CHAPTER 10

CATALYZING SUSTAINABILITY: CORNELL UNIVERSITY'S FIELD PRACTICUM IN CONSERVATION AND SUSTAINABLE DEVELOPMENT

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Abstract

Human society is increasingly facing a variety of complex, intertwined environmental conservation and rural development issues. For example, national park objectives have expanded from the conservation of biological diversity to also include contributing to the livelihood and development needs of local people. Human settlements in fragile uplands create conflicts between upstream agricultural livelihoods and the downstream effects of watershed degradation. Distant and remote populations are brought into both collaborative and conflictual relationships over their interests in shared natural resources, requiring new scales of analysis and integration of the biophysical and social sciences. These conservation and sustainable development (CSD) issues cut across many of the traditional boundaries in natural resource management. As a result, the boundaries of the traditional disciplines of ecology, agricultural sciences, and the social sciences must be spanned, and science must increasingly be integrated with political and local collaborative processes of governance and decision making. These matters and other related issues are considered in this chapter.

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Introduction

The Graduate Minor in Conservation and Sustainable Development (CSD) was formed at Cornell University in 1991 to provide graduate students with the opportunity to acquire an interdisciplinary perspective on environmental problems and to learn interdisciplinary problem-solving skills. The minor recognizes the importance of traditional disciplinary expertise, while at the same time it promotes a holistic perspective grounded in familiarity with other disciplines, experience in analyzing real-world conservation and rural development problems in interdisciplinary teams, and skills in building collaborative relationships with local communities. A graduate level course, the Field Practicum in Conservation and Sustainable Development (Natural Resources 619), was established to provide experience in interdisciplinary CSD principals and techniques.

The field practicum has been carried out in conjunction with two Cornell University research programs, each working in several Latin American countries. The Cornell Program in Ecological and Social Science Foundations of Conservation, an NSF-funded Research Training Group, provides graduate training in interdisciplinary research skills on current problems in environment and development, and is working in five Latin American countries. The Cornell International Institute for Food, Agriculture, and Development (CIIFAD) seeks to integrate knowledge generation with particpatory and collaborative processes of development and natural resource management, with projects in Latin America, Africa, and Asia.

The field practicum has been integrated into these ongoing programs of CSD research and practice for several reasons. From an educational point of view, this enables students to have a hands-on experience working with real conservation and development issues in the field. From the point of view of broader CSD programs, the field practicum provides an opportunity to catalyze collaborative CSD efforts through knowledge generation, community participation, and building new collaborative organizational ties.

Promoting CSD from a university, as opposed to from a project or program, presents a unique set of constraints and opportunities and requires a unique set of processes. This paper will begin by presenting the definition of CSD that guides our process, one which emphasizes multidisciplinarity and the integration of research and practice. Subsequently, recent experiences of Cornell University's Field Practicum in Conservation and Sustainable Development will be summarized in order to draw some broader lessons about possibilities and strategies for catalyzing sustainability from an educational and research organization.

Defining Conservation and Sustainable Development

The term conservation is well established in Western thought, and, when applied to natural resources, refers to the management, use, and protection of a natural resource to prevent over-exploitation or destruction. In the U.S., the conservation movement has encompassed both efforts to promote the "wise use" of natural resources as well as ecosystem preservation (Andrews 1999). The term sustainability is more recent , and rose to prominence in the late 1980s. It is generally defined as "meeting the needs and aspirations of the present and future generations without compromising the ability of future generations to meet their needs" (IUCN/UNEP/WWF 1991). Sustainability serves as a bridge between conservation and development (development may be defined as improvements in human welfare), which have otherwise often been seen as contradictory.

Sustainability has been criticized as a vague and meaningless concept, the "odd delusion of being able to have your cake and eat it, too" (Soule 1995:159), that is broad and fuzzy enough to be appealing to everyone but masks fundamental contradictions (Redford 1992). Yet the term has spread rapidly and widely. International and government agencies and committees on sustainable development have been set up at the highest levels, and, at the other end of the spectrum, grass roots organization espousing sustainable development have sprung up in rural and urban communities worldwide. While some find the vagueness of the term sustainability problematic, the ambiguity, multi-vocality, and condensation of meaning in the term sustainability are themselves characteristic of powerful symbols (Kertzer 1988) and are central to the term's power and prominence. As such, sustainability embodies and symbolizes the interconnectedness among people and nature, and the importance of pluralistic, interdisciplinary, and participatory ways of resolving environmental and development problems.

