihoods, sustainability and environmental studies, environmental management, agro-ecology, and agro-forestry, just to name a few.

Table 3-10 contains an abbreviated summary of the setting for each institution used to test the framework. A more detailed table can be seen in the appendices (Appendix H).

Table 3.10: Abbreviated Institutional Summaries

Code	Institutional Category	Year Founded	Role	2007-2008 Enrollment	Student to Faculty Ratio	Average Class Size	Community Population	Evaluation Program
A1	Research & Land Grant	1940	Doctorate Granting Public Liberal Arts & Sciences	3,457 total 3,276 UG ^a	16 to 1	22 students	45,000 residents	Agroecology & Environmental Quality
A2	Research & Land Grant	1893	Doctorate Granting Public Institution	17,585 total 14,270 UG	14 to 1	29 students	13,000 residents	Forest Resource Management
A3	Research & Land Grant	1922	Doctorate Granting Public Institution	9,687 total 8,621 UG	10 to 1	14 students	32,000 residents	Natural Resources Management
B1	Public Regional	1866	Master's College and Univ. Public unit of state system	~7,000 total 6,930 UG	16 to 1	23 students	25,000 residents	Reclamation, Environment & Conservation
B2	Public Regional	1913	Master's College and Univ. Public unit of state system	7,550 total 6,760 UG	19 to 1	24 students	16,650 residents	Environment & Natural Resource Sciences
B3	Public Regional	1893	Doctorate Granting Public unit of state system	13,961 total 11,841 UG	20:01	20 students	60,000 residents	Environmental Studies
C1	Private	1834	Master's College and Univ. granting	820 total	14 to 1	15 students	3,600 residents	Natural Resource Management
C2	Private	1855	Baccalaureate College	1,514 total	10 to 1	16 students	10,000 residents	Agriculture & Natural Resources
C3	Private	1966	Doctorate Granting	750 total	10 to 1	12 students	34,000	Environmental Studies

^a UG: Undergraduate Student Population, full and part time

To the extent possible, publicly available data were used in testing the framework of criteria and indicators, as described in methods section 2.2. Data for the indicators ranged from full current information to partial information and in some cases no information currently available. Additionally, data included anecdotal information. Two tables, one full (Appendix I) and one abbreviated for side by side comparison of institutions within categories (Appendix J), containing the data collected for testing the framework can be found in the appendices. A rating matrix of the data (Table 3-11) was constructed for evaluation and presentation of the test results. In order that all information gathered for each program was measured on a common scale, I developed a template for the standards of measurement to be used, presented in Appendix K.

Table 3.11: Framework Data Matrix

Ratings: (4) Fully meets, (3) Mostly meets, (2) Partially meets,
(1) Does not meet, (0) Not known or unclear

Criterion 1: Maintenance and Enhancement of Academic Program										
Indicator	A1	A2	A3	B1	B2	B3	C1	C2	C3	ave:
Program Goal-a	3	4	3	4	3	3	3	3	4	3.3
Program Goal-b	4	4	4	4	4	4	4	4	4	4.0
Program Review-a	3	4	4	4	2	3	3	4	3	3.3
Program Review-b	1	4	1	4	4	4	0	1	4	2.9
Program Review-c	2	2	2	2	4	2	0	4	2	2.5
Outcomes Assess-a	1	1	1	4	1	1	0	4	4	2.1
Outcomes Assess-b	2	2	1	2	1	2	0	3	2	1.9
Outcomes Assess-c	2	4	1	4	1	1	3	4	2	2.4
Outcomes Asses-d	2	3	2	2	1	1	0	4	2	2.1
Visibility-a	2	3	2	2	4	3	4	3	3	2.9
Visibility-b	3	3	4	3	4	2	4	2	3	3.1
<i>totals:</i>	25	34	25	35	29	26	21	36	33	
Criterion 2: Curriculum appropriate to the goals of environmental sustainability										
Indicator	A1	A2	A3	B1	B2	B3	C1	C2	C3	ave:
Env Sust Coursewk	2	3	2	2	3	2	2	2	2	2.2
Interdisciplinarity	2	3	4	3	4	4	4	3	4	3.4
Curricula Emph	3	4	4	4	4	4	3	4	4	3.8
Learn Appli. Knowl.	4	4	4	2	3	4	4	4	4	3.7
Undergrad Rsch	4	3	1	3	3	2	4	4	3	3.0
Int/Multi Structures	4	4	4	3	4	4	2	2	4	3.4
<i>totals:</i>	19	21	19	17	21	20	19	19	21	
Criterion 3: Activities and experiential hands-on learning opportunities										
Indicator	A1	A2	A3	B1	B2	B3	C1	C2	C3	ave:
Social Responsibility	3	3	3	3	4	3	3	3	2	3.0
Work Experience	4	3	3	4	3	3	3	4	3	3.3
Learning via Action	4	4	4	4	4	4	4	4	4	4.0
Physical Resources	4	3	3	4	4	4	4	4	4	3.8
<i>totals:</i>	15	13	13	15	15	14	14	15	13	

Table 3.11: (continued)

Criterion 4: Community Engagement										
Indicator	A1	A2	A3	B1	B2	B3	C1	C2	C3	ave:
Community Partnerships	4	4	4	4	4	3	4	4	2	3.7
Government Partners	4	4	4	0	4	3	0	0	2	3.5
Collaborations	3	4	4	4	4	0	4	0	3	3.7
<i>totals:</i>	<i>11</i>	<i>12</i>	<i>12</i>	<i>8</i>	<i>12</i>	<i>6</i>	<i>8</i>	<i>4</i>	<i>7</i>	
Criterion 5: Institutional Commitment to Environmental Sustainability										
Indicator	A1	A2	A3	B1	B2	B3	C1	C2	C3	ave:
Institute Statement	4	4	2	3	4	3	4	4	3	3.4
Campus Env Comt	2	4	2	2	4	4	4	4	4	3.3
Environ. Sustain.	2	4	2	2	4	2	3	4	3	2.9
Gen Ed Requirement	2	2	2	2	2	2	3	1	2	2.0
Sustainability Office	1	1	1	1	1	1	1	4	1	1.3
National level Org. Part.	4	4	4	1	4	4	4	4	4	3.7
<i>totals:</i>	<i>15</i>	<i>19</i>	<i>13</i>	<i>11</i>	<i>19</i>	<i>16</i>	<i>19</i>	<i>21</i>	<i>17</i>	
Total Score:	85	99	82	86	96	82	81	95	91	

Land Grant Institutions

Criterion 1: Maintenance and Enhancement of Academic Program

The land grant institution programs each have a defined statement on how they are achieving their goal through balanced interdisciplinary approaches and active engagement learning opportunities. Common elements among programs were that administration and internal bodies are included in periodic reviews and that, although program stakeholders are identified, they are not included in reviewing the data from evaluations or assessments. The program at A2 does include student focus groups or surveys for internally performed evaluations or assessments. However, none of the programs indicated that student evaluations are asking how well students feel they achieved the learning goals for their program.

Some programs are more involved in student placement than others. Program A3 claimed not to be assisting in student placement, while A2 claims excellent job placement, and A1 appears to be involved through some of its partnership activities.

Freshman programs and high school recruiting activities were the most common forms of program visibility. Program A2 includes a summer program for attracting students while A3 includes direct mailing. Each program is participating in or holding a variety of seminars that aid in highlighting their program.

Criterion 2: Curriculum Appropriate to the Goals of Environmental Sustainability

Each of the land grant institutions is including economics, and covering socio-scientific and policy issues in the core of its curriculum, though some represent supplemental options rather than a requirement. Program A2 requires an Environmental Law & Policy course, Natural Resource Economics, and technical writing course. A3 has the most declared balance of science and social science, evident in the following statement: "...the program concentrates on the management of the multiple resources that occur in natural systems and encourages creativity through a balanced interdisciplinary education that emphasizes the natural and social sciences."

An emphasis on participation in research at the undergraduate level stands out at A1 and A2, while at A3 a greater focus is at the graduate level. At A1 students are matched with faculty mentors and given the opportunity to conduct research during the summer sessions. Each of the programs reviewed also requires a senior seminar or thesis course where students are provided with the opportunity to develop a research report based on the knowledge acquired through their coursework and experiences to demonstrate their problem solving, analysis, and communication skills.

Additionally each of these institutions contains interdisciplinary or multidisciplinary structures for research, education, and policy development on agricultural, environmental, or sustainability issues, such as their experimental farms, forests, research and extension centers and their field research sites.

Criterion 3: Activities and Experiential Hands-on Learning Opportunities

With regard to experiential hands-on learning activities associated with program curricula, opportunities such as internships, service learning, and work study are available at all of the institutions, with internship opportunities or requirements standing out at the program level. A2 encourages its faculty to engage their classes through service learning and was recently recognized for its work in community service. Additionally the A2 program offers a summer in the field course credit opportunity to develop hands-on skills through practical experience. The program at A3 includes an orientation to the field course that provides an overview of career opportunities and discussions with research faculty and upper class students involved in various aspects of resource management issues. A3 also offers, but does not require, a practicum option that consists of a supervised individual study on a farm, in a greenhouse, managed forest, agency or business, or other approved location.

Each institution includes a number of opportunities for student participation in national professional organizations and university clubs with a natural resource foundation. At A1 the University Student Association is currently working with the administration on initiatives to promote a sustainable campus.

The program at institution A1 stands out for its available physical resources dedicated to the program. While A2 and A3 each utilize an experimental forest and A3 does include a farm resource, A1's physical resources include their designated building facilities with a computer laboratory dedicated to the program, a 110 acre university farm for forestry, vegetable production, sustainable agriculture, livestock production, beekeeping, and aquaculture. Additionally, each of these programs places an emphasis on the use of the surrounding natural environment for teaching and learning activities.

Criterion 4: Community Engagement

Community engagement partnerships for each program included several USDA agencies, state and local governments. Program A1 includes field trips and work with the local community on agricultural and forestry enterprises and local botanical and garden clubs, partnerships with the National Science Foundation, National Park Service, and EPCOT Science. A2 partners with Keep America Beautiful, and the state commission on national and community service, while A3 provides surplus harvest from its agricultural research to local food banks.

Criterion 5: Institutional Commitment to Environmental Sustainability

Evidence of a whole campus approach or institutional commitment to environmental sustainability is strongest at A2, where the "green" campus campaign is promoting the University's commitment to the environment and sustainability. There are also a number of examples of this commitment in the form of campus recycling, environmentally responsible purchasing, a focus on sustainable food sources, and water and landscape management activities. Several activities at A3 are in progress and a recent

proposal was made to establish a Sustainable Campus subcommittee. At A1 a sustainable campus is being promoted by the student association which in 2007 began working with administrators to start addressing items such as recycling and green building efforts.

None of the three land grant institutions investigated currently requires a course on the environment or natural resource conservation as part of the general education curriculum. However there are options to take courses such as Environmental Science, Environmental Ethics, or Humans, Earth and Environment to fulfill natural science or humanities areas requirements.

Summary

Based on the information collected for the developed draft framework of criteria and indicators for successful higher education programs focused on environmental sustainability, the program at A2 is currently meeting or fulfilling more of the indicators determined to lead to successful education programs. In particular it stands out in the areas of program review, visibility, curriculum requirements, and institutional commitment. Some strong points at institution A1 are the emphasis on hands-on learning and the availability of physical resources. Although institutional evidence of commitment to environmental sustainability is currently lower than at the others, the fact that it is being lead by the students is a positive reflection of providing value to their learning experience by their involvement in the decision making process. These students are keeping ecological issues at the forefront of their campus as they work with faculty and staff to promote sustainability. Additionally, A3 stands out in community engagement because of its research focus on community development, education and outreach, multiple resource management, policy and law in local, regional, national and global areas.

Public Regional Institutions

Criterion 1: Maintenance and Enhancement of Academic Program

Of the public regional institutions investigated, each program emphasizes a commitment to problem solving through interdisciplinary studies that include the natural and social sciences through a combination of classroom and experiential learning and training situations. Again it was found that although program stakeholders are identified they are not included in reviewing the data from evaluations or assessments. All programs include student focus groups or surveys for internally performed evaluations or assessments. B1 reported that student evaluations are asking how well students feel they achieved the learning goals for their program.

Program B1 claims one hundred percent job placement for its students and also conducts and maintains follow up surveys of its alumni. Additionally the B1 program's website provides information on current alumni chapter activities for fellow alumni, current students, and the general public.

A larger number of avenues for program activities, promotion and visibility are evident for the program at B2, which includes community college recruiting, a summer science program for kids, and several special initiatives within the college. High School recruiting and seminars were the most common among programs, and B3's program additionally maintains a Community Conservation calendar listing many activities throughout the academic year.

Criterion 2: Curriculum Appropriate to the Goals of Environmental Sustainability

The core curriculum for B2's program includes policy, economics, socio-environmental issues, and a nature writing course. The program places emphasis on "a multidisciplinary approach to understanding the interactions between the biological and physical world, human institutions, and human behavior." B1 and B3 both offer courses relevant to policy or regulation. B3 also offers Sustainable Economic Development

though it is not required and B1 requires coursework in Ecological Methods of Research and Technical Writing.

Each program offers opportunities for undergraduate participation in research. At institution B1 an independent study requirement exists for majors while, at B2 and B3 senior capstone projects are included in the curriculum. The programs at B1 and B2 require internship credits, while at B3 many nonprofit groups actively recruit interns through the University's Center for Work Based Learning.

Criterion 3: Activities and Experiential Hands-on Learning Opportunities

Several experiential hands-on learning opportunities are available at the regional programs investigated. B1 offers a Cooperative Field Experience Option, B2 places an emphasis on integration of classroom instruction with hands-on field experience in the natural environment, and B3's program offers a Field Studies course which can be repeated for different experiences. Additionally the program at B3 encourages its students to connect with the rest of the world through relevant study abroad and exchange programs.

All of the programs have a variety of national and campus led student leadership clubs. The student club associated with the program at B2 stands out with the following mission statement: "...to promote social opportunities and service projects, for both club members as well as our community, in order to develop personal, professional, and environmental enrichment."

Physical resources for the program at B1 range from a designated hall with available study areas, a small library, computer and science labs, and access to the university's 430 acre farm and a new greenhouse. Program B2 contains a center for low and no impact living, marine lab and sea research vessel, greenhouse, tree farm, and natural history museum. B2 enhances its learning experience through access to the natural laboratory of the university setting with its nearby parks, forests, nature preserves,

and wildlife sanctuaries. B3's program has a dedicated environmental science laboratory, farm, and community gardens.

Criterion 4: Community Engagement

Within community engagement, B1 is providing research programs that are utilizing its partnerships with community businesses, other universities and various levels of government agencies. Along with the University extension system B1 has initiated a "Community University Partnership" program that combines the resources of the university and the extension system to better serve the local communities. Students at B2 work with local community forest group and other non-profit groups on environmental and resource issues. The program at B3 emphasizes its involvement with the broader community through a focus on community based action research.

Criterion 5: Institutional Commitment to Environmental Sustainability

Sustainability as a social and environmental issue stands out at each campus. The Board of Regents Fall 2007 Agenda at B1 addressed these issues, institution B2 is participating in the state wide Green Campus program, and B3 has formed a Sustainable Campus Committee of stakeholders from across the campus community. Evidence of an institutional commitment to environmental sustainability is led by institution B2's demonstrating social and environmental responsibility through its own actions. These actions include Leadership in Energy and Environmental Design (LEED) certifications, environmentally responsible purchasing, renewable energy use, sustainable food options, and water and landscape management efforts. Each campus contains a recycling program, B1 has some LEED projects in progress, B2 is currently placing emphasis on renewable energy use, and B3 has a focus on local food.

Again none of the programs investigated in the public regional institution category have a general education requirement in environmental or natural resource conservation issues. However, a variety of relevant courses are available to fulfill natural

science and human society areas, including Natural Resource Conservation or Critical Thinking and Environmental and Social Responsibility at institution B2 and Environmental Studies as an option under several of the general education perspectives at institution B3.

Summary

The program at institution B2 is currently meeting or fulfilling a greater number of criteria indicators for program success than B1 and B3. This program showed particular strength in the areas of program review, activities and visibility, available physical resources, student leadership, and institutional commitment. B1 demonstrated strength in its student placement efforts, maintaining contact with alumni, and the partnerships the program utilizes to better serve the students and their communities.

Private Institutions

Criterion 1: Maintenance and Enhancement of Academic Program

Program goals for the private institutions investigated are somewhat more diverse in nature than for the previous categories, with a focus on the different challenges students will be faced with in their careers. All of these programs are meeting their goals in a similar fashion through involvement in experiential hands-on activities and an emphasis on teamwork to provide their students with the ability to apply their knowledge to real world situations.

