REFLECTIVE ESSAY

Why a Bachelor of Science Degree Program in Global Environmental Science?
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Interdisciplinary environmental science has become in recent years an important part of the scientific endeavor. We are also currently living in a world where development has become irrevocably linked with the environment. Human activities have been recognized as strong agents and forcings within the Earth system, and as a result, the concept of sustainable development has emerged as an important theme in the national and international arena (witness the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro and the World Summit on Sustainable Development in Johannesburg in 2002). To the extent that natural science is objective, sustainability is an objective concept, and it is feasible to establish scientifically the environmental burden that is “admissible” on the basis of the objectives of sustainability. To some extent based on the recognition that sustainability is an objective concept, the "greening" of industry and business has become an important goal in some countries. In addition, there has developed a strong need for explicit interactions across the physical (including chemical) and biological (including human) sciences that would improve our ability to understand environmental effects from human activities and natural causes and their potential feedbacks, and to develop appropriate environmental regulation and protection policies, as well as the technological means to implement them. Regardless, environmental problems are increasing worldwide as the developing countries rapidly industrialize.

Looking at the whole of the global environmental crisis, there are numerous parts of the problem that demand policy development, analysis, and planning at all levels of governance. However, the world’s governmental, industrial, and academic structures have been slow to develop an effective response to this situation. Part of the reason for the lack of an effective response has been an extreme ignorance on the part of society, including its policy makers, for the complexities of problems of the environment and the concepts of sustainability. To some degree, this ignorance stems from a woefully inadequate rigorous education in earth, ocean, ecological, and atmospheric sciences. In particular, while various parts of the scientific community have developed monitoring, modeling, and experimental approaches to articulation of the basic scientific research questions related to global environmental issues, educational programs at the undergraduate level in global environmental and Earth system science (including concepts of sustainability) have generally been part of another established curriculum. Recognizing this situation, in 1995 I proposed to the faculty of the Department of Oceanography that we develop an interdisciplinary undergraduate B.S. degree program. As a result of our discussions, a planning document was written up, endorsed by the oceanography faculty, and submitted to the University of Hawai’i at Mānoa (UHM) administration in the fall of 1996. After complete and thorough review of the proposed program by the UHM Faculty Senate and the administration, the Board of Regents granted provisional academic status to the Bachelor of Science Degree
Program in Global Environmental Science (GES) within the School of Ocean and Earth Science and Technology (SOEST) and administered by the Department of Oceanography on October 10, 1997. We started the program with two students and we now number about 80!

Global environmental science has much to offer the student who is interested in the environment, the effects of humans on the environment, and the concepts of sustainability. Global environmental science is an holistic and rigorous scientific approach to the study of the Earth system composed of the interacting reservoirs of water, rock and soil, ice, air, and life. The subject matter of GES focuses on these global reservoirs and their interfaces and the processes acting upon and within this interactive system including human activities. The academic program has important ties to the more classical sciences of geology and geophysics, meteorology and climatology, oceanography, and ecology, as well as to the social sciences. Thus, the scope of GES is broad. However, the skills developed in this program can be brought to bear on environmental and sustainability issues at the local and regional level and provide the necessary tools to appreciate the science behind the concept of the Hawaiian ahupua’a system as well.

The University of Hawai’i System Strategic Plan was just published in June 2002. One action strategy of the Strategic Plan is to “enhance the involvement of undergraduate students in the creation and transfer of knowledge”. This implies research-intensive courses, student research opportunities and related employment, joint faculty-student publications, and service learning opportunities. In addition, there is the recent recognition for the necessity to reinvigorate science teaching at leading research universities throughout the nation. We in GES are far ahead of the game. Many of our professors apply as much innovation and energy to their teaching and mentoring efforts as they invest in research. They encourage students to participate in active research programs with world-class scholars and provide the opportunity for hands-on research experiences. Students are exposed to research (experimental, observational, and theoretical) methodologies and are required to design and conduct a senior research project using one or more of these methodologies. Students then complete a senior research thesis and present their results in a public seminar with faculty, graduate students, and peer undergraduate students.

The ultimate objective of the GES program is to produce students informed in the environmental sciences and the concepts of sustainability at a rigorous level who are able to go on to graduate or professional school; enter the work force in environmental science positions in industry, business, or government; enter or return to teaching with knowledge of how the Earth system works; or enter the work force in another field as educated persons with the knowledge required to enable them to become wise environmental stewards of the planet.