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Year 4
Annual Report
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INTRODUCTION

External politics had a big impact on Cornell-Zamorano collaborative efforts this year Although we entered the quarter with great momentum, our activities were slowed by funding uncertainties for year five of the UDLP as well as by Congressional action designed to penalize Honduras for falling into arrears on its foreign debt payment We were grateful to the UDLP leadership in Washington, D C for the special attention it gave this quarter to the concerns of the Cornell-Zamorano project that has enabled us to follow through with long-term plans

Recently, the Cornell-Zamorano Joint Committee met for two days of meetings at Cornell to plan Year Five of the UDLP and to strategize for the future The group reviewed the strengths and weaknesses of the collaboration, and it discussed alternative opportunities for strengthening the linkage The Joint Committee developed a plan that would encourage greater faculty participation and that would integrate with the strategic plans of both institutions The result was an operating plan for further institutionalizing the program's coordination

Evolving Program Structure

While Phil Arneson is the titular Project Coordinator of the UDLP, the linkage is managed by two interacting faculty committees, one at Cornell and one at Zamorano These joint committees have worked together to direct the UDLP, in particular to oversee the MPS program (selection of candidates) and to oversee the mini-grant program that has supported promising inter-institutional initiatives

Within the Cornell International Institute for Food, Agriculture and Development (CIIFAD), a Central American committee (comprising Phil Arneson, Robert Blake, David Lee, Max Pfeffer, and Margaret Smith) assumes Cornell's linkage responsibilities The Cornell-Zamorano Joint MPS Program falls within Cornell's International Agriculture and Rural Development (IARD) program, whose Director of Graduate Studies is Robert Blake and whose Field Secretary is Deborah DeLorenzo Zamorano's Joint MPS Committee is made up of Marco Esnaola, Antonio Flores, and Allan Hruska

Beginning June 1995, we established a full-time liaison office at Zamorano with Stephen Sherwood as liaison officer to administer funds, to support the MPS program and other initiatives, and to facilitate communication between the two institutions Through the increased participation of its Academic and Outreach Deans as well as faculty members, Zamorano has

been slowly committing greater institutional resources to the linkage In January 1998, Sherwood will complete his work as liaison officer, and a strengthened Zamorano faculty committee will take over the linkage responsibilities The UDLP will continue to finance the part-time position of a logistics support person through Year Five of the project, beyond which Zamorano will meet associated costs through income generated by the intensive Masters-level course and MPS tuition

Priorities

MPS Program

The central activity of the Cornell-Zamorano linkage has been the joint Masters of Professional Studies (MPS) program This program not only has contributed to the professional development of young leaders in the region, but the teaching and advising responsibilities have helped to link Cornell and Zamorano faculty with each other and with the students in the program These relationships extend well beyond the program, and when the graduates return to their careers, the established linkages serve to foster collaboration and development in the region

Faculty-to-faculty links

For three of the four years of the UDLP we offered a round of "mini-grants" of up to $5000, to help establish long-term collaborative linkages between Cornell and Zamorano faculty in areas that would address the region's priority development needs The relatively small size of the grants limited projects to ones that could be completed with modest funding or those "seed" projects that could attract more substantial funds over lengthier periods from outside the UDLP

To date, we have distributed 22 mini-grants for a total of $78,000 These grants provided the startup money for most of the initiatives presented in this report The joint committees will hold one last round of UDLP mini-grants at the beginning of Year Five to help encourage the most promising initiatives and draw financial support for continued collaboration into the future The Cornell-Zamorano committees have identified as potential priority areas for continued collaboration the following animal science (nutrient dynamics), information technologies, distance education, food technology and science, plant breeding (field beans, maize), plant protection (IPM, soil health), quality of education, soil science (cover crops and the intensification of fallows), and the Yeguare Valley program (collaborative resource management)

PAST YEAR'S ACTIVITIES

Human Resource Development and Teaching

Joint Master of Professional Studies Program

The Zamorano committee, along with Phil Arneson and Stephen Sherwood, met bi-weekly during the past year to plan the Zamorano intensive course and to discuss other MPS concerns Zamorano's Communication Section produced a new Spanish-language brochure to promote the Cornell-Zamorano MPS program (See Appendix B)