All of the programs perform periodic internal reviews; however none of the programs claimed to be using student focus groups or surveys in their assessment measures, although C2 stands out because it is asking students about their achievement of the learning goals. The program at C1 is relatively new, having been established in 2005, and information regarding program review and outcomes assessment was reported as unknown. However, C1 recently added a required freshman level introductory course that would set the stage for the program curriculum and major in order to offer students a

more defining freshman experience. C2 most recently performed its own internal self study and an external review one year ago and reported making changes accordingly, though those changes were not specified.

Program activities towards visibility and promotion are more prominent at C1 which is utilizing freshman programs, high school recruiting, direct mail, a monthly newsletter, and a college wide majors fair offered every fall for current students.

Criterion 2: Curriculum Appropriate to the Goals of Environmental Sustainability

The curriculums within these programs place an emphasis on self-designed or directed study which allows for greater flexibility for the student to pursue interests across disciplinary lines. The curriculum at institution C3 is offering opportunities for policy, economics, socio-environmental issues, and writing relevant to the field within its program. The program at C2 offers coursework in economics, Introduction to Global Agriculture, and a Scientific Knowledge and Inquiry course as part of the core curriculum. The C2 program also emphasizes that it retains a strong natural resource foundation with a significant number of social-science electives allowing students the flexibility to emphasize specific areas of sustainability. At C1 students are provided with the option to participate in an interdisciplinary block course that allows students to spend an entire semester working with professors from multiple disciplines on a single area of focus, often through field research and other activities. Participation in research is encouraged by each of these programs, and a senior capstone project is included in their curricula.

Criterion 3: Activities and Experiential Hands-on Learning Opportunities

Experiential learning is central to each of these academic programs. Practical work experience is gained through course credit or volunteer opportunities on the programs' educational farm units. Students are encouraged to gain hands-on experience

through internships and service learning opportunities. Institution C1 requires up to 12 credits of internship activities, and the program itself actively encourages study abroad.

Physical resources specific to the private institution programs are present in the form of farms, gardens, and greenhouses primarily operated by the individual programs. Availability of physical resources for individual programs stands out at C2 with over 7,000 acres of forest and 1,200 acres of land for instruction in agriculture and natural resources. Both C1 and C3 have farm and garden units.

Criterion 4: Community Engagement

Local community partnerships stood out for these programs. Students in the program at institution C2 participate in traditional community service, stewardship of natural resources, and preservation of regional culture and traditions. The program at C1 holds an annual series of talks and open discussions that includes many experts from within the local community. And the program at C3 places an emphasis on its contribution to the local Community Supported Agriculture program. Several opportunities exist for students to get involved with student clubs or organizations, including a Slow Foods Chapter at C1 and the Student Environmental Network at C3.

Criterion 5: Institutional Commitment to Environmental Sustainability

Each of the private institutions investigated is demonstrating a strong commitment to environmental responsibility through its teaching and numerous campus wide practices. These institutions are also members of the Association for Advancement of Sustainability in Higher Education and are signatories to the American College and University Presidents' Climate Commitment. Each program demonstrates its own additional commitment through different approaches. At C1 the institution environmental mission includes an environmental emphasis throughout the general education program that helps students understand the environment and what might be required to create a sustainable future. At C2 an experiment in sustainable living program is part of campus

renovation and construction based on ecological design that offers opportunities for students to participate in the development of a sustainable campus. At C3 students may participate in the sustainable community development program which provides them with the opportunity to explore ways to offer service to both human and natural communities.

Summary

Although the program at C1 is barely three years old, it has mostly or partially fulfilled a number of indicators. Program C2 is fully meeting outcomes assessment, experiential learning indicators, and institutional commitment. Indicators related to program curriculum were led by program C3 where students are engaging in a diverse curriculum designed to pursue personal interests and the opportunity to participate in environmental and sustainability related research.

Comparison Summary

Criterion 1: Maintenance and Enhancement of Academic Program

Results based on the sample of institutions used to test the developed framework of criteria and indicators for success should not be generalized to all institutions within the categories. The regional programs show strength in evidence for a comprehensive approach to continued improvement through program evaluation and assessment due to the use of student focus groups when performing internal evaluations or assessments. The land grant institutions appear to be maintaining closer communications with alumni as well as assisting students with job placement.

Outcomes assessment scores were low among all programs investigated. A majority of programs reported that they are not asking students how well they have achieved learning goals. Alumni contact was mostly informal and often a source of fundraising and while several programs do provide some assistance in student job placement they are not tracking career development on a formal basis.

Criterion 2: Curriculum Appropriate to the Goals of Environmental Sustainability

Broad and balanced teaching strategies for core curriculums were varied; the research and land grant programs all include an economics requirement, while the public regional programs all required a policy course. The land grant and regional programs investigated do offer a number of options to fulfill additional areas of focus from the framework. As previously mentioned, the curriculums for the private programs place an emphasis on self-direction; although coursework related to environmental policy, economics, or socio-scientific issues may not be required, it is suggested and available.

In their efforts to raise awareness of environmental and natural resource issues each program includes literacy in regards to sustainability and a sense of place and contribution to the local community as part of their teaching strategies. Additionally, all of the programs require a senior capstone course, senior practicum or senior project options that provide the opportunity for students to demonstrate quality of learning and application of knowledge. The research and land grant programs appear to have greater opportunities for research although it is encouraged within the other institutional categories as well.

Criterion 3: Activities and Experiential Hands-on Learning Opportunities

Learning and cultural awareness activities and experiences are provided through various avenues. The research and land grant institutions are promoting service learning and offer a number of internship opportunities. The public regional and private programs more often require internships as part of the curriculum and the private program institutions themselves are placing a greater emphasis on experiential “hands-on” learning across their campuses.

Every campus contains opportunities for participation in student leadership groups or organizations, and among those investigated one program within each category had a student group that was working with institutional administration on campus sustainability issues.

Physical resources such as farms, forests or gardens were consistent for all of the programs. The research and land grant programs have access to institutional farms, forests and experimental stations and are emphasizing use of the surrounding natural environment to enhance learning activities. Public regional programs contained farm units and placed a greater emphasis on building and laboratory facilities designated to their programs. Private programs also have access to program or college run farms and gardens.

Criterion 4: Community Engagement

There is evidence for stakeholder partnerships beyond the university and community involvement within each program. Research and land grant programs are working more often with various levels of government agencies while private programs tended to focus on their local or regional communities. The land grant programs provided more information regarding their inter-institutional or international collaborations.

Criterion 5: Institutional Commitment to Environmental Sustainability

The private programs investigated had the strongest evidence of campus commitment to environmental sustainability through a whole school approach that also complements the institutional priorities. The remaining program efforts were varied; however each institution has made a statement on working towards becoming examples of environmental responsibility and action with various individual efforts in place, in progress, or being led by students.

One institution (C1) is providing an across-the-board emphasis on the environment as part of the general education curriculum, while most of the remaining institutions provided environmental or natural science options within their general education requirements. A campus office of sustainability or campus sustainability coordinator was only evident at one institution (C2). And evidence of taking on

sustainability efforts in partnership with national level organizations was evident at all but one institution (B1).

No one program investigated, using the developed framework of criteria and indicators for success of programs focused on environmental sustainability, stands out above the others investigated. All programs are using a variety of strategies towards success. Programs B2 and C2 did fulfill more indicators for three of the five criteria. Program C2 is best meeting indicators for maintenance and enhancement of the academic program, activities and experiential learning opportunities, and institutional commitment to environmental sustainability. Program B2 is best meeting indicators that address a curriculum appropriate to the goals of environmental sustainability, activities and experiential hands-on learning opportunities, and community engagement.

Chapter 4: Discussion

The purpose of this study was to develop a framework of criteria and indicators for evaluating programs in higher education focused on environmental sustainability. The first objective to develop the framework for evaluation was met through a participatory process involving academic program stakeholders. The second objective, to test the applicability of the framework for evaluation, investigated a diversity of academic programs through nine case studies of land grant, regional, and private colleges and universities across the U.S. (Appendix H). These tests identified those strategies that are currently in place to meet the developed framework criteria and indicators (Appendix I and Appendix J) at the individual programs. This discussion will address the specific findings of the research project.

The research project questionnaire used to gather participatory interest confirmed that academic program educators are open to development of a standard framework of evaluation for academic programs focused on environmental sustainability. The academic program stakeholders contacted at this stage were primarily faculty and department heads. The questionnaire participants were informed of the study's purpose, as a component of a dissertation research project in the Department of Forestry and Environmental Resources at North Carolina State University (Appendix A). They were also informed of the goals to identify and communicate the criteria for successful programs promoting environmental sustainability. Once the concept of using criteria and indicators as an appropriate framework for evaluating the success of academic programs focused on environmental sustainability was agreed to, the research project then focused on identifying criteria and determining the basic set of indicators to fulfill the criteria.

The Framework of Criteria and Indicators

The resulting framework (section 3.3) is primarily composed of strategic indicators for academic program success. Strategic indicators focus on the approaches or strategies that academic programs and institutions are using to meet the developed individual criterion within the framework. These indicators are helpful in improving quality of operations, identifying processes or areas that are weak, defining opportunities for improvement, setting priorities, and allocating resources (von Loon et al., 2005).

Criterion One (Maintenance and Enhancement of Academic Program) contains indicators that are considered recommendations to be able to support claims of success through program review and outcomes assessment. Review and assessment should be practiced on a regular basis to look for areas of weakness, strength, or in need of change (von Loon et al., 2005 and Shriberg, 2004). Establishing a meaningful program in higher education is a long term process that needs monitoring or evaluating before moving to the next stage and will therefore lead to a greater chance of success (Sterling, 2001).

Institutional support is also essential to a faculty commitment to evaluation (Jenks-Jay, 2004). Faculty responses to the survey expressed a need to feel that their college president, provost, and academic deans wholeheartedly endorse and support a practice of evaluation or assessment. Additionally, students and other education stakeholders need to be involved in the decision making process. Students should have the opportunity to participate effectively in the process. Institutions where students feel valued and listened to have reported an improved ethos which is believed to enhance the learning experience (Uturn, 2007; Jenks-Jay, 2004).

The majority of survey respondents, 94.7 percent, supported the need to address student perception of their achievement of learning goals in their coursework or academic

program (Table 3-9). The degree of satisfaction students have with their education and students' awareness of the outcomes are indicators of success for an academic program. If students do not receive what they feel to be a worthwhile educational investment (Madewell et al., 2003) then these academic programs may lose students to other programs.

Survey responses also supported the importance of asking alumni about perceptions of learning (89.5 percent, Table 3-9) and agreed (82.8 percent) that it is important to keep track of alumni through regular surveys and to maintain a database of alumni contacts (86.4 percent). Maintaining alumni relations is an additional part of the evaluation process. Alumni surveys help to support a need for change in programs where there may be a certain level of knowledge, or skill set that needs to be strengthened. The discovery of something missing can result in a change to curriculum or activities that will better prepare future graduates (Taylor et al., 1993).

This developed framework of criteria and indicators will aid in formulating a picture of progress and success and provide a means by which information can be presented to stakeholders and the general public in a simplified and highly visible form.

Results of Framework Tests

Results of the framework tests (Table 3-11) demonstrate that the academic programs and their institutions are meeting many of the indicators for the developed criteria through various strategies that will ensure program success. The most consistent data are found in criterion 3, Activities and Experiential Hands-on Learning Opportunities. The importance of an experiential component presents a learning landscape that can provide direction for students on knowledge of the environment and the skills necessary to handle change, and link theory to real life situations (Lieblin et

al., 2004; Shute and Michaels, 2000; and Sitarz, 1998). Information to support the indicators for criterion 3 was directly available from academic program websites, department chairs, and course catalogs.

Results of the research project support my belief that academic programs addressing environmental sustainability will have the greatest impact on students by integrating experiential learning and outreach activities with traditional classroom teaching strategies. Figure 4-1 illustrates how these three important components work together in a successful program. Survey responses indicated that student learning opportunities such as experiential hands-on learning units, community service, internships, and work experience are important to the overall learning experience (Table 3-8). Individual comments stressed the interrelatedness of all the categories and that the actual usage of classroom material through experiential learning and community engagement helps to clarify the lesson as well as to make it more interesting. Students are able to build their confidence through application of course concepts by participation in management practices and conducting research in a supportive setting.

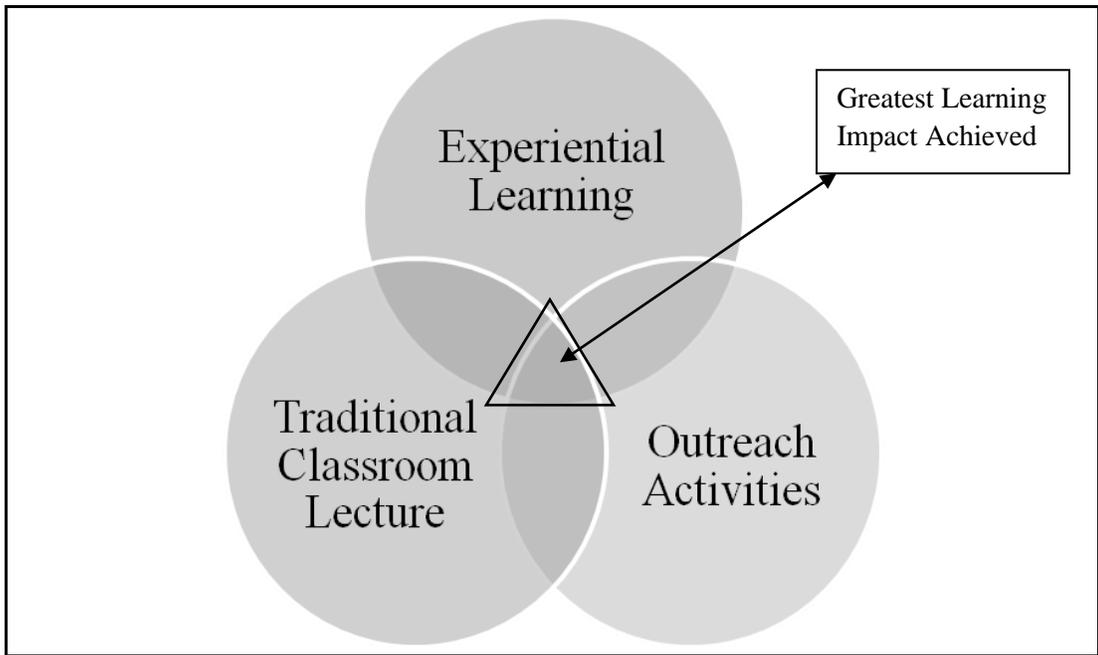


Figure 4-1. Components of Successful Learning

In general, criterion 2, the academic program curriculum, test programs provided the most information to support (1) that students are provided with opportunities to demonstrate quality of learning and application of knowledge through a senior capstone course, senior practicum or senior project, (2) undergraduate participation in research is encouraged, and (3) evidence of interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues. The deficiencies in criteria 1 and 4 tended toward a lack of identifiable strategies for meeting indicators or not enough information to support the indicators.

Academic Program Test Results: Strengths

Four areas of strength were apparent among the academic programs used to test the developed framework from this research project, regardless of institutional category. Strength of indicators was determined by the lowest average score from the results of the matrix of framework data (Table 3-11).

(1) Student learning through action

At colleges and universities across the U.S. students are finding, and founding, opportunities to make sustainability part of a well rounded education. Given the green light, students today are keeping ecological issues at the forefront of their campuses as they work cooperatively with faculty and staff to promote sustainability (Motley, 2007). Students can be effective trainers and are particularly effective in reaching their peers. Students that take charge of initiatives associated with environmental problems and social issues are then able to develop a sense of power and control over their own livelihoods (Dreyfus and Wals, 2000; Creighton, 1998). Survey responses supported and emphasized the influence of peer to peer educational methods and opportunities for students to

mentor each other. Student led groups or organizations (Table 3-8) were considered by all survey respondents to be important at some level to student learning opportunities for a successful academic program. Respondents also indicated that academic program promotion is positively influenced by the presence of student run societies. Each of the academic programs investigated had a student run organization directly associated with the academic program or directly addressing the issues of environmental sustainability on their campus and in their communities. The growth of student led sustainability and one-on-one education provided by student groups will help to build successful and long lasting academic programs. By allowing for and supporting student led initiatives and outreach activities we are providing students with the opportunities to learn through their own actions.