Yet, to endure, sustainability must be more than a powerful term or symbol in social and political discourse. Operationalizing and applying the concept of sustainability requires some common understandings and tools. Sustainability seeks to maximize a variety of diverse goals across the biological and resource system, the economic system, and the social system (Barbier 1987), both within and across generations (Dixon and Fallon 1989). There are at least six dimensions of sustainability: (1) avoiding land degradation; (2) conserving biological diversity, including species and ecosystems; (3) maintaining ecological processes services, including watersheds, estuaries, and the global atmosphere; (4) socio-economic sustainability, or sustaining and improving human livelihoods; (5) the wise use of agrochemicals and fossil fuel inputs to avoid human health impacts, effects on ecosystems, and overdependence on

finite resources; and (6) equity and fairness, among the developed and lesser developed countries, urban and rural populations, racial groups, gender, etc. (Schelhas 1994). Within each of these dimensions, specific, measurable indicators can be developed to concretely evaluate sustainability. For example, numbers of bird species found in a landscape may be an indicator of the biodiversity dimension, and increasing household income or improving health status could be indicators of the socio-economic dimension. Yet prioritizing and optimizing among these indicators is a much more difficult question. The different dimensions of sustainability are value-oriented, and in effect represent different value spheres that are incommensurable, or have no common denominator by which they can be compared.

Because these tradeoffs are fundamentally value-oriented, there are multiple ways in which they can be made (Redclift 1987). Thus issues of sustainability cannot be definitively resolved in the abstract. Any attempt to do so seems to only produce endless argument, because there are multiple perspectives and rationalities involved. Because sustainability decisions can only be made using preconceived, value-based criteria (Redclift 1987), different people, each using impeccable logic can derive different conclusions, or recommend different solutions, to their differently defined CSD problems.

Because of the value-oriented and indeterminate nature of CSD decision making, it can also be viewed as a process that seeks to make incremental improvements across the broad range of indicators by shifting from a zero sum approach to a collaborative problem-solving approach that is focused on a specific geographical area. Although CSD must have a place as its focus, it also deals with issues of concern to people across the full range of the local to global continuum. In fact, the distribution among different stakeholder groups of the costs and benefits of resource use is often an underlying source of conflict in complex resource management problems. For example, there are often tensions between farmers and downstream landholders, fisherman, and coastal tourism facilities in watersheds; and between local people and international conservation interests around national parks and other protected areas. The multiple perspectives of these stakeholder groups must be taken into account through dispute resolution and collaborative problem solving. Campbell (1995:125) has suggested that the real challenge of sustainability is not to define it [or develop indicators], but to develop processes, forums, and modes of inquiry and learning that can support a broad societal debate and decision making about the goals and actions of conservation and sustainable development efforts.

This is not to claim that participation and collaboration are ever complete or perfect, or that solutions can be developed that fully meet the objectives of all stakeholders. Some possible resource uses must always be forgone by some people in order to meet the needs of other interests or to provide for sustainable resource use over the long term. There are often winners and losers, and change may be most likely to occur when coalitions form and develop enough strength to advance their interests. But groups who are left out of agreements or whose needs are not fully met generally continue to be heard from, creating an incentive to strive for full participation and a recognition that most complex issues are managed rather than resolved. CSD is a broad, interdisciplinary, multi-party social learning and adaptive management approach. It points to a "fundamentally messy, contingent, and ambiguous intermingling of knowledge, power, interests, and chance in the workings of the world" (Parson and Clark 1995: 457). Yet, in spite of the complexity and lack of definitive resolution to many problems, strategies can be developed that bring about real improvements in environmental and social indicators.

A broad view that encompasses both indicators and processes points to a variety of elements of a CSD approach. Although processes of collaborative decision making and participation are critical, they must be supplemented with contributions from science and technology. For example, forestry, agroforestry, and agricultural practices exist and can be developed that simultaneously improve the biodiversity and economic returns in human dominated landscapes. Agricultural practices often can be developed that have sufficient soil and watershed conservation benefits to enable people to farm some sensitive areas with few downstream impacts. Social science research can help illuminate issues of power, gender, and racial inequity that influence conservation and sustainable development, and understand the micro-level decision-making processes and behaviours of rural people. Economic research can help compare values and make trade-offs. Ethics can provide guidance in making choices among different resource uses, avoiding the difficulties of considering all competing claims on a resource as equally valid.