Over the last year, Steve Sherwood has been pursuing various potential sources of financial support for students, including DSE (German government), COSUDE (Swiss government), the Instituto Ecuatoriano para Crédito Educativo (IECE), the Ford Foundation, the McArthur Foundation, the Kellogg Foundation, the Inter-American Foundation, and the Inter American Development Bank To date, we have not identified a block of funds for program scholarships, but we have been successful in helping individual applicants identify sources of support

Presently, eight Joint MPS candidates are enrolled in the program, listed below (with their respective nationality, primary source of support, and year of matriculation)

Thomas Solomon – US citizen, UDLP, August 1995
Keith Chanon – US citizen, EPA and UDLP, August 1996
Milton Flores -- Honduran, Kellogg Foundation, August 1996
Laura Meitzner – US citizen, UDLP, August 1996
Fernando Neri -- Ecuadoran, UDLP, August 1996
Gonzalo Rodríguez -- Guatemalan, Inter-American Development Bank, August 1996
Matthew Thornton -- US citizen, personal funds and UDLP, August 1996
Jose Garcia -- Guatemalan, Inter-American Foundation and UDLP, August 1997
Carlos Piedrasanta -- Guatemalan, Care International, August 1997

As part of their academic programs at Cornell, the MPS candidates participated in a group seminar and interacted weekly with Dr Robert Blake, the Director of Graduate Studies of IARD Additionally, the joint degree students have met with Phil Arneson, Steve Sherwood, Marco Esnaola and Isidro Matamoros during visits to Cornell, and they participated in the design of the Zamorano intensive course on sustainable agriculture In May 1997, after completing two semesters at Cornell, they spent two months at Zamorano, followed by six months of applied research with collaborating organizations to complete their problem-solving theses

Zamorano Intensive Course on Sustainable Agriculture

The intensive course on sustainable agriculture is the cornerstone of the Zamorano contribution to the joint degree program In June 1997, with the logistical support of Stephen Sherwood and Gloria Rojas, Allan Hruska coordinated a very successful first offering of this comprehensive survey course Seventeen Zamorano faculty participated in the six-week course, which included topics in agricultural economics, animal science, biotechnology, conflict management, extension, fish culture, formal education, irrigation, plant protection, soil health (The students gave the course a rating of 4 8 on a scale of 5 0)

This year only the four joint MPS students participated in the course, but next year, Zamorano plans to invite people from the professional sector to increase the number of participants to about ten people This not only would make the course more viable financially, but it would enhance the overall learning experience by permitting greater interaction between the MPS students and other agricultural professionals participating in the training as a short

course This course offers Zamorano a great opportunity to strengthen its outreach activities and to foster the interaction of its faculty with outside professionals

Teaching Workshop for Zamorano Faculty

Early in 1996, Dr Dean Sutphin (Cornell Associate Dean of Agriculture and member of the Department of Education) and Dr Antonio Flores (Zamorano's Academic Dean) planned a series of activities to improve practical teaching skills at Zamorano in such areas as reflective questioning, discipline, and student evaluation In March 1997 Dr Sutphin, Jaime Rojas (Office of the Academic Dean, Zamorano), and Stephen Sherwood led a series of two-day workshops for 67 Zamorano faculty and teaching instructors The workshops focused on the determination of course objectives, offered tools for effective teaching, and provided information on the management of large classes, the use of case studies and other instructional methods, and the evaluation of professors and students This training activity was later complemented by a series of workshops facilitated by faculty of the University of Florida In June 1997, Rojas visited Cornell for one week to learn about the use of new technologies as teaching aids Future plans include the review and development of Zamorano's curriculum