(2) Physical resources to support hands-on learning

The ability to see both the theoretical basis of classroom lessons and actual usage of the lesson helps to clarify the classroom material as well as make it more interesting (NCSU FCTL, 2001). Pike et al. (2003) state that the way in which learning occurs is as important as the content, and Townsend (2005) found that students felt much of what they learned was outside of the classroom. Survey results support the importance of onsite learning units in the form of farms, forests, and research stations (Table 3-8). Individual survey responses provided additional emphasis for hands-on learning opportunities as crucial to the understanding of environmental sustainability, and that concrete working demonstrations provide for greater awareness and understanding. All of the academic programs investigated had an onsite or readily accessible farm, greenhouse, or forest resource to support student application of classroom learning. Several programs placed additional focus on the use of the surrounding natural and cultural environment as

learning laboratories for teaching, research, and service activities. The results of the research project and the findings in regards to availability of physical resources to support hands on learning activities support my belief that access to quality facilities for learning activities, such as a farm, forest, or garden units maintained by the academic program is a very important element of success to outstanding programs in environmental sustainability education.

(3) Opportunities for partnerships with local community

Local partnerships with relevant, responsive outreach help to create a positive organizational response to the changing environment and policies associated with environmental issues (Pence and Grieshop, 2001). Partnerships among universities, individuals and organizations beyond the university are necessary for a more sustainable society. It is the increased interaction between the university community and other organizations and individuals concerned with environmental sustainability at local, regional, and global scales that will promote a worldwide effort towards a sustainable future. Students and faculty need to relate to real situations by opening up to the community and providing expertise, resources, and a real context for learning, along with the mutual understanding and good will that result from these relationships (Ekarius, 2007; Ahnström et al., 2005; Wright, 2004; Ehrhart, 2001; Sterling, 2001). As a result of these partnerships, students will gain confidence and believe they can make a difference, and their efforts will stimulate action by their family and communities (Motley, 2007).

Additionally, Jenks-Jay (2004) points out that Calder and Clugston state in “Stumbling Towards Sustainability”, nearly all major reports and declarations for sustainability stress higher education outreach and partnerships. Survey responses support (Table 3-8) that community partnerships and research and collaborations with local

landowners to address issues of environmental sustainability are important to the success of academic programs focusing on these issues. Each of the academic programs was participating in various areas of research, education, and demonstration with its local community. These community partnerships were established through a variety of avenues and ranged from more general declarations to specific activities:

(a) ... research, education, and outreach programs reflect the interest of the diverse clientele of the community;

(b) ... professional engagement with external partners in agriculture, science, business, industry, education, government, civic organizations, and other areas;

(c) ... annual series of talks and open discussions that include farmers and agriculture experts from the community, and scholars from the College and other educational, government and non-profit organizations throughout the state and the country;

(d) Students participate in traditional community service, stewardship of natural resources, and preservation of regional culture and traditions.

The literature and project results support the concept that a commitment to involvement with the broader community is an important component to successful education programs. Any non-formal education settings outside of the formal classroom setting provide important opportunities to complement and build on classroom learning.

(4) Membership in national organization focused on sustainability in higher education

All but one of the academic program institutions are members of the Association for the Advancement of Sustainability in Higher Education (AASHE). The mission of

AASHE is to promote sustainability through education, communication, research and professional development. Five of these institutions are also signatories to AASHE's American College and University Presidents' Climate Commitment initiative. Survey responses supported the idea that institutional participation in this initiative has an influence on academic programs focused on environmental sustainability (Table 3-6).

I found, through conversations with both undergraduate and graduate students, that evidence of a campus commitment to the environment and sustainability serves as an attraction to having chosen an institution for study. Student success in bringing about positive change in their own communities hinges on having learned about appropriate avenues for change during their time on campus. Institutions making commitments to national or international level initiatives and giving environmental sustainability a priority position on campus provide additional success for academic programs by having that avenue readily available to the student (Townsend, 2005). Programs working, aiding, and encouraging such activities on their campuses strengthen collaboration and commitment by the entire administrative and student body. Chancellor Peterson of the University of Colorado at Boulder recently expressed his support for the unifying influence universities can have by joining together to address climate change and other social, economic, political, and environmental challenges of our society (solutionsforourfuture.org, 5 June 2008).

Academic Program Test Results: Weaknesses

Four areas of weakness were also apparent among the academic programs used to test the developed framework from this research project, regardless of institutional category. Weakness was determined by (1) a lower average score from the results of the

matrix of framework data and (2) a lack of available information regarding indicators (Table 3-11).

(1) Outcomes assessment

The literature argues that a factor of success for education programs will be the ability to adapt and change in order to reflect and address society, industry and environmental concerns (Allen, 2004; Hernon and Dugan, 2004; Walker et al., 2004; Walvoord, 2004; Madewell et al., 2003; Miller et al., 1998). In order to determine where adaptation or change is necessary, outcomes assessment enables academic programs to determine the extent to which they are able to demonstrate success of the program. The results of assessments and evaluations are valuable in gauging department strengths, allowing for better communication and appeal to prospective students, providing useful information for policy development, and providing important data for funding programs and potential funders.

I am in agreement with the literature on the value of assessment and evaluation. Many academic programs already perform evaluation informally on an ongoing basis through casual feedback and observation. A concern with performing assessment then becomes a question of whether or not the information is used. The issue of costs associated with performing evaluations or assessment is more likely the problem versus recognition of their value. Costs associated with establishing a formal assessment process include data collection, access to sources of information, the time frame (when is it needed by), and responsibility for analyzing and summarizing the resulting information.

(2) Coursework relevant to the goals of environmental sustainability

The curriculum that deals adequately with the issues of environmental sustainability requires an interdisciplinary focus or collaboration among different academic programs. An interdisciplinary curriculum is closely related to the theme of ecological literacy. In order for ecological literacy to occur an integrated approach to teaching strategies and research is necessary to provide students with the ability to make connections between each subject they study and the environment (Sterling, 2004; Wright, 2004; Roling, 2000; Sitarz, 1998).

All of the survey participants agreed that providing interdisciplinarity and an understanding of socio-scientific issues are important teaching strategies relevant to the goals of environmental sustainability. Additional individual responses supported a need to educate professionals who will know how to balance both the demand for the products provided by nature with the need for a quality environment. This supports the need for students to have an understanding of both political and economic issues associated with the environment. Only one academic program reviewed to test the framework fully met the curriculum criterion indicator in regards to ecological literacy (Table 3-11). The remaining programs were at least partially meeting the indicator with at least one course requirement, supplemental requirements, or other options to take coursework that included policy, economics, writing, or social issues related to the natural environment.

The rating of this indicator is the apparent source of the problem. In order to have been considered fully met programs had to be requiring coursework on each of the topic areas that covered policy or politics, economics, social issues, and an appropriate writing course relevant to the issue of environmental sustainability. The project acknowledges that it can be difficult for academic programs to provide students with everything we

want them to know and some programs are at least providing specific opportunities to address these topic areas. A suggestion for adjusting the indicator for future framework evaluation use may be to change the indicator rating for programs that are providing a wide range of opportunities or change the indicator. An alternative indicator for the curriculum criterion could be the availability of an introductory course that would include each of the topic areas. The findings in regards to this specific indicator for the curriculum criterion suggest that further development and understanding are needed.

(3) Institutional general education requirement relevant to environmental science or natural resources

Bruyere (2008) and Gerstenberger et al. (2004) found that a college level environmental education experience can have a positive impact on environmental awareness and anticipated future behaviors. This issue was also covered in the Spring 2007 issue of *Uturn* magazine which addressed the changes students are making in their lives (as a result of the lessons learned in the classroom) and are carrying with them from the campus to the communities they choose post graduation.

Sixty-three percent of survey respondents (Table 3-6) agreed that an institutional requirement for an Environmental Science or Natural Resources course is important to the success of academic programs focused on environmental sustainability. Individual comments in regards to examples of institutional commitment to sustainability included a need for “environmental science as a CORE university required science course.”

Just one institution used to test the framework is providing an understanding of environmental issues as a dedicated part of the institutional general education requirements. This institution’s general education coursework focuses on combining the

skills and content of its liberal arts requirements with a focus on the environment. The remaining institutions are providing a variety of environmentally related coursework options to fulfill different general education perspective areas. Environmental Science or Humans, Earth, and Environment were options found to fulfill natural science requirements. Environmental Ethics coursework was available to fulfill humanities requirements. A course on Critical Thinking, Environmental, and Social Responsibility was used to fulfill the communications and critical thinking requirements, and Natural Resource Conservation was an option to meet human, social, political, and economic areas of emphasis.

I believe, and conversations with colleagues and results of the survey support, that due to the human inter-relationship with the environment, an environmental science course is as important as a foreign language requirement and more important in higher education than physical education. However, the problems expressed with making this change include the time before it would go into effect and the need to drop some existing requirement. Additionally, it was expressed in these conversations with faculty from various institutions that there is already concern about the amount of institutional credit requirements versus academic program credit requirements. Some institutions are limiting or reducing the total number of credits required for a degree in order to improve graduation rates and the amount of time to reach degree requirements.

(4) Campus sustainability coordinator or officer

Efforts to improve environmental performance will be longer lasting if they are woven into the foundation of university life and complement university priorities. This whole school approach, of building environmental sustainability

awareness into curriculum and policies will go beyond the personal interest of individuals, and will enable an institution's commitment to survive future changes in faculty, staff, or administration (Sterling, 2001; Creighton, 1998).

When survey participants were asked about the relationship of the academic program with an institutional office of campus sustainability, 43.8 percent responded that it is important (Table 3-6), while 37.5 percent responded that they were unable to address the question. This discrepancy suggests that they may not have these positions at their institutions or are simply unaware of the position and the role it plays. Several survey responses to questions regarding examples of university promotion of sustainability and demonstration of commitment expressed a need for these roles on college and university campuses. Several survey respondents were concerned that these positions are more facilities related with a focus on energy efficiency and not the vision of sustainability in academics, research and outreach for university. Results of the framework test found that only one academic program's institution had a campus sustainability coordinator.

These positions may not be currently widespread across U.S. colleges and universities, but during the time between May 8, 2008 and June 12, 2008 twelve institutions advertised for Sustainability Coordinator, Director of Sustainability, Sustainability Specialist, or Sustainability Programs Manager positions. Review of these recent postings (in the weekly *AASHE Bulletin*, with *The Chronicle of Higher Education*, and at *HigherEdJobs.com*) for sustainability positions indicates that yes there is a focus on facilities and operations functions but they also include responsibilities to develop and provide education programs and strategies to enhance sustainability for the campus and local community, encourage and facilitate programs initiated by faculty and students, and to assist in defining goals and long range plans for sustainability.

Issues with Framework Development

According to the literature, stakeholder participation to identify criteria and indicators for success of academic programs is critical because it provides validity and meaning to the developed framework for evaluation (von Loon et al., 2005; Blakeley, 2004). Ahnström et al. (2005) and Ehrhart (2001) expressed the importance of understanding and addressing today's environmental sustainability issues requires that academic programs actively involve and establish partnerships among their education stakeholders and the intended beneficiaries. Engagement of stakeholders who have shared goals provides more information on perspectives of issues and strategies that will prepare students for solving and managing today's environmental problems. The research project identified education program stakeholders as administration, faculty, staff, students, and community representatives.

This study found that achieving stakeholder participation can often be difficult. Based on individual comments, from the questionnaire, the survey, and personal communication through email, the greatest concern for participation was time commitment, reflected in the following statements:

“...willing to help if time commitment is not too great...”

“...interested, but it would depend on the time commitment.”

Identification of students within individual academic programs was limited due to privacy concerns; therefore the project relied on program faculty to encourage student involvement as well as the program's community partners. It is unknown how many surveys were forwarded to students and community partners. Several survey participants did report that they had forwarded the survey as requested. However, only one student participated in the project survey to identify and provide perspectives on criteria and

indicators for academic program success. Through discussions with colleagues at various professional meetings, it was recognized that students often need an incentive to participate. The need for incentives was supported by observance of university and individual instructors offering reward incentives (entry in drawings for cash, IPODS, course extra credit) for students who complete or participate in campus or academic program surveys.

Additionally, no community partners were recorded in the survey. Upon further communication with two respondents who had received the survey from a forwarded email it was found that they were filling more than one stakeholder role. These respondents were also community partners working with education programs in staff or adjunct faculty roles. It is further acknowledged that staff may participate in adjunct faculty roles and that faculty often fill administrative roles.

The project also addressed stakeholder involvement in the program review processes. Two of the academic programs reported that in addition to identifying stakeholders associated with the program these stakeholders are involved in program evaluation or assessment practices. This suggests that although it may be important for stakeholder involvement to identify the criteria and indicators important to the success of the academic program it is not as important to involve them in a regular practice of program review.

Chapter 5: Conclusions

This research project determined a common set of criteria and associated indicators for successful higher education programs focused on the issue of environmental sustainability. As a result a valuable set of guidelines for academic program success was established and the strategies used by different academic programs to achieve success were identified.

This study demonstrates that educational stakeholders are aware of the need for and interested in evaluating the success of academic programs addressing the issue of environmental sustainability. While the literature states that stakeholder involvement in evaluation is critical, the results of this project found that it is often hard to achieve. Getting all stakeholders of an educational program engaged in evaluation is a matter of understanding individual concerns, finding ways to address these concerns, and taking the time to educate the stakeholders about the purpose, methods, and value of the evaluation process.

The results of this study support the opinion that academic programs concentrating on environmental sustainability will have the greatest impact on students by integrating experiential learning and outreach activities with traditional classroom teaching strategies. Additionally, study participants' perceptions support the need for these academic programs to address all three goals of environmental sustainability: environmental health, economic profitability, and social equity.

The following are specific conclusions drawn from this investigation to determine criteria and indicators for evaluation of environmental sustainability focused academic programs in higher education:

1. The developed framework consists of strategic indicators that focus on the approaches that lead to success.
2. Framework tests were successful in determining whether programs are meeting the identified criteria, and tests were able to determine if indicators were fulfilled at the investigated programs.
 - a. The most common areas of strength among the investigated programs were (1) learning through action by student led organizations, (2) availability of physical resources for hands on learning, (3) community partnerships, and (4) institutional membership in national level organizations that are focused on sustainability in higher education.
 - b. Areas of weakness were (1) outcomes assessment practices for supporting claims of success, (2) coursework encompassing the goals of environmental sustainability, (3) lack of a dedicated institutional general education requirement relevant to environmental issues, and (4) lack of sustainability coordinator or office to support institutional commitment to environmental sustainability.
3. As a result of this research project, an initial framework for continued development of an evaluation process has been established. Future research to refine the indicators and measurements of success for the individual criterion is needed.

These conclusions should be of interest to everyone involved in higher education programs concerned with environmental sustainability. Work on identifying indicators

(performance and additional strategic) for the identified criteria would be best performed through a participatory and collaborative process of stakeholders to refine the measurement and definition of indicators, to explore linkages between a national level accrediting body's criteria and indicators, and the implementation of evaluation practices at the program level. The challenge will then be to put program evaluation into practice.

I recommend that continued development of the framework of criteria and indicators be taken on by AASHE and used within their Sustainability Tracking, Assessment and Rating System (STARS) program. The STARS program is a project to develop a voluntary, self-reporting framework for gauging relative progress toward sustainability for colleges and universities. STARS is a collaborative project with volunteer representatives from colleges and universities, higher education associations, related nonprofit organizations, businesses, and government agencies helping to shape the rating system. STARS is currently in its fifth revision which was made available for review in April 2008. The Association for Advancement of Sustainability in Higher Education (AASHE) is currently compiling a list of completed or in-progress theses and dissertations related to Sustainability & Higher Education for their Resource Center. The results of this dissertation project would best contribute to the Education and Research category. The Education and Research category has changed significantly since earlier versions of STARS. In a previous draft, this category was worth significantly fewer points than the other categories. Several reviewers said that educating students and conducting research are the primary functions of higher education and that schools can make the largest contributions to sustainability through these activities (Matson, 2008).

References

- AASHE. (2008), "AASHE: Association for the Advancement of Sustainability in Higher Education", available at: www.aashe.org (accessed 30 July 2008).
- AASHE. (2006), "AASHE Digest 2006: A Review of Campus Sustainability News", available at: www.aashe.org/publications/digest.php (accessed 29 May 2008).
- ACUPCC. (2008), "American College & University Presidents Climate Commitment (ACUPCC)", available at: www.presidentsclimatecommitment.org/ (accessed 30 July 2008).
- Ahnstrom, J., Hockert, J., Bergea, H., Hallgren, L., and Ljung, M. (2005), "Farmers' Perception of Nature Conservation", The 11th International Symposium on Society and Resource Management, Ostersund, Sweden, 18 June.
- Allen, M.J. (2004), *Assessing Academic Programs in Higher Education*, Anker Publishing Company Inc., Bolton, MA.
- ASU. (2008), "Arizona State University (ASU) School of Sustainability", available at: www.schoolofsustainability.asu.edu (accessed 30 July 2008).
- Arreola, R.A. (2000), *Developing a Comprehensive Faculty Evaluation System: A Handbook for College Faculty and Administrators on Designing and Operating a Comprehensive Faculty Evaluation System, Second Edition*, Anker Publishing Company, Inc., Bolton, MA.
- Ary D., Jacobs, L.C., and Razavieh, A. (2002), *Introduction to Research in Education*, Wadsworth Group/ Thomson Learning, Belmont, CA.
- Berea. (2008), "Berea College: Sustainability and Environmental Studies", available at: www.berea.edu/sens/ (accessed 30 July 2008).
- Blakeley, J. (2004), "Is it Green Enough? Evaluating Environmental Education Programmes Effectively", in Azeiteiro, U. (Ed.), *World Trends in Environmental Education*, Peter Lang, New York, NY, pp. 79-90.