In the end, CSD is multifaceted. It requires a broad awareness of the perspectives and knowledge of other disciplines, of practitioners, and local people. Its practitioners must have skills and experience in group process and participatory techniques. Solutions often require knowledge generation and development of new "technologies". In all cases, it is important to focus on incremental achievements to address real problems rather than abstract debates.

The Field Practicum in Conservation and Sustainable Development

Cornell University's field practicum seeks engagement at a specific research site in order to make a positive contribution towards the process of conservation and sustainable development. The practicum takes place at an existing Cornell research site, and is developed in collaboration with local partners engaged in both research and practice at the site. Generally, this includes government agencies and NGOs, a host-country university, and community groups. The leaders of the practicum work with these groups for up to a year in advance of the practicum itself to select a conservation issue and a site that is of both academic and practical relevance. Advance meetings are held between Cornell faculty, host-country agency and university participants, and community groups to develop a mutually agreed upon focus for the practicum. By developing a common practicum focus and objectives, the full participation of all collaborators in the practicum is ensured. The involvement of collaborators from local CSD projects and programs also ensures that the practicum is not a short, isolated academic event that extracts information for use only at Cornell University, but rather that it serves as an event that can help to focus and catalyze ongoing CSD efforts at the practicum site.

The practicum itself involves two weeks of intensive fieldwork, which includes participatory and rapid appraisal activities drawn from different scientific disciplines. These activities include: (1) Participatory rural appraisal activities such as community maps, land use transects, farm maps, Venn diagrams of community and external organization, community histories, and analysis of community needs (Fruedenberger 1994), (2) interdisciplinary household interviews and farm visits (Hildebrand 1981), (3) interviews with key informants from communities, the government, and NGOs, (4) preliminary biophysical measurements, such as bird counts, vegetation transects, and measures of water quality and quantity. Immediately following the field work, an initial presentation is made to the community and other organizations, and summaries of preliminary findings presented to the collaborators.

These provide immediate return of information at the site, an issue of great importance to local collaborators who have often helped or facilitated research in the past without ever learning the results of that research. After the overall field experience, several things take place. On the Cornell side, the field practicum group meets for a full semester to compile and analyze the information that was collected. Students choose topics of interest to them and important at the practicum site, and write individual or small group papers that draw on both field research and the academic literature. The entire group then discusses these projects and the results of the field work to generate an integrated set of research and action recommendations. Often the group has

specific ideas for action that can be undertaken immediately, and these are specified. Other questions and actions are less clear, and important research needs are identified. A group paper is written that presents the information collected during the practicum and the analysis of research and action needs. This paper serves several purposes. It provides a concise compendium of information about the community (or multi-community) research site and an analysis of the chosen CSD issue in that site, which can be used by both the community and CSD organizations to help generate new projects (including those requiring outside funding). It also delineates key research needs to address CSD needs, making important connections both to local needs and to the scientific literature, which can stimulate researchers, both from Cornell and in-country universities, to develop relevant research projects.

At the same time as the Cornell practicum group is analyzing the results and developing individual and group papers, the government agencies and NGOs that participated in the practicum begin to carry out activities at the practicum site that follow up on the needs that are identified during the practicum. These may include: (1) provision of financial, logistical, or technical support for local projects, such as tree nurseries, irrigation systems, or soil conservation; (2) organization of forums for collaborative problem solving, and (3) assistance in obtaining projects and technical support from international aid organizations such as the Peace Corps, the U.S. Agency for International Development, the World Bank, and private foundations. Providing immediate and concrete results is of fundamental importance to local collaborators, and also ensures that Cornell's efforts amount to more than an academic exercise.

By carrying out this process, Cornell's field practicum becomes more than a single, isolated event. Prior planning ensures that the practicum addresses an important local concern, and that community and CSD organizations are committed to participation and follow-through.