Arneson Sabbatical Leave

Phil Arneson spent a one-year sabbatical leave (August 1, 1996 to July 31, 1997) in Zamorano's Department of Plant Protection (DPV), co-supported by the Cornell Department of Plant Pathology and a Fulbright Scholar grant When Arneson arrived for his sabbatical study, the Department of Crop Protection at Zamorano had had a vacant plant pathologist position for two years Dr Arneson helped instruct an introductory plant pathology course, provided training support for numerous DPV short courses, participated in the selection of a new pathology professor, advised multiple Zamorano students, and participated in the Zamorano UDLP meetings

This sabbatical was an excellent opportunity for professional exchange and development Arneson gained new appreciation for the challenge of pest management in the tropics, and he developed a rich, new array of teaching methods that truly will "internationalize" his classes at Cornell (A copy of Arneson's report to the Fulbright Scholar Program is attached as Appendix A)

Food Science and Technology

Roberto Cuevas, Coordinator of Zamorano's new Food Technology program, traveled to Cornell in April 1997 to learn more about academic programs in Food Science He also visited McGill University, Purdue, the University of Illinois, and Kansas State Beyond developing the school's curriculum in this area, Cuevas collected literature and established contacts for potential professor and student exchange During year five of the UDLP, Zamorano and Cornell plan to establish greater links between their respective food technology programs

Cornell's International Agriculture and Rural Development Field Trip to Honduras

For the seventh year, Cornell's International Agriculture 602 course entitled "Agriculture in Developing Nations" traveled to Honduras for two weeks to learn about agricultural development and natural resource management In this course 35 students, from over 15 countries, along with 6 International Agriculture faculty, traversed the country, visiting private farms (from subsistence level to large multinationals), NGOs, government projects, and agribusinesses The class spent two days at Zamorano to meet the Director and Academic Dean and visit the School's departments

Global Classroom on Sustainable Development

Dean Sutphin and Mark Schneider (Academic Programs) from Cornell and Keith Andrews (Director), Richard Knab (Director's Assistant), and Antonio Flores (Academic Dean) from Zamorano are participating in a global higher education initiative that involves colleagues from institutions in Costa Rica, the Dominican Republic, Holland, Sweden, and the United States This initiative is funded by the US Department of Commerce Telecommunications and Information Infrastructure Assistance Program (TIIAP)

In early October the project ran its first test seminar in which the partners from the Netherlands presented the topic "Global Environmental Issues" to an audience of 10 to 20 professors and students at each site Participants were provided reading material and a video to review prior to the session and interacted with the seminar via computer conference

While the first seminar session was a success, the group experienced some technical difficulties, particularly with audio reception The focus of the first seminar was on identifying and correcting some of these technical communication problems, but coming seminars will emphasize enhancing the subject-matter content and improving the interaction and the learning at participating sites The Global Seminar plans to run four similar seminars during the present academic year, with Cornell and Zamorano each leading a conference

Institutional and Network Development

Rural Schools and Community-Based Development

Raúl Zelaya (recent Cornell Ph D in Education and Zamorano Professor of Rural Development) explored the potential role of Central American rural schools in community-based development Zelaya found that many rural high schools in Honduras, Nicaragua, and Guatemala are steeped in outdated learning paradigms that emphasize cognitive change through passive interactions between teacher and student Zelaya also found that communities, private development organizations, and governments do not commonly view schools as sources of development Nevertheless, given their local legitimacy, infrastructure, and profound influence on youth, rural schools represent a valuable and underutilized institutional resource

Consequently, Zelaya argues for strengthening efforts to help schools strengthen philosophical approaches and teaching methodologies, so they may assume more meaningful roles in community development To achieve this, Zelaya recommends that

- education become more participatory and active
- schools expand their role and begin to serve the broader needs of the community
- schools become more productive and self-sufficient institutions and provide an example of invigorating management and entrepreneurship
- private development organizations and governments work more closely with local schools to strengthen teaching for youth and develop continuing education and outreach opportunities for adults

Zelaya raised challenging questions that need further attention How do we improve linkages between primary, secondary, and tertiary levels of education? How do we improve linkages between community, private industry, government, and schools? How do we disseminate among schools the experience of community-based development? As part of his work with Zamorano's Rural Development Department, Zelaya is beginning to address these and other related issues