- Boulmetis, J. and Dutwin, P. (2000), *The ABCs of Evaluation: Timeless Techniques for Program and Project Managers*, Jossey-Bass, San Francisco, CA.
- Bruyere, B.L. (2008), "The Effect of Environmental Education on the Ecological Literacy of First-Year College Students", *Journal of Natural Resources and Life Sciences Education*, Vol. 37, pp. 20-26.
- CARRS. (2006), "Michigan State University: Department of Community, Agriculture, Recreation, and Resources Studies (CARRS)", available at: www.carrs.msu.edu/Main/ (accessed 30 July 2008).
- Corcoran, P.B. and Wals, A.E.J. (2004), *Higher Education and the Challenge of Sustainability: Problematics, Promises, and Practice*, Kluwer Academic Publishers, Norwell, MA.
- Creighton, S.H. (1998), *Greening the Ivory Tower*, MIT Press, Cambridge, MA.
- Creswell, J.W. (2003), *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Sage Publications, Inc., Thousand Oaks, CA
- Diem, K.G. (2002), "A step-by-step guide to developing questionnaires and survey procedures for program evaluation and research", available at: www.rce.rutgers.edu/pubs/pdfs/fs995.pdf (accessed 6 June 2006).
- Dillman, D.A. (2007), *Mail and Internet Surveys: The Tailored Design Method*, Jon Wiley & Sons Inc., Hoboken, NJ.
- Doherty, P.B. (2006), "The Context and Culture of the Web as a Research Environment", in Williams, D.D., Howell, S.L., and Hricko, M. (Eds.), *Online Assessment, Measurement & Evaluation: Emerging Practices*, Information Sciences Library, Hershey, PA, pp. 10-27.
- Dreyfus, A. and Wals, A.E.J. (2000), "Anchor Points for Integrating Sustainability in Higher Agricultural Education", in Van de Bor, Wout, P. Holen, A. Wals, and W.L. Filho (Eds.), *Integrating Concepts of Sustainability into Education for Agricultural and Rural Development*, Peter Lang GmbH, Frankfurt, Germany, pp. 73-92.
- Ekarius, C. (2007), "Up you sustainability", *Hobby Farms*, Vol.7, pp. 54-62.

- Filho, W.L. (2000), "Recognizing and Addressing Misconceptions on the Concept of Sustainability at University Level", in [Van de Bor, W.](#), [Hernon, P.](#), and Filho, [W.L.](#) (Eds.), *Integrating Concepts of Sustainability into Education for Agricultural and Rural Development*, Peter Lang GmbH, Frankfurt, Germany, pp. 185-197.
- Gerstenberger, S.L., Kelly, W.E., and Cross, C.L. (2004), "The influence of an introductory environmental science class on environmental perceptions", *Journal of Natural Resources and Life Sciences Education*, Vol. 33, pp. 73-76.
- Gray, D.E. (2004), *Doing Research in the Real World*, Sage Publications Ltd, London.
- Haessig, C.J. and La Potin, A.S. (2004), "Lessons Learned in the School of Hard Knocks: Guidelines and Strategies to Encourage Faculty Ownership and Involvement in Outcomes Assessment", in Banta, T.W. (Ed.), *Hallmarks of Effective Outcomes Assessment*, Jossey-Bass, San Francisco, CA.
- Hernon, P. (2006), "Design and Methodological Considerations", in Hernon, P., Dugan, R.E., and Schwartz, C. (Eds.), *Revisiting Outcomes Assessment*, Libraries Unlimited, Westport, CT, pp. 219-234.
- Hernon, P. and Dugan, R.E. (2004), "Four Perspectives on Assessment and Evaluation", in Hernon, P and Dugan, R.E. (Eds.), *Outcomes Assessment in Higher Education: Views and Perspectives*, Libraries Unlimited, Westport, CT, pp. 219-234.
- Hutchings, P. and Marchese, T. (1990), "Watching Assessment: Questions, Stories, and Prospects", *Change*, Vol. 22, No. 5, pp. 13-38.
- Jenks-Jay, N. (2004), "Integrating Education for the Environment and Sustainability into Higher Education at Middlebury College", in Corcoran, P.B. and Wals, A.E.J. (Eds.), *Higher Education and the Challenge of Sustainability: Problematics, Promises, and Practice*, Kluwer Academic Publishers, Norwell, MA, pp. 263-275.
- Leahy J. (2004), "Using excel for analyzing survey questions", available at: <http://learningstore.uwex.edu/pdf/G3658-14.pdf> (accessed 16 February 2008).
- Lieblein, G., Ostergaard, E., and Francis, C. (2004), "Becoming an Agroecologist through Action Education", *International Journal of Agricultural Sustainability*, Vol. 2, No. 3, pp. 147-153.

- Madewell, T.M., Savin, M.C., and Brye, K.R. (2003), "Alumni and Employer Perceptions of Crop, Soil, and Environmental Sciences Curricula: Survey Results", *Journal of Natural Resources and Life Sciences Education*, Vol. 32, pp. 100-106.
- Matson, L. (2008), "Sustainability Tracking, Assessment, and Rating System (STARS) for Colleges and Universities: Version 0.5", available at: www.aashe.org/stars/documents/STARS_0.5.pdf (accessed 7 July 2008).
- Miller, W.W., Williams, D.L., Bekkum, V.A., and Steffen, R.W. (1998), "The Follow-up Survey as a Student Outcome Assessment Method: Some Procedures and Examples", *Journal of the National Association of Colleges and Teachers of Agriculture*, Vol. 42, pp. 40-46.
- Motley, A. (2007), "Student led sustainability", *Business Officer*, Vol. 40, No. 10, pp. 31-37.
- MUM. (2006), "Maharishi University of Management (MUM): BS in Sustainable Living", available at: www.mum.edu/sustainable_living/ (accessed 30 July 2008).
- NCSU FCTL. (2001), *NC State University: Faculty Center for Teaching and Learning Newsletter*, Vol. 10, No. 3.
- Newport, D., Chesnes, T., and Lindner, A. (2003), "The "Environmental Sustainability" Problem: Ensuring that Sustainability Stands on Three Legs", *International Journal of Sustainability in Higher Education*, Vol. 4, No. 4, pp. 357-363.
- Orr, D.W. (1992), *Ecological Literacy: Education and the Transition to a Postmodern World*, SUNY Press, Albany, NY.
- Pike, L., Shannon, T., Lawrimore, K., McGee, A., Taylor, M., and Lamoreaux, G. (2003), "Science Education and Sustainability Initiatives: A Campus Recycling Case Study Shows the Importance of Opportunity", *International Journal of Sustainability in Higher Education*, Vol.4 No.3, pp. 218-229.
- Roling, N. (2000), "Sustainability as an Outcome of Human Interaction: Implications for the curricula in Higher Education in Industrialized Countries", in Van de Bor, Wout, P. Holen, A. Wals and W.L. Filho (Eds.), *Integrating Concepts of Sustainability into Education for Agricultural and Rural Development*. Peter Lang GmbH, Frankfurt, Germany, pp. 41-58.

- Schroeder, M.S. (2004), "What is Agroecology and Why is it needed?", Course Lecture Notes: Introduction to Agroecology, NC State University Crop Science Department, Raleigh, NC, 26 August.
- Shriberg, M. (2004), "Assessing Sustainability: Criteria, Tools, and Implications", in P.B. Corcoran, P.B. and Wals, A.E.J. (Eds.), *Higher Education and the Challenge of Sustainability: Problematics, Promises, and Practice*, Kluwer Academic Publishers, Norwell, MA, pp. 71-86.
- Shute, J.C.M. and Michaels, T.E. (2000), "Sustainable Agriculture Curricula: Between Evolution and Revolution", in Van de Bor, Wout, Hernon, P. and Filho, W.L. (Eds.), *Integrating Concepts of Sustainability into Education for Agricultural and Rural Development*, Peter Lang GmbH, Frankfurt, Germany, pp. 199-210.
- Sitarz, D. (1998), *Sustainable America: America's Environment, Economy, and Society in the 21st Century*, Earthpress, Carbondale, IL.
- Sterling, S. (2004), "Higher Education, Sustainability, and the Role of Systematic Learning", in Corcoran, P.B. and Wals, A.E.J. (Eds.), *Higher Education and the Challenge of Sustainability: Problematics, Promises, and Practice*, Kluwer Academic Publishers, Norwell, MA, pp. 49-69.
- Sterling, S. (2001), *Sustainable Education: Re-visioning Learning and Change*, Green Books Ltd., Bristol, UK.
- Suskie, L.A. (2006), "Accountability and quality improvement", in Hernon, P., Dugan, R.E., and Schwartz, C. (Eds.), *Revisiting Outcomes Assessment*, Libraries Unlimited, Westport, CT.
- Taylor, B.E., Meyerson, J.W. and Massey, W.F. (1993), *Strategic Indicators for Higher Education: Improving Performance*, Peterson's Guides, Princeton, NJ.
- Taylor-Powell, E. 1996. "Analyzing Quantitative Data", available at: <http://learningstore.uwex.edu/pdf/G3658-6.pdf> (accessed 26 February 2008).
- Taylor-Powell, E. and Renner, M. (2003), "Analyzing Qualitative Data", available at: <http://learningstore.uwex.edu/pdf/G3658-12.PDF> (accessed 26 February 2008).

- Thompson B. (2006), "Education and Training Opportunities in Sustainable Agriculture, 17th edition", available at: www.nal.usda.gov/afsic/pubs/edtr/EDTR2006.shtml (accessed 01 March 2007).
- Townsend, B.J. (2005), "Environmental Sustainability "inreach": How the Campus Community Informs itself about Environmental Issues", unpublished M.S. Thesis, NC State University, Raleigh, NC, available at: <http://www.lib.ncsu.edu/theses/available/etd-05162005-155241/unrestricted/etd.pdf> (accessed 30 July 2008).
- True, A.C. (1929), *A History of Agricultural Education in the United States, 1785-1925*, U.S. Department of Agriculture, Washington, D.C.
- ULSF. (2008), "ULSF: Association of University Leaders for a Sustainable Future", available at: www.ulsf.org (accessed 20 July 2008).
- UTurn*. (2007), "It's Not Easy Going Green", *UTurn, A Barnes and Noble Student Magazine*, Spring, pp. 22-23.
- vonLoon, G.W., Patil, S.G., and Hugar, L.B. (2005), *Agricultural Sustainability: Strategies for Assessment*, Sage Publications Inc., Thousand Oaks, CA.
- Walker, K.E., Wals, A.E.J., and Corcoran, P.B. (2004), "The Practice of Sustainability in Higher Education: An Introduction", pp. 229-234.
- Walvoord, B. (2004), *Assessment Clear and Simple: A Practical Guide for Institutions, Departments, and General Education*, Jossey-Bass, San Francisco, CA.
- World Commission on Environment and Development. (1987), *Our Common Future*, Oxford University Press, Oxford; New York.
- Wright, T. (2004), "The Evolution of Sustainability Declarations in Higher Education", in Corcoran, P.B. and Wals, A.E.J. (Eds.), *Higher Education and the Challenge of Sustainability: Problematics, Promises, and Practice*, Kluwer Academic Publishers, Norwell, MA, pp. 7-19.
- Yin, R.K. (2003), *Case Study Research: Design and Methods*, Sage Publications, Inc., Thousand Oaks, CA.

Appendices

Appendix A. Initial Questionnaire Pre-notification Email, Questionnaire Letter, and Questionnaire Form

Subject Line: Environmental Sustainability Education Questionnaire

Dear :

In the following week you will receive an email request to fill out a questionnaire about your educational program for a dissertation research project at North Carolina State University.

I am writing in advance because most people like to know ahead of time that they will be contacted. The study's goal is to identify the criteria that define the success of our sustainable natural resource education programs through a collaborative process that will develop a framework for assessment.

Thank you in advance for your time and consideration in this effort.

For more information about this dissertation project please visit
<http://www4.ncsu.edu/~asgrecho/research.html>

Sincerely,

April S Grecho, PhD Candidate
Department of Forestry & Environmental Resources
NC State University
Raleigh, NC 27695
919-280-7411
asgrecho@ncsu.edu

Subject Line: Environmental Sustainability Education Questionnaire

Dear :

I am writing to ask your help in studying the effectiveness of academic programs focused on environmental sustainability at US colleges and universities. I am contacting a sample group of these programs across the US. The research focuses on identifying criteria for evaluation of these programs. The goal of this research assessment is to identify and communicate the criteria and indicators of successful programs in promoting environmental sustainability. The study is a component of a dissertation research project in the Department of Forestry and Environmental Resources at North Carolina State University.

You have been identified as a key stakeholder for your institution's education program. Your participation in the attached questionnaire will focus on your role, knowledge, and experiences as a stakeholder in your educational program. The questionnaire is available on-line at the following address:

http://www.surveymonkey.com/s.aspx?sm=9KOkEwXfMuBggVHPK4bnA_3d_3d

You should be able to access the questionnaire by clicking the above link or by copying and pasting it into your browser address window. You will need approximately 20 minutes to review and complete the survey. Results of this project will be made directly available to all participants.

For an abstract and more information about the project and investigator please visit:
<http://www4.ncsu.edu/~asgrecho/research.html>

Thank you for your participation, if you have any questions please feel free to email (asgrecho@ncsu.edu) or call me (919-280-7411).

It is requested that the questionnaires be completed by Monday, July 23, 2007 so that the next step in the project can be initiated as soon as possible.

Sincerely,

April S Grecho, PhD Candidate
Department of Forestry & Environmental Resources
NC State University
Raleigh, NC 27695
919-280-7411
asgrecho@ncsu.edu

QUESTIONNAIRE

A. INTRODUCTION

The purpose of this questionnaire is to obtain your opinions based on your role, knowledge, and experiences as a stakeholder in your educational program.

The results of this questionnaire will provide guidance in developing a draft framework for assessment that will lead to the identification and communication of standards and criteria for successful educational programs in promoting sustainable agriculture, and natural resource management.

The questions are confidential and answers will not be attributed to any individuals within the written results.

Please complete the survey once you have started it, as you will not have the opportunity to return to this page, answer all questions to the best of your ability. The survey should not take more than 20 minutes to complete. Results of the survey will be made available to all participants.

When finished with the survey there should be an exit link in the top right corner of the page or simply closeout of the window. Any responses are automatically collected as you finish each page.

Thank you for your time; I greatly appreciate your effort in completing this survey!

1. Program Name _____
2. Institution _____
3. Year Program Initiated _____
4. Program Concentrations _____

B. ABOUT YOUR PROGRAM

5. Are students in your program required to take a course on issues related to the environment or sustainability as part of the general education requirements?

___ No

___ Yes, please describe:

6. Does your program include in its teaching:

- How the campus functions in the ecosystem
- A sense of place (natural features, history, culture, and biota of the surrounding community)
- The institution's/ program's contribution to a sustainable local community
- Other (please specify):

7. Does your institution have established multidisciplinary or interdisciplinary structures (such as in institute ore center for research, education, and policy development on agricultural, environmental, or sustainability issues)?

- No
- Yes, please describe:

8. In what ways does your institution promote your program (check all that apply)?

- Bulletins
- Weblinks
- Announcements
- Freshman Programs
- Other (please specify):

9. What percentage of program activities focus on: (should add to 100)

- Outreach
- Education
- Research

10. Does the program collaborate with local landowners in any of the following activities?

- Research
- Education Programs
- Demonstration Projects
- Community Farm Days/ tours
- Other (please specify):

11. Does the program participate in a local:

- Community Supported Agriculture Program (CSA)
- Food Bank
- Other outreach or service program in your community:

12. Does your program cooperate with local:

- Cooperative Extension Services (CES)
- Natural Resource Conservation Service (NRCS)
- Soil and Water Districts
- Other (please specify):

13. In what areas of sustainability do your faculty/ students participate in research or scholarship of the various disciplines?