Community and agency involvement during the practicum helps to bring together diverse stakeholders, catalyzes particpatory community thinking and action about the problem, and starts to build new relationships between the community needs and agencies that can address or impact those needs. The individual and group analyses developed by the Cornell practicum group bring together academic research and local needs, thereby (1) helping to crystalize problem definition and action strategies at all levels, (2) providing important written documentation that can support project development, and (3) strategically analyzing research and action needs. Immediate follow-up projects in the community initiate action and results, ensuring that the momentum generated during the practicum continues.

Field Practicum Examples

Cornell's Field Practicum has been conducted six times in three countries. Three examples are presented here to illustrate the way in which the practicum can use the strengths of a research institution to catalyze sustainability research and action. Further information on these and other examples can be found in the practicum reports (Schelhas 1993, 1995, 1996, 1998, 1999; and Schelhas and Artuso 1994).

Watershed Management in the Dominican Republic

Situation

The Nizao watershed covers an area of 1064 km2 on the southern slope of the Central Cordillera in the Dominican Republic. The watershed is an important source of drinking water for the capital city of Santo Domingo, of hydroelectric power for the country (supplying about 15% of the nation's electric power), and of irrigation water for domestic and export crops grown on the southern coastal plain. There are four dams in the watershed, two completed in 1976 at a combined cost of $60 million, and two completed in 1992 at a combined cost of $612 million.

The watershed is made up of steep valleys, with over 70% of the land in the watershed having a slope of greater than 32%. Periodic severe rainfall events (tropical storms and hurricanes) occur, causing considerable soil erosion in the watershed. Vegetation has been substantially modified, with only the upper reaches of the watershed retaining significant tracts of natural forest. Hillside lands tend to be in pasture or agriculture, and the valley bottoms are mostly planted in coffee, grown under a dense, forest-like shade canopy. Actual land use exceeds land use capability on 60.4% of the land. Population density in the watershed above the dam is 53 people per km2, with 85% of the landholders having holdings of less than 12.6 hectares and nearly two thirds of the landholders in the watershed lacking formal title to their land.

As a result of the combined social and biophysical situation, there is a high level of soil erosion in the watershed. This has led to concerns that siltation of the reservoirs may shorten the useful life of the hydroelectrical facilities or require costly silt removal. In response, the Dominican government has carried out soil conservation programs in the watershed for many years, with increasing activity after completion of the two new dams in 1992. Recent policies have included a strictly enforced ban on slash-and-burn agriculture, discontinuation of credit from the government agricultural bank for annual crops grown in the

watershed, and implementation of pilot soil conservation and reforestation programs using incentives of fertilizer and cash payments.

Findings and Activities

The Cornell practicum group worked with government extensionists and scientists from a Dominican University to identify barriers and new options for CSD. Existing government soil conservation efforts were focused on agricultural fields, yet the practicum group's work raised questions about the relative importance of these fields as a source of sediment in the watershed. Widespread road and footpath associated erosion and landslides were observed in the Nizao watershed. Roads and footpaths have been shown to be a major source of sedimentation worldwide (Nagle 1999), and may be a least as important as agricultural fields in sediment contribution to the reservoirs in the Nizao watershed. Questions were also raised about how much of the sediment coming off agricultural fields was actually making it to the reservoirs. The complex mosaic of land uses in the Nizao watershed, in which agricultural fields are on the uplands and shade-grown coffee in the bottomlands, showed evidence that much of the sedimentation that was washing off agricultural fields was being captured by coffee plantations before reaching the river. These observations led to a Ph.D. dissertation that mapped erosion and deposition at the landscape level (Nagle in press).

The goal of government soil conservation programs, at the time of the practicum, was to replace the traditional practice of conuco agriculture with intensive annual cropping using soil conservation practices of dead and live contour barriers. Farm maps and farmer interviews raised questions about the effectiveness of this approach to soil conservation. Although the conuco system begins with burning, it is a sequential polyculture that involves relay cropping in the same field for multiple years. The traditional system actually exposes the soil only for a brief period at the beginning of this several year cycle, and mixes nitrogen fixing crops with other crops to reduce the need for chemical fertilizer application. There is no conclusive data on how the two systems compare in terms of soil erosion over a five-year or longer conuco cropping cycle.

