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THE SUSTAINABLE BIOSPHERE INITIATIVE: A STUDENT CRITIQUE AND CALL TO ACTION

Introduction

As students planning careers in Ecology, we read about the "Sustainable Biosphere Initiative" (SBI) (Lubchenco et al. 1991) with great interest. SBI represents the collective vision of the "ecological establishment" outlining a possible course for future ecological research. We had mixed reactions. While we support the broad goals presented in SBI, the purpose of this commentary is to address several questions. First, does this document foreshadow future research funding priorities in ecology? Second, does SBI require a fundamental "retooling" for ecological research? Third, how will educational reforms necessary for SBI be realized? And fourth, as aspiring ecologists, how can we participate in the future implementation of SBI?

Three central themes were selected as the foci of future research efforts: global change, biodiversity, and sustainable ecological systems. SBI charges us as ecologists to (1) further our understanding of the ways ecological complexity controls global processes, (2) discover linkages between biological diversity and ecological processes, and (3) elucidate underlying ecological processes in natural and human-dominated ecosystems (Holland et al. 1991).

As we interpret SBI, its main assumption is that advances in understanding ecological

processes are fundamental for solving environmental problems. SBI calls for the "acquisition, dissemination, and utilization of ecological knowledge required to ensure the sustainability of the biosphere" (Risser et al. 1991:626). The emphasis is on the acquisition of ecological knowledge through basic research.

An important aspect of SBI is that current and future environmental problems, ranging from local to global scales, must be addressed within an interdisciplinary framework. Yet, the traditional dogma that "investigator-initiated, peer-reviewed basic research" (Lubchenco et al. 1991:373) is the best approach for tackling environmental problems still prevails. There seems to be a contradiction here. Is basic ecological research really central to solving environmental problems?

In many cases, a sufficient foundation of ecological information already exists that should be used in environmental restoration, remediation, and management. Given the importance of addressing environmental problems from an interdisciplinary perspective, it is unfortunate that applied research seems tangential to basic research in SBI. Shouldn't applied research questions actually be a central theme? Wouldn't SBI be substantially stronger if it contained focused proposals for (1) tackling specific environmental problems, and (2) evaluating ecological information and translating it into a format that could be implemented in the field by policy makers and managers? For ecologists to really make strides towards solving environmental problems, we must bring the laudable, but lofty, goals expressed in SBI back to earth. Applied scientists must be directly involved. Solutions will be more forthcoming only through the coordination of applied and basic research via multi-university or research group consortia and governmental/industrial/academic partnerships.

Were any choices made regarding which research priorities will be most relevant in solving environmental problems? We think not. From our perspective as students, SBI identifies three central themes we should be working on, but it does not help us decide on research priorities. SBI is an exceptionally inclusive document. Virtually all ecologists can find their research interests embedded in the "Intellectual Frontiers of Ecology" (Lubchenco 1991:381). We think that solving urgent environmental problems mandates that we redirect our efforts. Unfortunately, some of us may be excluded in the process, unless, of course, we all change our own priorities.

SBI and Education

Although many interesting ecological topics are addressed in SBI, one important issue is not addressed adequately: human population growth, coupled with problems of efficient resource allocation and use. Driven by population growth and the rising standard of living in many regions around the world, human demand for resources is rising dramatically (Brown 1991). The world population will soon reach 5.4 billion. With a growth rate of 1.8%, population of the world may exceed 10 billion people in less than 75 years. While advances in scientific knowledge are indeed necessary to achieve a sustainable biosphere, any efforts to understand and slow global change of the biosphere may be largely wasted if the human population continues to grow at its present pace.

It is essential that educational programs implemented under SBI confront the problems of human population growth and overpopulation. Such a commitment to honestly addressing the challenge of overpopulation and resource allocation will indeed be a positive step towards achieving the broad goals outlined in SBI. Furthermore, it is crucial that such educational programs focus on how to manage ecological systems and natural resources to achieve biosphere sustainability.

Clearly, basic and applied research, education, and environmental decision-making are interrelated. Ecological information will only be useful for solving environmental problems if decision makers are knowledgeable about ecological phenomena in particular, and science in general. How will SBI reach policymakers, let alone the classroom, if the training of science educators is not adequate? In this era of budget cuts, and the subsequent steady erosion of teaching resources, can we really expect trickle-down science to fare any better than trickle-down economics? We strongly suggest that not only should ecology course requirements be strengthened and expanded at the college level, but also that it is imperative to strengthen ecological as well as basic science education at the primary and secondary levels of our public schools. Educational

efforts should involve participation by ecologists in local public schools as well as a concerted effort to better train teachers in ecological concepts and environmental problem solving. Without a strong scientific background, it is unlikely that the general public will be responsive to the broad goals outlined in SBI.

Putting SBI into Action

Current students must help shape the future course of SBI and its implementation. What can students do to further the aims of SBI? One possibility is for students, in consultation with interested faculty and administrators, to convene multidisciplinary panels to discuss the implementation of SBI on their campuses. Interdisciplinary panels could consist of knowledgeable and interested individuals representing, for example, geographers, physical and social scientists, economists, and ecologists. Those who are not members of the academic community such as legislators, representatives of the local Chamber of Commerce, natural resource managers, ranchers, representatives of industry, and the media should also be included. The format of the programs could vary according to the expertise of the panel members and the issues of regional concern. We plan to hold the first panel at the University of Wyoming in the spring of 1992. Topics we are considering to promote dialogue on regional issues in Wyoming are water use and allocation, hazardous waste disposal, sustainable forest management, and mineral extraction.

Summary

Although we perceive some significant omissions in SBI, we also appreciate the wake-up call for ecologists to get involved in real world problems. The most complete ecological information will not be persuasive without communication between scientists, managers, policymakers and the public. Without communication, SBI will not be recognized by historians as anything that made a difference. Solving complex environmental problems will demand our collective creativity, and we all must play a part in linking research to public awareness and decisionmaking.

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