- a. Renewable Energy
- b. Sustainable Building Design
- c. Ecological Economics
- d. Indigenous Knowledge
- e. Population and Development
- f. Waste Management
- g. Environmental Quality
- h. Other (please specify):

C. EXPERIENTIAL LEARNING

14. What types of practices are in place as part of your program's experiential learning opportunities and/or your institution's farm? (check all that apply)

- a. Agroforestry
- b. Water Quality
- c. Mixed Crop and Livestock
- d. Organic
- e. Integrated Pest Management (IPM)
- f. Cover Cropping
- g. Soil Erosion Controls
- h. Conservation Tillage
- i. Wildlife/ Natural Habitat Integration
- j. Crop Rotations
- k. Specialty Crops
- l. Restoration Efforts of Native Plants/ Wetlands
- m. Other (please specify):

15. Does your program include a farm unit for research and experiential learning opportunities?

No Yes

16. What percentage of farm work responsibilities are allocated to:
(should add to 100)

Farm Managers Employees
 Students Volunteers
 Other (please specify):

17. What percentage of farm activities focus on: (should add to 100)

Education Research
 Outreach Other (please specify):

D. OTHER STUDENT OPPORTUNITIES

18. What sustainability related community service, service learning, or internships exist as part of your program?

19. Does your program have a student group that works across the campus on environmental or sustainability focused issues?

No Yes, please describe:

20. Do students across the institution have the opportunity to be involved in your program?

No Yes, please describe:

E. MORE QUESTIONS...

21. Is there an existing strategic plan for your program?

I don't know

No

Yes, if yes is it publicly available and where?

22. Who should be contacted regarding any program evaluations already in place for your program that are used to track program success?

23. Would your program be interested in participating in a graduate research project to develop a set of assessment standards for new, developing, and continuing sustainable resource management education programs in the US?

I not able to address this question

Yes

No

24. If answered Yes to the previous question please indicate at which stage of the project you are interested in continuing your program's participation.

Surveys and/or interviews to aid in developing the framework for assessment (this would involve representatives of stakeholders: administration, faculty, students, operations managers, and local community representatives)

Your institution's program as a case study for testing the framework

F. JUST A FEW MORE THINGS...

25. What do you see when you walk around your campus that tells you the institution is committed to the sustainability of our natural resources?

26. Please describe any key events on your campus from the past year that gave visibility to your program, sustainability, environmental/ agricultural issues, etc: (for example – guest speakers, conferences, Earth Day celebrations, other program activities, etc)

27. Please list your program goals here.

Appendix B. Survey Pre-notification Email, Survey Letter, and Survey Form

Subject Line: Educational Program Stakeholders

Dear :

You have been identified as a key stakeholder for your institution's education program in environmental studies, natural resources, forestry, or agriculture. Next week I will be emailing you with a request to fill out an anonymous survey regarding your opinions for ranking and identifying criteria and indicators for successful education programs in these areas, specifically those centered on environmental sustainability. The survey will focus on your experience with your program and your opinions on what indicators are of greatest value to you in understanding the success of such a program. The study's goal is to identify the criteria that define the success of our academic programs focused on environmental sustainability through a participatory process that will develop a framework for evaluation.

This survey is a component of my dissertation research project in the Department of Forestry and Environmental Resources at North Carolina State University. You can learn more about this project at

<http://www4.ncsu.edu/~asgrecho/research.html>

I know that you are a busy person and appreciate that your time is valuable. I believe, however, that you will find this an interesting and worthwhile project in which to participate. I look forward to sharing the results of my study with you and others and am optimistic that our sustainable natural resource education programs will benefit from such information.

In addition, I am asking for your assistance in making sure I get the full extent of information. It has proven very difficult for me to identify your student and community representatives. So that I might obtain the full spectrum of stakeholder opinions, I would very much appreciate if you would send me contact information for at least 2 students (preferably undergraduate) and 2 community members (farmers, landowners, or organizations) that work closely with your program. Alternatively, please simply forward this email (and the following survey email) to those people and encourage them to participate in this important project by completing the survey.

Thank you in advance for your time and consideration in this effort.

Sincerely,

April S Grecho, PhD Candidate
Department of Forestry & Environmental Resources
NC State University
Raleigh, NC 27695
919-280-7411
asgrecho@ncsu.edu

Subject Line: Educational Program Stakeholders

Greetings:

Recently you received an email requesting your participation in a survey regarding your opinions on the ranking and identification of the criteria and corresponding indicators for successful programs of higher education focused on environmental sustainability.

This study is a component of a dissertation research project in the Department of Forestry and Environmental Resources at North Carolina State University. The project focuses on the development of a framework for evaluation of current higher education programs in environmental sustainability initiatives in the US. The goal of this research assessment is to identify and communicate the criteria and indicators of successful programs in promoting environmental sustainability. Environmental sustainability programs in areas such as natural resource management, forestry and agriculture are some of the fastest growing sectors in higher education today with a number of opportunities and unmet needs that such an evaluation can help to address.

Your participation in this project is very important because you have been identified as a key stakeholder for your institution's education program. Key stakeholders include administrators, faculty, students, staff, operations managers, and local community representatives associated with the education program. The survey focuses on your role, knowledge, and experiences as a stakeholder in your educational program. Your participation will help assure the success of the framework for assessment that will be useful to you, your program, and overall your community.

Please take a few minutes and go to:

http://www.surveymonkey.com/s.aspx?sm=Y5BvxQ9YU_2bXuEEpvXDikNA_3d_3d

to complete the online survey before the Saturday, January 5th deadline.

It should take no more than 30 minutes to complete the survey.

This survey is completely anonymous. Results will only be reported in the aggregate; neither individual responses nor institutions will be identifiable.

In addition to completing the survey, I am asking you again for your help to make sure I get the extent of information I need. So that I might obtain the full spectrum of stakeholder opinions, I would very much appreciate it if you send me contact information for at least 2 students (preferably undergraduate) and 2 community members (farmers, landowners, or organizations) that work closely with your program. Alternatively, please simply forward this email to those people and encourage them to participate in this important project by completing the survey. Thank you to those who have already done so.

Second, I hope to conduct a few short, 10 -15 minute telephone interviews with interested stakeholders to gain some more subjective feedback about what stakeholders think programs should be providing. If you are interested please respond to asgrecho@ncsu.edu with the best day of the week and time for reaching you for the month of January.

Thank you for your participation, if you have any questions please feel free to email (asgrecho@ncsu.edu) or call me (919-280-7411).

Sincerely,

April S Grecho, PhD Candidate
Department of Forestry & Environmental Resources
NC State University
Raleigh, NC 27695
919-280-7411
asgrecho@ncsu.edu

SURVEY

A. INTRODUCTION

The purpose of this survey is to obtain your opinions based on your role, knowledge, and experiences as a stakeholder in your educational program that is focused on environmental sustainability. The results of this survey will provide guidance in developing a draft framework for evaluation that will lead to the identification and communication of standards and criteria for successful programs in higher education promoting sustainable agriculture and natural resource management.

Please complete the survey once you have started it, as you will not have the opportunity to return to this page. The survey will take approximately 30 minutes to complete. Some questions may not be applicable to your stakeholder role, please select the N/A option to continue through the survey.

Thank you for your time; I greatly appreciate your effort in participating in this project!

B. STAKEHOLDER

1. Program Name: *(This is meant to be an anonymous survey, please do not indicate the name of your institution. You may include a department name if desired.)*

2. Institution Type:

Private/ Liberal Arts Land Grant or Research 4 year Regional

3. Stakeholder Role

Faculty Administration Staff Community Partner Student

4. How many years have you been in this role?

5. What is your field of expertise/specialty?

6. Does the program have written learning goals?

Yes No Don't Know

7. Are the learning goals of the program well stated/ appropriate?

Yes No Don't Know

8. Are the program learning goals readily accessible to students and faculty?

Yes No Don't Know

C. INSTITUTIONAL RELATED QUESTIONS

9. Please rate the level of importance for the following regarding the Institution's relationship with the educational program.

a. How central the program is to the Institution's mission.

Very Important (Impt) Important Somewhat Impt Not Impt NA

b. Institutional promotion of program.

Very Important (Impt) Important Somewhat Impt Not Impt NA

c. Institution's Office of Sustainability collaboration/ interaction with the program.

Very Important (Impt) Important Somewhat Impt Not Impt NA

d. Evidence of campus commitment to sustainability of natural resources.

Very Important (Impt) Important Somewhat Impt Not Impt NA

e. Established multidisciplinary and/or interdisciplinary structures (such as an institute or center) for research, education, and policy development on environmental, agricultural, or sustainability issues.

Very Important (Impt) Important Somewhat Impt Not Impt NA

f. An Institutional general education requirement to include an Environmental Science or Conservation of Natural Resources course.

Very Important (Impt) Important Somewhat Impt Not Impt NA

g. Institutional signatory to University Leaders for a Sustainable Future Taillores Declaration (http://www.ulsf.org/programs_talloires.html).

Very Important (Impt) Important Somewhat Impt Not Impt NA

h. Institutional signatory to the American College and University Presidents Climate Commitment (<http://www.presidentsclimatecommitment.org/>).

Very Important (Impt) Important Somewhat Impt Not Impt NA

10. In your opinion, what is the most effective promotion of a specific program that an Institution can provide (i.e.; weblinks, bulletins, freshman programs, other...)

11. Please list your top 3 examples for evidence of campus commitment to sustainability of our natural resources:

a.

b.

c.

12. Please feel free to provide comments regarding questions from this section here. They could be referring to items you feel are missing or issues you may have with items listed.

D. RANKING AND IDENTIFYING CRITERIA CATEGORIES

13. Please rank the following items with 1 being the most influential and 7 having the least influence.

- Activities (social responsibility, community engagement, participation in research, volunteer activities, internships, etc)
- Human (Student:Faculty ratio, Retention, Graduation, Alumni)
- Financial (Economic Resources, Tuition, Financial Aid, Grants, Funding)
- Physical (Buildings, Land, Equipment, Farm)
- Information (Library and Computer Resources)
- Curriculum (Teaching Strategies, Education and Research)
- Outcomes Assessment

Please provide comments here regarding suggestions, issues, or concerns with the above categories:

14. Please list other criteria categories that you believe are missing from the list above:

15. Please indicate whether you agree, disagree, or are not able to address the following statements:

- a. It would be useful for programs/departments to track students who take an introductory class and go on to declare and/or complete the program or major.
 Agree Disagree N/A
- b. Programs should keep track of alumni through regular surveys.
 Agree Disagree N/A
- c. It would be useful for programs to maintain a database of alumni contacts.
 Agree Disagree N/A
- d. Experiential learning should be required for educational programs.
 Agree Disagree N/A

E. INDICATORS

Caveat: The diversity of higher education programs is such that no single listing of indicators could reflect the condition of all programs with their varying circumstances and strategies.

16. Please provide your opinion on how important the following indicators are for determining or developing a successful program.

a. Student:Faculty Ratio

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

b. Graduate Exit Interviews

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

c. Regular Surveys of Alumni

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

d. Regular Surveys of Employers

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

e. Enrollment Numbers

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

f. Retention Rates

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

g. Graduation Rates

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

17. In regards to student learning opportunities how important are the following items to the success of their educational program?

a. On site/hands on learning units (farm, forest, research station, etc)

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

b. Community partnerships

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

c. Community service activities by students, faculty, and staff

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

d. Internship requirement

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

e. Work Study Opportunities

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

f. Student led groups or organizations

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

g. Collaboration/Research demonstrations with local landowners

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

18. How important are the following teaching strategies.

a. Interdisciplinarity: looking at issues from a variety of viewpoints to find a synthesis.

___ Very Important (Impt) ___ Important ___ Somewhat Impt ___ Not Impt ___ NA

b. Providing an understanding of socio-scientific disputes.

Very Important (Impt) Important Somewhat Impt Not Impt NA

c. Amount of involvement by students in professor's research.

Very Important (Impt) Important Somewhat Impt Not Impt NA

Please list other teaching strategies that you are aware of that are important to you:

19. In regards to outcomes assessment:

a. Should student evaluations include questions asking students how well they thought they achieved the learning goals of the course (versus asking them about quality of instruction)?

Yes No Not Sure

b. Should Alumni or Graduation surveys include questions regarding the perception of their own learning?

Yes No Not Sure

c. Is it useful to have a question for students regarding improvements to the program?

Yes No Not Sure

d. Should the program use focus groups for internal assessment?

Yes No Not Sure

e. Is it useful for programs to rely on Institutional Review data for internal evaluation?

Yes No Not Sure

F. IN CLOSING

20. With the successful development of a framework for program evaluation would you find it useful to your program, would you use it or recommend its use, or even as a guideline to developing another assessment.

Yes No Not Sure

Thank you for your participation, if you have any further questions please contact me at asgrecho@ncsu.edu

Appendix C. Reminder Email Letter

Subject Line: Important Reminder for Education Program Stakeholders

Greetings:

Recently you received an email requesting your participation in a survey regarding your opinions for ranking and identifying criteria and indicators for successful education programs in natural resources, forestry, agriculture, and environmental conservation; specifically those focused on environmental sustainability.

Since the survey is anonymous, I have no way of knowing whether you have responded or not. If you have already responded thank you for taking the time to do so! Your participation is appreciated and your comments have already contributed greatly.

If you have not been able to complete the survey, I hope you can take a few minutes now to do so. In sharing your opinions you can help shape the future success of our educational programs to provide the necessary tools and resources for our students to create positive change for the pressing issues facing our local, regional, and global environments.

http://www.surveymonkey.com/s.aspx?sm=Y5BvxQ9YU_2bXuEEpvXDikNA_3d_3d

You should be able to access the survey by clicking the above link or by copying and pasting it into your browser address window. You will need approximately 30 minutes to review and complete the survey.

Thank you in advance for completing the survey by the extended deadline of Thursday, January 10th. If you have any questions please feel free to email (asgrecho@ncsu.edu) or call me (919-280-7411).

Sincerely,

April S Grecho, PhD Candidate
Department of Forestry & Environmental Resources
NC State University
Raleigh, NC 27695
919-280-7411
asgrecho@ncsu.edu

Appendix D. Institutional Review Board Exemption Letter

North Carolina State University is a land-grant university and a constituent institution of The University of North Carolina

**Office of Research
and Graduate Studies**

NC STATE UNIVERSITY

Sponsored Programs and
Regulatory Compliance
Campus Box 7514
1 Leazar Hall
Raleigh, NC 27695-7514

919.515.7200
919.515.7721 (fax)

From: Debra A. Paxton, Regulatory Compliance Administrator
North Carolina State University
Institutional Review Board

Date: February 14, 2007

Project Title: From Knowledge to Management: Assessing and Communicating the Efficacy of Sustainable Resource Education Programs in the US

IRB#: 43-07-2

Dear Ms. Grecho:

The research proposal named above has received administrative review and has been approved as exempt from the policy as outlined in the Code of Federal Regulations (Exemption: 46.101.b.2). Provided that the only participation of the subjects is as described in the proposal narrative, this project is exempt from further review.

NOTE:

1. This committee complies with requirements found in Title 45 part 46 of The Code of Federal Regulations.
For NCSU projects, the Assurance Number is: M1263; the IRB Number is: 01XM.
2. Review de novo of this proposal is necessary if any significant alterations/additions are made.

Please provide a copy of this letter to your faculty sponsor. Thank you.

Sincerely,

Debra Paxton
NCSU IRB

Appendix E. Framework Test Questionnaire

A. INTRODUCTION

Thank you for your participation in the research project to develop and test a draft framework of standards for program success.

While the majority of the information needed to complete the evaluation is available publicly there are a few items we need to collect directly from the program.

Several of the following survey questions require specific information (i.e.; number of graduates), while others are subject to your personal opinion.

Please complete to the best of your ability.

It should take only 10 to 15 minutes of your time.

Thank you.

B. FRAMEWORK FOR EVALUATION SURVEY

1. Student numbers

Number of majors for the current academic year:

Number of graduates expected for Spring 2008:

Number of graduates that first completed the program:

2. Please check yes or no to the following questions regarding the current level of program evaluation or assessment:

a. Periodic review by institutional administration

Yes No Don't Know

b. Periodic review by external bodies

Yes No Don't Know

c. Periodic review by internal bodies

Yes No Don't Know

d. Are all stakeholders involved in reviewing resulting data

Yes No Don't Know

e. Are stakeholders identified

Yes No Don't Know

f. Are student focus groups or surveys used for internal review

Yes No Don't Know

g. Do student evaluation materials ask students how well they feel they achieved learning goals

Yes No Don't Know

3. How long since last program evaluation or assessment?

4. Have there been any new trends or recent changes in the program? What are the contributing factors?

5. In regards to assisting and following student progress:

a. Does the program assist in placing students

Yes No Don't Know

b. Does the program conduct follow up surveys of graduates

Yes No Don't Know

c. Does the program keep a record or file of this information

Yes No Don't Know

6. At what time or regular intervals of time does program conduct graduate/ alumni surveys?

7. Other than your program's home website, what other forms of promotion are utilized? (check all that apply)

High School Recruiting Freshman Programs
 Campus Fliers Seminars
 Direct Mail Other (please specify):

8. In regards to classroom instruction, does the program encourage faculty to incorporate any of the following into their teaching?