Furthermore, the intensive agricultural system being recommended by the government required labour intensive construction of soil conservation structures, discontinuation of burning (farmers report that burning reduces pest problems), ploughing (which requires renting oxen), the use of chemical fertilizer (requiring high cash expenditures or subsidies), all of which are resisted by farmers. Government extension programs sought to set up an independent network of soil conservation groups, through which incentives for the new agricultural system could be offered, with limited success. Our findings

suggested that there were existing social groups in the watershed, and that working through these groups would reach more people with less organizational effort than new, single purpose soil conservation groups. Improving existing agricultural processes, rather than seeking to replace them wholesale with new practices with dubious environmental and economic characteristics, was identified as one strategy to make this possible. These finding led to a Ph.D. dissertation project on social organization and soil conservation in the Nizao watershed and the adjacent Ocoa watershed. Results from these and other projects were incorporated into watershed management and soil conservation programs in the Nizao watershed.

A Biological Corridor in Costa Rica

Situation

Clearing and fragmentation of tropical forests, and the resulting threats to biological diversity, has been a topic of considerable concern in Costa Rica over the past several decades. The cantón of Coto Brus, located in Southern Costa Rica adjacent to the La Amistad International Park and Biosphere Reserve, has been transformed from largely continuous forest to a mosaic of pastures, coffee plantations, agricultural fields, and forest patches since the 1950s (Schelhas et al. 1997). These concerns have led to efforts to connect conserved patches of forest to each other to help counter the biodiversity impacts of forest fragmentation and isolation (Schelhas and Greenberg 1996). One such effort, proposed in 1993, was a biological corridor to reconnect the Las Cruces Biological Station (200 ha) to the Guaymi Indigenous Reserve (7,000 ha). The proposed corridor would promote reforestation along the strip of intervening land, which consisted of pasture, rural homesteads, and forest patches.

Coto Brus was faced with an economic crisis in the early 1990s, brought on by declines in the worldwide price of coffee, a decline in the local cattle industry, and declining prices for beans as government price supports were eliminated as a part of neoliberal economic policies. Rising ecotourism in Costa Rica, along with government financial incentives for reforestation and forest conservation, led some local landholders to join with conservationists in proposing a biological corridor. Local people saw the possibility of generating economic returns from lands of low agricultural productivity through forest conservation, and conservationists saw the possibility of mitigating the ecological isolation of an important biological research station. Interested parties included several large landowners directly in the corridor path, residents of two communities of small landholders adjacent to the proposed corridor, and North American and Costa Rican researchers and conservationists.

Findings and Activities

The Cornell practicum group worked with local landholders, communities, and conservationists to conduct an analysis of the feasibility of establishing a Coto Brus Biological Corridor. Mapping of land cover and land use capability found that, although considerable forest-to-pasture conversion had taken place along the proposed corridor, virtually all the land was suitable only for natural forest management or protection forest. Very little land was found to be appropriate for pasture or commercial reforestation due to steep slopes and the frequent presence of low clouds and fog. The unsuitability of the land for reforestation meant that government financial incentives for commercial reforestation would be difficult to obtain for this region. One group of practicum students interviewed farmers and calculated net present value of projected returns for cattle pasture, coffee production, reforestation with and without incentives, and natural forest management, finding that reforestation incentives were central to making reforestation economically attractive. This work ultimately led to a Master's project on reforestation incentive program participation in Coto Brus (Thacher et al. 1997).

Since commercial reforestation had some constraints in the corridor area, several members of the practicum group conducted a preliminary analysis of natural regeneration in the corridor region. Sampling in six abandoned pastures suggested that natural forest readily regenerates in abandoned pastures; students also developed preliminary descriptions of forest structure, species composition, and fruit availability. Yet naturally regenerated forests consisted primarily of species with low economic value, suggesting the need for enrichment of naturally regenerating forests with economically valuable species. Other students did preliminary analyses of bird and mammal populations in forest patches along the proposed corridor route. Faculty and graduate students from Cornell and other universities continue to study the presence, abundance, and movements of animals along the corridor route.