How the campus functions within the ecosystem
 A personal sense of place or contribution to the local campus community
 Literacy in regards to sustainability

9. What is the percentage of dedicated funding to the program:
(Please total to 100)

Institutional _____
College or School _____
Departmental _____
Private _____
Other _____

10. Which of the following activities are evident on your campus:

Paper Recycling Container Recycling Green Building(s)

LEED Certified Building(s) Renewable Energy Use

Environmentally responsible purchasing

Sustainable Food (local, organic, fair trade)

Water and Landscape Management

Appendix F. Program Concentrations

Institution Category	Year	Department	Program Curriculums/ Concentrations
Land Grant	1970	Dept of Natural Resources	Applied Ecology, Resource Policy & Mgt, Environmental Studies
Land Grant	1971	College of Agricultural Sciences	Environmental Resource Mgt
Land Grant	1973	Dept of Environmental Studies	Environmental Policy and Planning, Restoration Ecology, Agroecology and Sustainable Agriculture, Political Ecology
Land Grant	1975	Dept of Natural Resources Mgt	Forest Sciences, Resource Mgt, Plant Animal Soil Sciences
Land Grant	1989	Dept of Extension	Community Food Systems, Sustainable Agriculture
Land Grant	1990s	Dept of Crop, Soil & Environmental Sciences	Environmental, Soil, & Water Science
Land Grant	1994	Agriculture, Forestry & Natural Resources	Agroecology & Environmental Quality
Land Grant	1998	Land Resources & Environmental Science	Natural Resource Management , Agroecology, Land Rehabilitation
Land Grant	2000	Campus Sustainability	Sustainability Indicators, Energy, Curriculum, Solid Waste
Land Grant	2001	Forestry Extension	Natural Resource Mgt
Land Grant	2003	School of Natural Resources & Environment	Interdisciplinary Ecology
Land Grant	2003	Department of Forestry & Natural Resources	Forest Resource Mgt
Land Grant	2004	Dept of Plant & Soil Science	Ecological Agriculture
Land Grant	2006	Interdisciplinary Studies, Organic Agriculture	Organic Horticulture, Field Crop Production
Land Grant	2006	Dept of Extension	Low Impact Development, Stormwater Quality & Mgt
Regional	1960s	College of Agriculture	Agriculture, Business
Regional	1972	Dept of Environmental Studies & Planning	Conservation & Restoration, Outdoor Leadership, City & Regional Planning
Regional	1980	School of Agriculture	Reclamation
Regional	1992	College of Natural Resources & Sciences	Environmental & Natural Resource Sciences, Forestry Science, Rangeland Resources
Regional	1994	Dept of Agriculture	Agricultural Business, Education, or Science
Regional	1998	Dept Renewable Resources	Sustainable Agriculture, Environmental & Sustainable Resources
Private	1970	Environmental Studies	Requires Environmental Science, Economics, & Politics
Private	1975	Environmental Studies	Human Ecology, Environmental Science, Environmental policy
Private	1994	Environmental Studies	Sustainable Agriculture

Appendix G. Participant Stakeholder Backgrounds

Stakeholder Role	Years	Area of Expertise/ Specialty	Institution Category
Administration	15	Farmer Planner Facilitator	Private
Administration & Faculty	6	Environmental Science	Land Grant
Faculty	32	Education, Extension, Wildlife, Conservation Education, Hunter Education, Sustainability and Land Management	Land Grant
Faculty	27	Social Science	Land Grant
Faculty	13	Agriculture	Land Grant
Faculty	6	Organic Soil Fertility	Land Grant
Faculty	4	Ecology, Agroecology	Land Grant
Faculty	2	Organic Soil Fertility	Land Grant
Faculty	24	Agronomy (Sustainable Agriculture)	Public Regional
Faculty	17	Rural/Development Social Science	Public Regional
Faculty	6	Ecological Agriculture	Public Regional
Faculty	9	Horticulture, Ecology	Private
Faculty	6	Agronomy, Soil Science	Private
Staff	10	Non-formal education, Direct marketing	Land Grant
Staff	2	Energy use in agriculture, season extension and vegetable production	Land Grant
Staff	1	Conservation	Land Grant
Staff	7	Research and Assessment	Public Regional
Staff	4	Sustainable Agriculture	Public Regional
Staff	1	Environmental Education	Public Regional
Staff	11	Education, Farming	Private
Student	3	Civil/Environmental Engineering	Land Grant
No Response	10	Environmental Economics	Land Grant

Appendix H. Framework Tests: Institutional Summaries

Land Grant	A1	A2	A3
Institutional Category	Research and Land Grant (founded 1940, current title 1970)	Research and Land Grant (founded 1893, current title 1964)	Research and Land Grant (founded 1922, current title 1935)
Role	Doctoral granting Public Liberal Arts & Sciences University	Doctoral granting, Public Institution	Doctoral granting (interdisciplinary PhD option), public institution
Enrollment (2007-2008)	3,457 total enrollment undergraduates	17,585 total enrollment undergraduates	9,687 total enrollment undergraduates
Student to Faculty Ratio	16 to 1	14 to 1	10 to 1
Average Class Size	22 students	29 students	14 students
Calendar System	2 semesters of 16-17 weeks each and a four-week intensive summer session and a six-week regular summer session	2 semesters of 16-17 weeks each and a four-week intensive May session and two six-week regular summer sessions	2 semesters of 16-17 weeks each and a four-week intensive May session and a six-week regular summer session that offers in-state tuition for everyone
Community Setting	Population approximately 45,000. Downtown farmers market provides fresh and organic produce and locally produced goods. The natural and cultural environment serves as a learning laboratory, the setting for many teaching, research, and service activities	Population 13,000+, college-town, lakefront setting against a backdrop of mountains and forests, is characterized by a strong sense of community, and commitment to service.	Population approximately 32,000+. Surrounded by vast expanses of forest, streams and rivers, the city maintains the friendliness of a small town while offering the services of a larger city. Teaching and learning takes place in a classroom and laboratory
Evaluation Program	Agro-ecology and Environmental Quality (established 1993)	Teaching, research and outreach: institution plays a major conservation role in its state.	Natural Resources Management
Program Description	The Agro-ecology and Environmental Quality curriculum is designed for students interested in sustaining agrarian and surrounding ecosystems through more efficient management of land, biota, and water. The program blends comprehensive classroom instructio	The objective ...is to produce professionals who have a broad-based knowledge in natural resources, and an ability to interact with other resource professionals to provide thoughtful solutions to environmental and natural resource problems. This program wil	...provide leadership in research, education and outreach emphasizing natural resources management to benefit (<i>the people</i>) and their environment. The research, education, and outreach programs reflect the interest of the diverse clientele: native people, ru

Regional	B1	B2	B3
Institutional Category	Four year Public Regional College or University (founded 1866, state university system 1971)	Four year Public Regional College or University (founded 1913)	Four year Public Regional College or University (founded 1893)
Role	Masters granting, public institution	Masters granting, public institution	Doctoral granting, Public unit of state university system
Enrollment (2007-2008)	7,000 total enrollment 6,930 undergraduates	7,550 total enrollment 6,760 undergraduates	13,961 total enrollment 11841 undergraduates
Student to Faculty Ratio	16 to 1	19 to 1	20 to 1
Average Class Size	23 students	24 students	20 students
Calendar System	2 semesters of 16-17 weeks each and two four-week summer sessions and a six-week regular summer session	2 semesters of 16-17 weeks each and two four-week summer sessions and a six-week regular summer session	2 semesters of 16-17 weeks each and two five-week summer sessions and a ten-week regular summer session and a January winter session
Community Setting	Population approximately 25,000, surrounded by farm country, extensive opportunities for business and recreation. The city and the university join together to offer local residents several events and activities ... is considered one of the safest campuses in	Population 16,650+. One of the top college towns in the United States for outdoor lovers with a wealth of natural environments from ocean, to forest, rivers, mountains, farms, and rangelands , and redwood community forest that adjoins the campus and nine	Approximately 60,000 residents and visitors from around the globe, the city has an increasingly diverse population. ... is the hub of five valleys and three major rivers –is a blend of small-town charm and big-city sophistication. On summer Saturdays local F
Evaluation Program	Reclamation, Environment, and Conservation	Environment and Natural Resource Sciences	Environmental Studies - emphasis on community service and environmental problem solving
Program Description	Interdisciplinary program of applied scientific practices for restoring, reclaiming, and managing degraded habitats, landscapes and ecosystems. ... involves restoration of mined lands, and deals with agricultural lands, rangeland, wetlands and even urban la	The Environmental & Natural Resource Sciences program teaches problem solving skills by combining traditional sciences with public policy, social sciences, and economics with a focus on sustainability.	Students are provided with the literacy, skills, and commitment needed to foster a healthy natural environment and to create a more sustainable, equitable, and peaceful world. ... enable them to promote positive social change and to improve both the environm

Private	C1	C2	C3
Institutional Category	Private College (founded 1834)	Private College (founded 1855)	Private College or University (founded 1966)
Role	Masters granting	Bachelors granting, BA and BS.	Bachelors and Masters granting.
Enrollment (2007-2008)	820 total enrollment	1,514 total enrollment	750 total
Student to Faculty Ratio	14 to 1	10 to 1	10:1 in classes 5:1 in the field
Average Class Size	15 students	16 students	12 students
Calendar System	2 semesters of 16-17 weeks each, summer sessions for credit available	2 semesters of 16-17 weeks each and one nine-week summer session and a short 4 week winter session	Block and quarter. Blocks are approximately four weeks in length and take place during September, January, and May. A 10-week quarter follows each block. During the block, students enroll in only one course and learn through deep involvement in the subject
Community Setting	Population about 3,600. Year 'round activities and enjoying the outdoors is central to enjoying "the good life". Summer outdoor activities include parades, picnics, swimming, golf, bicycle and canoe tours, shopping and antiques. The Autumn and Winter of	Population of 10,000, a small town atmosphere with rich cultural and historic roots makes an ideal place to live, work and play, extensive parks and recreational opportunities. Best known for its history of and continued support for folk arts and crafts.	Population approximately 34,000. The area is surrounded by 1,408,000 acres of National Forest, with more than 796 miles of trails. With four mild seasons and unsurpassed natural beauty, there is a diversity of outdoor activities, including rock climbing,
Evaluation Program	Natural Resource Management	Agriculture and Natural Resources in Sustainable Systems	Environmental Studies with Agro-ecology emphasis
Program Description	Interdisciplinary, experiential, and service oriented academic experience. ...to teach tomorrow's park rangers, forest managers, and wildlife specialists how to be good stewards to our natural resources, our land, and the people who rely on them for their	Emphasis on experiential learning and the application of ecological design to the development of sustainable communities. Students learn about and gain experience in planning, supervising, and evaluating agricultural/ environmental enterprises and applying	The aim of the Environmental Studies program is to encourage broad and thorough exposure to, and appreciation for, the nature of diverse and complex ecosystems, and to examine the relationships between humans and nature. From early on in the program, small

Appendix I: Framework Test Data

Land Grant

Test Program: A1

Category: Land Grant

Evaluation Program: Agro-ecology and Environmental Quality

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	to prepare students for a broad and full understanding of basic factors involved in production, management, processing, distribution, marketing, sales, and services in the field of agricultural sciences
How goals will be met.	seven areas of specialization are offered that include a balance of arts and sciences courses in the curriculum, additionally the program blends comprehensive classroom instruction with practical, technology-based education through hands-on learning
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Administrative and internal
Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Stakeholders identified but not involved in review process
<i>Outcomes Assessment</i>	
Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	
Use of alumni surveys to gain perception of learning for improvements to program	Exit interview surveys
Program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	Assists in placement but not tracking

Program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	
<i>Visibility</i>	
Evidence of activities highlighting academic program.	several events open to public
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	website, freshman programs, high school recruiting

Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Required: Agricultural Economics Supplemental requirements options: Natural Resource and Environmental Economics, Writing for Science and Technology
Interdisciplinarity through integration across different units and disciplines.	balance of College of Arts and Sciences courses in the curriculum
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	Campus ecosystem function, contribution to local community
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Required Senior Seminar
Undergraduate participation in research.	Students are matched with faculty mentors and have the opportunity to conduct research (for 8 weeks from mid June to late July) in areas of Agriculture and related sciences
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	Forestry education and research network, aquaculture and coastal resources center

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	Several opportunities for internships including Youth Conservation Corps, institution wide emphasis on service learning

Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	Required as part of curriculum: Directed Work Experience Program
Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	university student association promoting sustainable campus, several registered independent student organizations associated with college
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	110 acre farm laboratory - forestry, vegetables, sustainable agriculture, livestock production, equine science, beekeeping, tropical fruit, and aquaculture On campus – laboratories, greenhouse, and microcomputer lab The natural and cultural environment serves as a learning laboratory for teaching, research, and service activities.

Criterion 4: Community Engagement	
Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/ or organizations in areas of research, education, and demonstration).	field trips and work with local community agriculture and forestry enterprises, Epcot Science, botanical and garden clubs
Provides opportunities for partnerships with government partners (local, state, or federal).	USDA, NPS, National Science Foundation
Provides opportunities for inter-institutional or international collaborations.	Inter-institutional

Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	Active learning in research, internships, and community service, ...Develop a sustainability plan for the campus that will lead to the careful stewardship of resources and enhance the campus experience
Campus environmental committee made up of all campus stakeholders.	the 2002-2010 Strategic Plan calls for development of sustainability plan for the campus that will lead to the careful stewardship of resources and enhance the campus experience
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape management, etc).	Sustainable campus promotion by student association addressing some of these items in 2007 and working with administrators.

Institutional general education requirement in areas relevant to environmental sustainability issues (Environmental or Natural Resource Conservation).	Gen Ed: students must select 3 of 11 academic areas for total of 10 credit hours of which Environmental Science is an option
Campus Office of Sustainability or Campus Sustainability Coordinator.	
Institutional membership in organization focused on sustainability in higher education.	member of AASHE, signatory to ACUPCC state university system Thaillores signatory

Test Program: A2

Category: Land Grant

Evaluation Program: Forest Resource Management

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	To provide the educational groundwork for tomorrow's leadership in environmental stewardship by producing professionals who have a broad-based knowledge in natural resources, an ability to interact with other resource professionals to provide thoughtful solutions to environmental and natural resource problems, and be able to balance the resource demands of industry against public interests.
Clear support for how goals will be met.	...through interdisciplinary teams to enhance and improve our educational, research and public service activities, fostering team-based problem solving approaches with our constituents in the state, and optimizing the use of resources.
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Institutional administration, internal, and external reviews Last performed program evaluation in 2002
Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	Does use focus groups or surveys
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Stakeholders identified but not included in review
<i>Outcomes Assessment</i>	
Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	
Use of alumni surveys to gain perception of learning for improvements to program	1 and 3 years with university
Program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	Assists in placement , claims excellent job placement

Program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	Conducts surveys and maintains file of information alumni information newsletter and information also available through program website
<i>Visibility</i>	
Evidence of activities highlighting academic program.	agricultural commissioner's summer program, seminars
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Website, freshman programs, high school recruiting

Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Required: Forest Policy and Admin, Natural Resources, Environment & Economics, Natural Resource Economics, technical writing
Interdisciplinarity through integration across different units and disciplines.	two years in the forest resource management curriculum students establish a strong base in liberal arts, mathematics, and biology. The program offers freedom through elective courses to develop personal interests and to achieve academic and career goals.
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	yes
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Senior Portfolio requirement
Undergraduate participation in research.	yes
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	coastal ecology and forest science research institute

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	the university encourages faculty to engage their classes through service learning. Recently recognized as a “Campus With a Conscience” for its work in community service.
Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	summer in the field developing hands-on forestry skills, attending the summer camp is an opportunity to develop close working relationships with members of a crew, also gives practical experience as a foundation for major course work.

Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	number of national professional organizations and university clubs , and student group promoting environmental awareness
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	Experimental forest and arboretum

Criterion 4: Community Engagement	
Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/or organizations in areas of research, education, and demonstration).	local gov't, keep America beautiful, state commission on national and community service outreach includes large extension system
Provides opportunities for partnerships with government partners (local, state, or federal).	USDA Forest Service, State Fish & Wildlife Research Unit
Provides opportunities for inter-institutional or international collaborations.	yes

Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	to promote a “green” campus by coordinating and sponsoring events to further the University’s commitment to the environment and sustainability.
Campus environmental committee made up of all campus stakeholders.	Solid Green Campaign
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape management, etc).	Recycling, green or LEED building, environmentally responsible purchasing, sustainable food, water and landscape mgt
Institutional general education requirement in areas relevant to environmental issues (Environmental or Natural Resource Conservation).	Option available under math, science, and technological literacy requirement
Campus Office of Sustainability or Campus Sustainability Coordinator.	
Institutional membership in organization focused on sustainability in higher education.	Member AASHE Signatory Thaillores Declaration

Test Program: A3

Category: Land Grant

Evaluation Program: Natural Resources Management

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	...to generate and provide knowledge that is important for the successful long-term management of natural resources
Clear support for how goals will be met.	...encourages creativity through a balanced interdisciplinary education that emphasizes the natural and social sciences with field and laboratory opportunities to study resources, and exploring resource issues involving human effects on the environment.
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Last evaluation 2 years ago Institutional administration, internal, and external reviews
Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Stakeholders identified but not included in review
<i>Outcomes Assessment</i>	
Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	
Use of alumni surveys to gain perception of learning for improvements to program	
Program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	
Program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	Conducts follow up surveys and maintains file of
<i>Visibility</i>	

Evidence of activities highlighting academic program.	seminars
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Website, freshman programs, high school recruiting, direct mail

Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Required: Natural Resource Conservation & Policy, Introduction to Natural Resource Economics
Interdisciplinarity through integration across different units and disciplines.	9 credit hours required in humans and environment, the program concentrates on the management of the multiple resources that occur in natural systems and encourages creativity through a balanced interdisciplinary education that emphasizes the natural and social sciences.
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	yes
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Senior Thesis requirement
Undergraduate participation in research.	greater focus appears to more at graduate level
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	more than a dozen focusing on specific ecosystem Experimental Farm, Research and Extension Center, field research sites

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	Internship in Natural Resources Management- Supervised pre-professional experience in a business or agency (public or private) may be repeated for credit up to a maximum of 6 credits
Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	Orientation to Natural Resource Management Overview of career opportunities in natural resources. Includes discussions with research faculty and upper class students involved in various aspects of resource management issues. Practicum Option – experience working in greenhouse, on farm, or managed forest
Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	several national, and one natural resource based student run group
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	Experimental Farm, Research and Extension Center, field research sites Teaching & learning takes place in the surrounding natural setting encompassing more than 360 mil acres.
Criterion 4: Community Engagement	

Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/or organizations in areas of research, education, and demonstration).	research, education, and outreach programs reflect the interest of the diverse clientele of the community: native people, rural communities, industry, environmental organizations, farmers, foresters, tourists, fishers, and sports enthusiasts.
Provides opportunities for partnerships with government partners (local, state, or federal).	USDA, CES, LTER, and other state, federal, and other private partners
Provides opportunities for inter-institutional or international collaborations.	Yes, working with the centers and institutes for research
Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	Spring 2008 Master Planning Committee proposal to establish a Sustainable Campus Subcommittee
Campus environmental committee made up of all campus stakeholders.	Spring 2008 Master Planning Committee proposal to establish a Sustainable Campus Subcommittee
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape management, etc).	Renewable energy use and water and landscape projects in progress
Institutional general education requirement in areas relevant to environmental issues (Environmental or Natural Resource Conservation).	Options available include Environmental Ethics and Actions to fulfill Humanities Humans, Earth, and Environment to fulfill Natural Sciences
Campus Office of Sustainability or Campus Sustainability Coordinator.	
Institutional membership in organization focused on sustainability in higher education.	Member AASHE

REGIONAL

Test Program: B1

Category: Public Regional

Evaluation Program: Reclamation, Environment and Conservation Program

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	to provide a relevant and challenging education with basic and advanced courses which will ensure the technical expertise necessary for a major and/or minor that provide in-depth understanding of a particular field of study. This background will enable students to enter and advance in the professional career of their choice.
Clear support for how goals will be met.	Students are challenged with problem solving situations and real life case studies. Learning opportunities provide for application of classroom theories in practical situations.
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Institutional administration, internal, and external reviews Last performed program evaluation ~ 3 years
Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	yes
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Stakeholders identified but not included in review
<i>Outcomes Assessment</i>	
Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	yes
Use of alumni surveys to gain perception of learning for improvements to program	Alumni contacted for annual fund raising, less frequent and informal for other contact
Program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	claims 100% job placement of its graduates conducts follow up surveys and maintains record of
Program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	Alumni web page providing an area for alumni, current students and the general public, to receive information on current activities of the ... Alumni Chapter.
<i>Visibility</i>	
Evidence of activities highlighting academic program.	seminars

Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Website, high school recruiting, campus fliers
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Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Required: Ecological Methods of Research, Technical Writing, Environmental Law
Interdisciplinarity through integration across different units and disciplines.	program focus is on addressing the restoration of natural and cultural resources by the practical application of science and technology and management
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	yes
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Optional Individual/ Independent Study
Undergraduate participation in research.	Optional Individual/ Independent Study
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	yes

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	required summer internship
Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	Required Cooperative Field Experience Option
Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	Reclamation Club in addition to numerous other active clubs and organizations within school
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	On-campus science laboratories, new greenhouse, a 430 acre university farm engaged in measuring the real environment and economic impacts of different farming practices and in providing opportunities for youth, students, farmers and other citizens to learn about these impacts. Designated hall with study area, computer and science labs, and small library
Criterion 4: Community Engagement	

Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/ or organizations in areas of research, education, and demonstration).	The university and extension system have initiated the "Community University Partnership". This program is dedicated to mobilizing their combined resources for the purpose of better serving the local and regional communities. professional engagement with external partners in agriculture, science, business, industry, education, government, civic organizations, and other areas
Provides opportunities for partnerships with government partners (local, state, or federal).	
Provides opportunities for inter-institutional or international collaborations.	Provide agricultural systems research programs utilizing the program Farm in partnership with businesses, universities and agencies.
Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	Theme from strategic plan - Enhance campus climate through student leader engagement in cultural education and cross-cultural activities Sustainability as a social and environmental issue stands out in the Fall 2007 board of regents agenda
Campus environmental committee made up of all campus stakeholders.	campus sustainability issues stand out in the Fall 2007 board of regents agenda
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape management, etc).	Paper and container recycling, LEED in progress, water and landscape management
Institutional general education requirement in areas relevant to environmental issues (Environmental or Natural Resource Conservation).	9 credits of Natural Sciences
Campus Office of Sustainability or Campus Sustainability Coordinator.	no
Institutional membership in organization focused on sustainability in higher education.	no, however other institutions in the state system are

Test Program: B2

Category: Public Regional

Evaluation Program: Environmental and Natural Resource Science

- Completely new curriculum with new options replacing old options. Result of updating to stay current and responding to student demand.

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	The program focuses on restoring ecosystems, addressing energy and climate issues, and creating policies to solve environmental problems today and for the future. Goals: -learn to understand essential biological and physical processes -understand how to analyze human and environmental interactions -build critical thinking skills as a basis for natural resources decision making -gain specialized analytical skills in at least one aspect of environmental science
Clear support for how goals will be met.	this interdisciplinary program brings together elements of both traditional science and social science with an underlying philosophy of sustainability, students obtain the skills to solve environmental problems through a combination of fieldwork and classroom experiences
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Internal evaluation, last performed 5 years
Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	yes
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Stakeholders are identified and included in review process
<i>Outcomes Assessment</i>	
Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	

Use of alumni surveys to gain perception of learning for improvements to program	Used to annually but not recently
Evidence of program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	program does not assist in placing students
Evidence of program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	Used to
<i>Visibility</i>	
Evidence of activities highlighting academic program.	Summer science programs for kids plus several special initiatives within the college, seminars
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Website, freshman programs, high school recruiting, campus fliers, community college recruiting

Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Required: Environmental Politics, Environmental & Natural Resource Economics, Nature Writing
Interdisciplinarity through integration across different units and disciplines.	A multi-disciplinary approach teaches understanding of the interactions between the biological and physical world, human institutions, and human behavior, combines general science with specialized courses in natural resources education, conservation, and management.
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	yes
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	as practicum or participation in sustainable campus program
Undergraduate participation in research.	Gained through practicum
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	Several ecological based institutes

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	Required internship credits, service learning opportunities available Classroom instruction is integrated with hands-on field experience and practiced in easily accessible natural environment.
Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	Numerous opportunities to work with resource agencies in a professional setting
Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	Student centered campus - undergraduates serve on more than 50 university committees Student-led clubs coordinate restoration efforts, raise funds to attend national conferences, and organize elementary school groups for a day of outdoor education. Field trips and research range from weekend camping trips to designing and building sustainable household technologies. The mission of the NR Club is to promote social opportunities and service projects, for both club members as well as the community, in order to develop personal, professional, and environmental enrichment.
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	Spatial Analysis Laboratory, Center for Appropriate Technology (low and no impact living), marine lab and sea research vessel, greenhouse, tree farm, and natural history museum. An abundance of parks, forests, nature preserves and wildlife sanctuaries are located nearby to enhance learning experience.
Criterion 4: Community Engagement	
Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/or organizations in areas of research, education, and demonstration).	Students work with local community forest group and other non-profit groups on environmental and resource issues
Provides opportunities for partnerships with government partners (local, state, or federal).	Numerous resource agencies, local government
Provides opportunities for inter-institutional or international collaborations.	Yes
Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source

Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	From 2004-2009 strategic plan – aim for premier program in interdisciplinary study of environment and natural resources and demonstrate social and environmental responsibility and action.
Campus environmental committee made up of all campus stakeholders.	state wide Green Campus Program
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape mgt, etc).	Recycling, green or LEED building, environmentally responsible purchasing, sustainable food, renewable energy use, water and landscape management
Institutional general education requirement in areas relevant to environmental issues (Environmental or Natural Resource Conservation).	Critical thinking & environmental & social responsibility – option for communication and critical thinking Natural Resource Conservation – to meet one of 3 for human social, political, and economic area
Campus Office of Sustainability or Campus Sustainability Coordinator.	
Institutional membership in organization focused on sustainability in higher education.	Member AASHE

Test Program: B3

Category: Public Regional

Evaluation Program: Environmental Studies

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	To provide students with the literacy, skills, and commitment needed to foster a healthy natural environment and to create a more sustainable, equitable, and peaceful world. Students will acquire the skills and awareness that will enable them to promote positive social change and to improve both the environment and <i>their local communities</i> .
Clear support for how goals will be met.	Through an interdisciplinary program that includes fields from the humanities to the social and natural sciences, A stress on community service by faculty and students, and by training creative problem solvers for environmental issues.
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Institutional administration, internal, and external reviews

Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	yes
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Stakeholders identified but not included in review
<i>Outcomes Assessment</i>	
Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	
Use of alumni surveys to gain perception of learning for improvements to program	maintains contact through program alumni webpage and newsletter
Evidence of program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	
Evidence of program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	
<i>Visibility</i>	
Evidence of activities highlighting academic program.	Community Conservation calendar , seminars
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Website, high school recruiting

Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Required: Environmental Politics or Environmental Regulation, Community and Environment, Nature and Society Available but not required: Sustainable Economic Development, Information & Research & Critical Thinking Skills
Interdisciplinarity through integration across different units and disciplines.	Interdisciplinary approach, students study and apply the different perspectives of the humanities, and the social and natural sciences to environmental issues.
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	yes
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Required senior capstone
Undergraduate participation in research.	Opportunities available
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	many

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	Several opportunities for internships and community service
Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	many nonprofit groups actively recruit interns for Work-Based Learning Field Studies Course available and can be repeated for different experiences
Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	Earth Day planning committee, Sustainable Campus committee Environmental Action Community, Forestry & Wildlife Student Associations, and other national society's present as campus student groups
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	Social science research laboratory, Environmental Science laboratory, college farm, community gardens

Criterion 4: Community Engagement	
Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/or organizations in areas of research, education, and demonstration).	opportunities in the arts and responsibilities of democratic citizenship including communication, collaboration, and committed civic participation. Community based action research
Provides opportunities for partnerships with government partners (local, state, or federal).	local and state more evident
Provides opportunities for inter-institutional or international collaborations.	Unclear about specifics
Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	University efforts to help build a sustainable and just society through research, teaching, service/ outreach and operations.
Campus environmental committee made up of all campus stakeholders.	Sustainable Campus Committee
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape management, etc).	Recycling, sustainable food
Institutional general education requirement in areas relevant to environmental issues (Environmental or Natural Resource Conservation).	Environmental Studies course offered as an option under several perspectives
Campus Office of Sustainability or Campus Sustainability Coordinator.	
Institutional membership in organization focused on sustainability in higher education.	Member AASHE, signatory ACUPCC

PRIVATE

Test Program: C1

Category: Private

Evaluation Program: Natural Resources Management

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	to prepare students to step into leadership roles and to make sound decisions while experiencing successful, interdisciplinary careers that deal primarily with the natural world.
Clear support for how goals will be met.	Through balanced training and education experiences in theory and practical knowledge and individualized student development in and out of the classroom through projects, electives, practicum, internship and self-designed opportunities and student work on/ with interdisciplinary teams.
<i>Program Review</i>	
Provides for periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	The program is only in its third year and has not yet been reviewed since its inception. Does provide for institutional admin and internal review
Provides for program review that includes student focus groups or surveys for internal evaluation or assessment practices.	Not known
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Not known
<i>Outcomes Assessment</i>	

Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	Not known
Use of alumni surveys to gain perception of learning for improvements to program	The program is only in its third year
Evidence of program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	Does assist in placing
Evidence of program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	The program is only in its third year
<i>Visibility</i>	
Evidence of activities highlighting academic program.	Earth Week, College wide Majors Fair every Fall for current students, recently received Environmental Excellence Award Monthly newsletter
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Website, freshman programs, high school recruiting, direct mail
Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Required: Public Policy and the Environment, other options available through Social Science/Policy distributions
Interdisciplinarity through integration across different units and disciplines.	The fundamental components of the natural resources management program are found at the intersection of the natural and social sciences. By providing a solid understanding of the natural environment and human dependence upon that

	environment for a host of amenities.
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	Contribution to local community and literacy in regards to sustainability Institutional statement highlighting natural and social environment and community
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Senior capstone Required natural resources management seminar
Undergraduate participation in research.	Interdisciplinary block courses allow students to spend an entire semester working with professors from multiple disciplines on a single area of focus, often through field research, overnight outings, discussions with experts and a culminating project.
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	Required internships, opportunities available for participation in other activities
Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	Experiential learning is central to the College's education

Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	many opportunities to get involved outside of the classroom, dozens of student clubs and organizations, including a Slow Foods Chapter
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	College farm, garden and greenhouse
Criterion 4: Community Engagement	
Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/or organizations in areas of research, education, and demonstration).	farm and family forum as an annual series of talks and open discussions that include farmers and agriculture experts from the community, and scholars from the college and other educational, government and non-profit organizations throughout the state and the country.
Provides opportunities for partnerships with government partners (local, state, or federal).	
Provides opportunities for inter-institutional or international collaborations.	yes
Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	Through a wide range of liberal arts and career-focused majors, the college fosters the ideals of environmental responsibility, public service, global understanding, and lifelong intellectual, physical, and spiritual development.
Campus environmental committee made up of all campus stakeholders.	yes
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape management, etc).	Recycling, environmentally responsible purchasing, sustainable food, renewable energy use, water and landscape mgt

<p>Institutional general education requirement in areas relevant to environmental issues (Environmental or Natural Resource Conservation).</p>	<p>The general education program combines the skills and content of a strong liberal arts course of study with a focus on the environment.</p>
<p>Campus Office of Sustainability or Campus Sustainability Coordinator.</p>	
<p>Institutional membership in organization focused on sustainability in higher education.</p>	<p>Member AASHE, signatory ACUPCC</p>

Test Program: C2

Category: Private

Evaluation Program: Agriculture & Natural Resources in Sustainable Systems

- Recent changes due to result of a departmental self study and external review

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	Students will learn about and gain experience in planning, supervising, and evaluating agricultural and environmental enterprises and applying technical knowledge to address management challenges
Clear support for how goals will be met.	Education is the overarching priority. This begins with students being involved in hands-on laboratories in the majority of courses - through stewardship, leadership, cooperation, teamwork, and safe and ethical work habits.
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Institutional administration, internal, and external reviews 1 year since last review
Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	no
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Stakeholders are identified and included in review process
<i>Outcomes Assessment</i>	

Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	yes
Use of alumni surveys to gain perception of learning for improvements to program	Surveys sometimes annually to every 10 years
Program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	yes
Program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	yes
<i>Visibility</i>	
Evidence of activities highlighting academic program.	Earth Day and college labor day goes green
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Website, campus fliers
Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Required: Agricultural Economics or Principles of Microeconomics, Scientific Knowledge and Inquiry