Social appraisals were also conducted in communities adjacent to the proposed corridor. Corridors, due to their large edge to area ratio, are difficult to protect from hunting, logging, and agricultural pressure and, therefore, require good relations with neighbours. Although neighbouring communities were found to be generally supportive of the corridor, it was clear that their acceptance of it would ultimately be related to the benefits they received from it. Within our own practicum group, there was tension between the biological perspective, which favoured the simplest and narrowest definition of the corridor (the corridor route only) to reduce project cost and complexity, and the social science perspective, which favoured a broader definition in order to also provide benefits to corridor neighbours. This is one example of how differing

problem definitions in conservation and sustainable development can ultimately lead to different management recommendations.

In the end, several concerns were raised about the proposed corridor. First, it was not clear that the corridor was a critical conservation priority at the national level in Costa Rica, and thus a good site for substantial conservation investment. Additionally, concerns were raised about creating a source-sink effect where animals would be lured out of the larger forested areas into the narrow corridor or adjacent fields and pastures where they might be susceptible to human hunting pressure. As a result, in the absence of a clearly identified conservation need that would be served by the corridor, no major action was recommended. The group did highlight the potential of the corridor area as a site for ecological restoration and conservation biology research, and researchers from several universities have begun projects in the corridor area in collaboration with local landholders.

Irrigation Management in Ecuador

Situation

The Rio El Angel watershed, in Carchi, Ecuador, spans a steep environmental gradient. At the top of the watershed (elevation 3,600 to 4,200 metres above sea level), the 15,725 hectare El Angel Ecological Reserve protects an area of high rainfall and paramo vegetation. The deep organic soils of the paramo act as a sponge that stores and gradually releases water, and is the source of numerous irrigation canals that provide household and irrigation water to communities ranging down to the base of the mountain, some 3000 metres elevation below. One of these canals ends at the community of Yascon (2000 metres elevation). The community of Yascon has 65 households, and most of the inhabitants are subsistence farmers owning plots of land ranging from 2 to 20 hectares. Because the climate in Yascon is dry, the community depends on the Yascon canal for irrigation of agricultural crops and for much of its household water use.

The 44 km long canal passes through numerous agricultural areas and communities before arriving at Yascon. Canal water rights are administered by the government, and Yascon shares rights to canal water with 13 upstream users or user associations that include several cooperatives, a trout farm, and two greenhouses that grow flowers for export. Agricultural expansion and declining rainfall along the upper portion of the canal has led to increased illegal use of the canal by groups without legal rights to canal water. As a result, Yascon farmers are receiving considerably less than their legal allotments of water. In

fact, during the dry season, when water is most needed, it is common for no water to arrive to Yascon, threatening the very existence of the community. Additional problems are created by upstream canal neighbours who wash clothes, mix pesticides, and water their animals in the canal, so that what water does arrive in Yascon it is often severely contaminated by animal and human wastes, agrochemicals, and silt. This represents a serious health threat since roughly 30% of the residents of Yascon depend on canal water for domestic consumption. The result has been conflicts with upstream communities that threaten the collaborative management of the canal, which is essential to its continuing maintenance and functioning.

Findings and Activities

The Cornell practicum group formed into three subgroups, each of which conducted a similar series of participatory rural appraisal activities, one each in the upper, middle, and lower portions of the canal zone. These groups worked with farmers to: (1) map and describe land and water use, (2) identify health and social needs, (3) identify economic constraints and opportunities, (4) describe canal use and management, (5) identify community organizations, and (6) identify conflicts and collaborations with other communities and individuals related to the canal.

The result suggested a need for an integrated strategy of research, new technologies, and collaborative processes. One important need was research on reforestation with species that used less water than eucalyptus, the most commonly planted species in the watershed. The need for cultivation and marketing of crops requiring less water also emerged. By comparing social research on irrigation management in other parts of the world with that of the Yascon canal, suggestions were developed for improving the social organization of the management of the Yascon canal. The principal recommendations were: (1) the need to raise local awareness about the interdependence of canal users, and the needs of different groups along the canal; (2) the need to strengthen local water management institutions; (3) the need to create a nationally sanctioned, local entity to resolve water management disputes; and (4) the need to take an integrated approach that addresses the water needs of people throughout the watershed.