Interdisciplinarity through integration across different units and disciplines.	natural-resource foundation with science courses and a significant number of social-science electives.
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	yes
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Required senior capstone
Undergraduate participation in research.	encouraged by the College Independent Study or Team Initiated Study courses to provide students with the opportunity to study topics not ordinarily covered in regular College course offerings, to follow up on previous research, or to undertake projects not otherwise available through regular courses.
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	Internships available once reach sophomore standing Special programs featured by institution: farm and food project, service learning and sustainability

Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	unique practical experience working on the College's educational farm, which includes beef cattle, hogs, sheep, goats, field crops, and a horticultural operation that produces certified organic vegetables, fruits, herbs, as well as a variety of annual and perennial ornamentals for retail sale - REquired
Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	several, including Agriculture Union
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	7,700 acres of forest and 1,200 acres for instruction in agriculture and natural resources. College farm, forest, gardens, and greenhouse.
Criterion 4: Community Engagement	
Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/or organizations in areas of research, education, and demonstration).	Students participate in traditional community service, stewardship of natural resources, and preservation of regional culture and traditions.
Provides opportunities for partnerships with government partners (local, state, or federal).	
Provides opportunities for inter-institutional or international collaborations.	
Criterion 5: Institutional Commitment to Environmental Sustainability	

Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	Through the Agriculture and Natural Resources Program, Sustainability and Environmental Studies Program, and the Office of the Sustainability Coordinator students and faculty explore how current resource needs can be met without compromising the ability of future generations to meet their own needs. “...find new ways to apply our mission to contemporary times by ... serving our community and beyond and living sustainably to conserve limited natural resources.”
Campus environmental committee made up of all campus stakeholders.	Campus environmental policy committee
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable use, water and landscape management, etc).	Recycling, green or LEED building, environmentally responsible purchasing, sustainable food, renewable energy use, water and landscape mgt
Institutional general education requirement in areas relevant to environmental issues (Environmental or Natural Resource Conservation).	no
Campus Office of Sustainability or Campus Sustainability Coordinator.	yes
Institutional membership in organization focused on sustainability in higher education.	Member AASHE, signatory ACUPCC

Test Program: C3

Category: Private

Evaluation Program: Environmental Studies

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	The aim of the Environmental Studies program is to encourage broad and thorough exposure to, and appreciation for, the nature of diverse and complex ecosystems, and to examine the relationships between humans and nature. The program develops compassionate, informed, and responsible citizens who are prepared to offer constructive solutions to environmental problems and help heal damaged relationships between people and nature.
Clear support for how goals will be met.	Learning is self-directed and self-designed for every student, class size is extremely small and teaching is very personal with a high level of interaction between students and faculty, emphasis on experiential learning ("learning-by-doing") and self-directed study.
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Internal and Institutional Administration
Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	yes
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Stakeholders identified but not included in review process
<i>Outcomes Assessment</i>	
Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	yes
Use of alumni surveys to gain perception of learning for improvements to program	Yes, no info available on time
Program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	Yes - informally
Program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	informally
<i>Visibility</i>	
Evidence of activities highlighting academic program.	Earth day activities, college preview weekend, green business expo
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Website, high school recruiting, campus fliers
Criterion 2: Curriculum appropriate to the goals of environmental sustainability	

Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	Options available for: Environmental Politics, Ecological Economics
Interdisciplinarity through integration across different units and disciplines.	a diverse curriculum designed to encourage pursuit of interests across disciplinary lines
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	yes
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Yes, Independent Study, Senior Projects
Undergraduate participation in research.	College offers active and dynamic laboratories for students and gives them the opportunity to be on the cutting edge of environmental and sustainability research.
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	marine, agro-ecology research centers

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	Opportunities available
Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	Hands on coursework emphasis
Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	Student Environmental Network
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	College farm and gardens focusing on specific environment
Criterion 4: Community Engagement	
Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/or organizations in areas of research, education, and demonstration).	community supported agriculture
Provides opportunities for partnerships with government partners (local, state, or federal).	USDA
Provides opportunities for inter-institutional or international collaborations.	yes
Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	educational programs reflect the College's commitment to the environment and social justice.
Campus environmental committee made up of all campus stakeholders.	Sustainable Community Development Program

Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable energy use, water and landscape management, etc).	Recycling, sustainable food, renewable energy use, water and landscape management
Institutional general education requirement in areas relevant to environmental issues (Environmental or Natural Resource Conservation).	Options available under Personal Values and Social Systems distribution areas
Campus Office of Sustainability or Campus Sustainability Coordinator.	
Institutional membership in organization focused on sustainability in higher education.	Member AASHE, signatory ACUPCC

Appendix J: Framework Test Data – Abbreviated for side by side comparison Land Grant

Criterion 1: Maintenance and Enhancement of Academic Program			
Indicator	A1	A2	A3
PG-a	preparation, understanding	knowl, solutions, results	knowl and success
PG-b	balance classroom, hands-on	ITD tmwk, problem slvng	balanced ITD, field, alb
PR-a	admin, internal	admin, internal, external, 2002	admin, internal, external, 2006
PR-b		yes	
PR-c	ID, not included	ID, not included	ID, not included
OA-a			
OA-b	exit interviews	1 and 3 yrs w/ univ	
OA-c	placement	excellent placement	
OA-d		surveys, tracking, alumni info	follow up surveys, recorded
V-a	public events, seminars	summer program, seminars	seminars
V-b	FP, HSR	FP, HSR	FP, HSR, DM

Criterion 2: Curriculum appropriate to the goals of environmental sustainability			
Indicator	A1	A2	A3
EL	R: econ O: writing	R: policy, econ, wrtg	R: policy, econ
ITD		freedom thru electives	bal natural and social sciences
CE	EF, CLC	Lit, EF, CLC	Lit, EF, CLC
LAK	senior seminar	senior portfolio	senior thesis
UGR	yes	yes	more focus at graduate level
IMS	for educ rsch network, coastal	coastal, for sci instit	more than a dozen

Criterion 3: Activities and experiential hands-on learning opportunities			
Indicator	A1	A2	A3
SR	intern opps, SL emphasis	SL emphasis, CS recognition	internship in NRM
WE	reqd directed work exp	summer in the field opp	orientation to NRM
LA	students promoting sustainability	students prmtg env awareness	natural resource group
PHY	farm, lab, GH, comp lab, nat env	exp for, arboretum	farm, research sites, nat env

Criterion 4: Community Engagement			
Indicator	A1	A2	A3
CP	comm ag, for, garden clubs	local govt, KAB, extension	local comm, env org
GP	USDA, NPS, NSF	UDSA FS, F&W	state and federal levels
COL	yes	yes	yes

Criterion 5: Institutional Commitment to Environmental Sustainability			
Indicator	A1	A2	A3
IS	statement to dev sust plan	univ commitment to env and sust	Mstr Plng - Sust Campus Comm
CEC	called for in strategic plan	solid green campaign	Mstr Plng - Sust Campus Comm
ES	in progress by students & admin	many	renew energy, water & landscp
GER	ES option	options available	options available
COS			
ORG	AASHE, ACUPCC	AASHE, Thaillores	AASHE

Regional

Criterion 1: Maintenance and Enhancement of Academic Program			
Indicator	B1	B2	B3
PG-a	provide, ensure, enable	understd, build skills	skills, aware, promo, improve
PG-b	prblm solving lrng opp	bal ITD w/ fieldwork	ITD, hum, soc, sci, Com Serv
PR-a	admin, internal, external, 2005	internal, 2003	admin, internal, external
PR-b	yes	yes	yes
PR-c	ID, not included	ID & included	ID, not included
OA-a	yes		
OA-b	contacted for fund raising	used to not recently	maint vol contact
OA-c	placement, surveys, records	no placement asst	
OA-d	alumni chp news on web		
V-a	seminars	summer prog, seminars	com conser cal, seminars
V-b	HSR, CF	FP, HSR, CF, Com Coll Rec	HSR

Criterion 2: Curriculum appropriate to the goals of environmental sustainability			
Indicator	B1	B2	B3
EL	R: ecol rsch, wrtg, env law	R: politics, econ, wrtg	R: politics, socio
ITD	pract applic of sci, tech, mgt	MDS, phys & hum, NRECM	hum, nat, soc sci to env issues
CE	Lit, EF, CLC	Lit, EF, CLC	Lit, EF, CLC
LAK	Individual/ Independ study	practicum/ sust campus prog	reqd senior capston
UGR	Individual/ Independ study	gained thru practicum	opps available
IMS	univ farm	several ecol based	many

Criterion 3: Activities and experiential hands-on learning opportunities			
Indicator	B1	B2	B3
SR	reqd summer intern	reqd intern, SL opps	opps for inter, com serv
WE	coop field exp option	opps to work w/ agencies	WBL, field studies
LA	reclamation club	student ctrd campus	sust camp comm
PHY	lab, GH, farm, labs, library	labs, CAT, GH, tree farm, nat env	soc/ env labs, farm, com gard

Criterion 4: Community Engagement			
Indicator	B1	B2	B3
CP	local and regional partners	students work w/ comm, non prof	comm based action rsch
GP		sev govt agencies, mostly local	local and state
COL	yes	yes	unclear about specifics

Criterion 5: Institutional Commitment to Environmental Sustainability			
Indicator	B1	B2	B3
IS	strategic pln statement	stateg pln - soc & env resp	sust thru tchg, rsch, outrch
CEC	called for in board of regents	green campus program	sustain campus committee
ES	recyc, LEED, water & landscp	many	recycling, local food
GER	opt under natural science req	opt to meet perspectives	env stud opt for perspectives
COS			
ORG		AASHE	AASHE, ACUPCC

Private

Criterion 1: Maintenance and Enhancement of Academic Program			
Indicator	C1	C2	C3
PG-a	prepare ITD careers	exp and knowl	expos, appre, informed
PG-b	bal trng educ individ	hands on learning	learning by doing
PR-a	prov for admi inter	admin, int, ext, 1 yr last rev	admin, internal
PR-b	not known	no	yes
PR-c	not known	ID, not included	ID, not included
OA-a	not known	yes	yes
OA-b	only in third year	surv 1 to 10 yrs	
OA-c	does assit in placing	yes	yes
OA-d	only in third year	yes	
V-a	earth wk, fair, newsletter	earth day, green labor day	earthday, prev wk, grn expo
V-b	FP, HSR, DM	campus fliers	HSR, campus fliers

Criterion 2: Curriculum appropriate to the goals of environmental sustainability			
Indicator	C1	C2	C3
EL	R: policy	R: econ	opt for pol, econ
ITD	nat and soc sci	NR found w soc sci elect	enc lrng across disciplines
CE	EF, CLC - comm focus	Lit, EF, CLC	Lit, EF, CLC
LAK	senior capstone	reqd senior capstone	senior project
UGR	ITD block course	indep or team study	opps
IMS			marine, agricul ctrs

Criterion 3: Activities and experiential hands-on learning opportunities			
Indicator	C1	C2	C3
SR	reqd intern, opps for other	opps inter, SL emphasis	opps avail
WE	exp lrng central to edu	reqd	hands on emphasis
LA	slow food chp	several coll wide oppt	student env network
PHY	farm, garden, GH	farm, for, gardens, GH	farm and gardens

Criterion 4: Community Engagement			
Indicator	C1	C2	C3
CP	comm forum	com ser stewardship	csa
GP			USDA
COL	yes		yes

Criterion 5: Institutional Commitment to Environmental Sustainability			
Indicator	C1	C2	C3
IS	fosters env respons	serv com, sust	commit to env and soc justice
CEC	campus wide	campus env pol cmttee	sust comm dev program
ES	recy, purch, ood, renew, mgt	many	recy, local food, renew, mgt
GER	env lib arts gen ed prog	no	opts under distribution areas
COS		yes	
ORG	AASHE, ACUPCC	AASHE, ACUPCC	AASHE, ACUPCC

Appendix K. Framework Scoring Template

Criterion 1: Maintenance and Enhancement of Academic Program	
Indicator	Strategies/ Data Source
<i>Program Goals</i>	
Program goals are clearly and publicly defined and expressed in terms of results seeking to achieve and focus on the specific knowledge, skills, and attitudes conveyed to students upon completion of the academic program.	Subjective - Keywords from goals statement reflecting results, knowledge, skills, and attitudes. All four addressed = score of 4
How goals will be met.	Presence of a statement or curriculum reflecting. Scored as fully met or did not meet.
<i>Program Review</i>	
Periodic review by institutional administration, regular intervals of internal review, or review by external bodies.	Scored as: 4 = two forms of and recently performed 3 = two forms 2 = one form and no recent review
Program review that includes student focus groups or surveys for internal evaluation or assessment practices.	Scored as fully met or did not meet.
Stakeholders associated with program are identified and are involved in reviewing data from program evaluation or assessment where concerned.	Scored as fully (identified & included), partially (identified OR included), not met (neither).
<i>Outcomes Assessment</i>	
Indirect Measures of student learning include addressing whether students believe they have achieved learning goals (versus just asking about quality of instruction).	Scored as fully met (yes) or did not meet (no).
Use of alumni surveys to gain perception of learning for improvements to program	Subjective depending on information provided or available.
Program assistance in placing students and record keeping for tracking student placement and subsequent employment and educational status.	Subjective depending on information provided or available.
Program tracking career development through contact with alumni over time (may be kept informally by faculty or formally by program, alumni office, or institutional research office).	Subjective depending on information provided or available.
<i>Visibility</i>	
Evidence of activities highlighting academic program.	Scored as: 4 = several, 3 = at least two, 2 = one
Evidence of visibility through a variety of avenues (web, mail, high school recruiting).	Scored as: 4 = several, 3 = at least two, 2 = one

Criterion 2: Curriculum appropriate to the goals of environmental sustainability	
Indicator	Strategies/ Data Source
Coursework that includes policy, economics, socio-scientific issues, and writing relevant to the issues of environmental sustainability.	All four components met score = 4
Interdisciplinarity through integration across different units and disciplines.	Presence of a statement or curriculum reflecting. Scored as fully met or did not meet.
Emphasis on literacy in regards to sustainability, how the campus functions within the ecosystem, and a sense of place and contribution to the local community.	Provided by response from survey. Scored as fully met or did not meet.
Student opportunities to demonstrate quality of learning and application of knowledge (example – senior capstone projects).	Scored as fully met (yes) or did not meet (no).
Undergraduate participation in research.	Scored as fully met (yes) or did not meet (no).
Interdisciplinary or multidisciplinary structures for research, education, and policy development on sustainability issues.	Scored as: 4 = several forms of 3 = at least two 2 = one

Criterion 3: Activities and experiential hands-on learning opportunities	
Indicator	Strategies/ Data Source
Evidence of student participation in activities that demonstrate social responsibility (volunteer activities, internships, service learning, community service).	Scored as: 4 = required 3 = emphasis on 2 = opportunities available
Encouragement to participate in appropriate work experience, such as on the job training or comprehensive field projects that will expose student to real world working conditions.	Scored as: 4 = required 3 = emphasis on 2 = opportunities available
Evidence of learning through action (student led initiatives, student run organizations, student run sustainable outreach programs).	Scored as: 4 = several forms of 3 = at least two 2 = one
Availability of physical resources in the form of dedicated and readily accessible buildings, land, equipment, farm, forest, and/or gardens.	Scored as: 4 = numerous on site resources, off site, and focus on use of surrounding environment 3 = some of each 2 = limited

Criterion 4: Community Engagement	
Indicator	Strategies/ Data Source
Provides opportunities for partnerships with local community (collaboration with local landowners and/ or organizations in areas of research, education, and demonstration).	Scored as: 4 = several partnerships 3 = some 2 = limited
Provides opportunities for partnerships with government partners (local, state, or federal).	Scored as: 4 = several partnerships 3 = some 2 = limited
Provides opportunities for inter-institutional or international collaborations.	Scored as: 4 = several partnerships 3 = some 2 = limited 2 = limited

Criterion 5: Institutional Commitment to Environmental Sustainability	
Indicator	Strategies/ Data Source
Institutional statement (may be found in master plan or strategic plan) on sustainability or environmental stewardship.	Subjective based on how clear statement was. 4 = directly addressed 3 = some mention of
Campus environmental committee made up of all campus stakeholders.	Scored as fully met (yes) or did not meet (no). Scored as partially if in progress.
Campus commitment to environmental sustainability (recycling, green building, environmentally responsible purchasing, sustainable food, renewable energy use, water and landscape management, etc).	Scored as: 4 = numerous examples 3 = at least 5 examples of 2 = some examples or in progress
Institutional general education requirement in areas relevant to environmental sustainability issues (Environmental or Natural Resource Conservation).	Scored as: 4 = required 3 = emphasis on 2 = course opportunities available 1 = no evidence of
Campus Office of Sustainability or Campus Sustainability Coordinator.	Scored as fully met (yes) or did not meet (no).
Institutional membership in organization focused on sustainability in higher education.	Scored as fully met (yes) or did not meet (no).