The practicum ended with a presentation in the community of Yascon, and one to a local consortium of organizations and communities from the entire El Angel watershed to raise awareness of the issues faced in canal management and to make some preliminary suggestions of strategies to address them. Interest was strong, and follow-up activities included a summer project by a Cornell Master's student to measure water flows along the canal, and a summer

workshop in conflict management for canal communities, jointly sponsored by Cornell and the consortium, to catalyze collaborative problem solving along the canal. One of the practicum collaborators, FLACSO (Facultad Latinoamericano de Ciencias Sociales), continues research and development activities along the canal, and the Peace Corps assigned an agricultural development volunteer to the community of Yascon as a direct result of the practicum and lobbying efforts by FLACSO.

Conclusions

The above examples illustrate one way in which a university, through its traditional functions of teaching and research, can play a role in catalyzing sustainability in watershed management and biodiversity conservation. One of the most important roles of the university is in analysis and knowledge generation, by conducting interdisciplinary analyses that clarify important research and action needs. But the university also played a role in catalyzing the process of sustainability by bringing together and energizing important stakeholders around the field practicum "event". It is significant that this was done during the conduct of a university course, since students benefited from active involvement in a real world situation and the practicum provided the reason and funding for bringing people together in ways that otherwise might not have occurred. This is not to claim, however, that the university catalyzed or significantly advanced sustainability on its own. The strength of the experiences reported here were a result of working closely with local organizations and communities to develop, conduct, and follow up the practicum in ways that the university could not do by itself as a result of both its distance from the practicum sites and limitations imposed by its mandate for research and education (as opposed to CSD practice). Furthermore, activities related to the practicum were only small steps in larger, incremental processes of conservation and sustainable development in these sites. But the practicum experiences clearly helped advance both the processes and science (technologies) of conservation and sustainable development at these sites.

Finally, although the activities described in this paper took place far from the Cornell campus and relied on funding from several projects, it is important to note that the processes and experiences described here could be carried out in close proximity to a university at a lower cost, over a longer term, and with greater engagement with non-academic collaborators.

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TABLE OF CONTENTS

Preface 9

Chapter 1 Communicating sustainability: some international considerations and challenges
WALTER LEAL FILHO 11

Chapter 2 Attitudes towards environmental education in the Maltese formal education system
PAUL PACE 25

Chapter 3 The media as a tool for communication on the environment and sustainability
MICHAEL NITZ 45

Chapter 4 Sustainable development as a challenge for Universities
GERD MICHELSEN 69

Chapter 5 The Florida Gulf Coast University Colloquium: A graduation requirement in sustainability
PETER BLAZE CORCORAN 87

Chapter 6 Towards a culture of sustainability
ULRICH JÜDES 97

Chapter 7 A review of the President's Council on Sustainable Development (U.S.): building networks, throwing pebbles at a Goliath media
JOANN MYER VALENTI 121

Chapter 8 Environmental Communications at Kronsberg, Hannover – Concept and Praxis in the Context of Sustainable Urban Development
ANKE BENSTEM, MARION STOCK, MARTIN SCHULTE 135

Chapter 9 ECOPAESE: an approach to communicate sustainability in the Province of Reggio Emilia (Italy)
ANTONELLA BACHIORRI, MASSIMO BECCHI & ALESSANDRO FERRARINI 141

Chapter 10 Catalyzing sustainability: Cornell University's Field Practicum in Conservation and Sustainable Development
JOHN SCHELHAS 155

Chapter 11 Organizational Restructuring Implications for Corporate Sustainability
JOSEPH SARKIS, J. SCOTT JIUSTO, WAYNE GRAY & ROGER KASPERSON 173

Chapter 12 Sustainability as an Investment Concept
TAUNI SANCHEZ 197

Chapter 13 Linking college education to environmental monitoring and management: a case study from India
K. P. ACHAR, G. K. BHATTA, D. D. BHAT, A. GANGULY, Y. GOKHALE, H. NAGENDRA, P. PRAMOD & G. UTKARSH 205

Chapter 14 Training Materials for Urban Development: A long distance training project of the International Council for Local Environmental Initiatives (ICLEI) assists municipalities on their way to local Agenda 21
MONIKA ZIMMERMAN, DAVID & JAN MEYRICK, FRANCISCO ALARCON 229

Chapter 15 Simulations as an education tool
ANNE L. D. FRENCH 239

Chapter 16 Water Pollution Control approach applied in the Slovak Republic
STEVEN R. BUTKUS 253

Chapter 17 A second generation environmental science curriculum: the implementation of an interdisciplinary body of knowledge and good practice of learning
B.J. VAN DE LAAR, R.A.H. DE JONG, R.S.E.W. LEUVEN, H.W.J. BECKS 265

Chapter 18 Engaged Learning: An Integrated Community-Based Approach to Teaching Sustainability. Lessons from the School for Field Studies International Programs, USA.
RON H. SLANGEN 281

Chapter 19 From Environmental Blight to Model Disposal Sites- the solid waste disposal experience in St. Lucia, West Indies
CARLEEN JULES & MICHAEL COWING 295

Chapter 20 Raising Public Awareness on Environmental Health through Environmental Health Indicators
MRS. ASHWINI KHALADKAR & MR. V.S. CHARY 313

Chapter 21 Ecocentrism, Anxiety and Biophilia in Environmental Education: A Museum Case-Study
GLENN C. SUTTER 333

Chapter 22 Developing Collaborative International Education Projects' through the GLOBE Program: The Digital Earth Project "to observe the earth and visualize the future"
JOHN D. MOORE 349

Chapter 23 Entertainment-Education to the Rescue. Communicating sustainability in a way that leads to behaviour change: a case study from Tanzania
WILLIAM N. RYERSON 359

Chapter 24 Teaching For A Change: A Six Step Program For Recovering Lecturers
TARAH SHARON ALEXANDRA WRIGHT 369

Chapter 25 Education and communication for environment and sustainability: Experiences on networking and information exchange
YOLANDA ZIAKA 379

Chapter 26 From Environmental Education to Sustainability – Some Results of Empiric Research on Higher Education at German Universities
DR. CHRISTA HENZE & PROFESSOR DR. REINHOLD E. LOB 391

Chapter 27 Using Principles of Environmental Education as a Framework for Effective Communication on Sustainability
JO BLAKELEY & ROSS CALLAGHAN 401

Chapter 28 Problems In Communicating Sustainability: using action projects to teach Environmental Studies
SARAH BAUER & TAMMY LEWIS **419**

Chapter 29 Communicating Biodiversity - a role for the voluntary sector?
JENNIFER YOUNG..... **439**

Chapter 30 Sustainability and the Lake Superior Binational Program: An International, Multi-Sector Initiative
JAMES G. CANTRILL..... **455**

Chapter 31 Moving Forward
WALTER LEAL FILHO **475**

About the Authors **481**

Contact addresses for authors..... **489**

Thematic Index **495**

Preface

The UN Conference on Environment and Development (UNCED) held in 1992 in Rio de Janeiro, Brazil, is still in the minds of many people as a turning point with respect to environmental protection. UNCED was also important in bringing the debate on sustainability to the attention of the general public, particularly via Agenda 21, a document still regarded as instrumental in the subsequent efforts to promote sustainable development.

By the time this book is published, in the summer of the year 2000, over 8 years will have passed since Rio and some discussions are taking place about repeating UNCED in the year 2002. But before things are moved even further, it may be helpful to take a step back and look at the current status of sustainability.

In doing so, the UN document "E/CN.17/1997/2/Add.27" of 23 January 1997 may be prove quite useful. This UN paper was produced by the "Commission on Sustainable Development" (CSD), being prepared for the CSDs Fifth session (7-25 April 1997). It contains a description of the overall progress achieved since the United Nations Conference on Environment and Development and refers to national mechanisms and international cooperation for capacity-building in developing countries (Chapter 37 of Agenda 21).

A trend was conspicuous in that report and in the subsequent reports prepared in the context of other CSD events: the perceived problems experienced when raising support for sustainability. Despite the progress being made over the past years, there is still a noticeable difficulty in gathering support for sustainability. I believe that one of the reasons for this can be traced back to the fact that, to many people, the meaning (and the need!) for sustainability is still unclear. Much can be gained by communicating sustainability and there are many ways to achieve that.

It was therefore with the purpose of fostering better communication on sustainability, and at the same time with the aim of providing a contribution to the Rio+10 process, the process leading to the next UN Conference on Environment and Development, to be held in 2002, that this book has been prepared. It is part of the project "Sustainability Centres in the North Sea Region" but goes well beyond Europe, offering a wide range of views and perspectives on sustainability per se and on environmental education and communication, two important tools in achieving a better environmental understanding. This book also contains inputs gathered in the framework of