Zamorano Internet Access

Cornell, Zamorano, and other collaborators have been working together to help Zamorano with technical decisions on the American Schools and Hospital Association-funded effort to improve Zamorano's electronic communication capacity, particularly the school's management of internal networks and access to external systems Technicians from Cornell Information Technologies (CIT), the organization that created and now maintains Cornell's campus wide network, consulted on hardware and systems design Mario Ramírez, the technical operations manager from Zamorano's Plant Protection Department, spent three weeks at Cornell conferring with the computer experts of the CIT group and the CALS Advisory Group on Electronic Technology (AGET) We used UDLP funds to send Mark Schneider (Computer Consultant, Academic Programs, Cornell) to Zamorano in February 1997 to help in the elaboration of a Master Plan of Information Technology Development The plan included specific recommendations for desktop hardware, local area networks, a campus backbone, Internet connection, servers, smart classrooms, satellite options, audio/video conferencing and software acquisition

Personal and Organizational Factors Behind Farming Innovation

CIIFAD is collaborating with Sergio Larrea, a Bolivian student at Zamorano, to understand the personal and institutional factors behind farming innovation For the last year, Larrea has been working with farmers 15 years after their participation in the award-winning World Neighbors/ACORDE Development Program in the nearby community of Guinope Through formal surveys, farm visits, and a series of workshops, Larrea helped farmers reflect on their experiences and reach conclusions about the reasons behind their success

Larrea found that 15-20% of a community's population met his criteria for innovation, which was based not merely on the adoption of conservation practices, but rather on the invention of novel ideas and practices The study revealed the limitations of development paradigms that focus primarily on the transfer of technology Land ownership, years of formal education, years of farming experience, full-time farming, and interaction with development organizations positively contributed to innovation

Many of the innovators had previously left their community for urban centers but returned in subsequent years, because of the perceived opportunity that the World Neighbors/ACORDE project presented Concept mapping revealed that innovation with soil conservation practices was largely the consequence of a plethora of personal-level interactions, especially regarding changes in family and community relationships as well as spiritual development Innovators pointed to positive changes in attitudes that diminished "learned hopelessness"-- a defeatist outlook toward the future -- and emphasized greater appreciation for the possibilities of farming Larrea is preparing a document that will present recommendations for organizations, based on the extensive experience and interaction with development agencies of the farmer leaders that participated in the study

Conflict Management

The Kellogg Foundation recently awarded Zamorano three years of funding to help bring together development efforts in the Yeguare Valley (where Zamorano is located) The first stage of this program, called "UNIR" (literally "unite"), is managed by Zamorano's Planning Office On several occasions, Zamorano has invited Stephen Sherwood to facilitate discussions among UNIR's staff and share the experience of CIIFAD and ANAFAE with collaborative team building They have dedicated much attention to the roles of mediation and advocacy in helping bring together multiple parties with conflicting interests to establish new dialogue on land, water, and forest disputes

Last year the UDLP mini-grant program provided seed money for a series of introductory workshops on conflict management Since that time, Aldea Global (PANACAM), the Catholic Church (Pastoral Social), Cornell (CPECM and CIIFAD), and Zamorano (Yeguare Valley Program) formed a steering committee to coordinate national-level efforts for the promotion of more effective conflict management, particularly regarding disputes associated with protected areas and watersheds Canada's International Development Research Council (IDRC), the Candadian International Development Agency (CIDA), the Inter-American Foundation (IAF), and the NGO Mercy Corps have since provided a total of over $135,000 of direct financial support to various aspects of this inter-agency initiative

In July Aldea Global employed a support person for its "civil society" project, who will commit 25% of his time to the national network Immediate plans for the next six months include the establishment of an information center, a communication network, capacity building workshops, and the documentation of cases A national workshop is slated for April of 1998, and a Meso-American workshop to exchange regional experiences is planned for October of 1998

ANAFAE Policy Committee

A consortium of German-based NGOs, including Bread for the World, MISEREOR, Southwind, and FIAN, solicited from ANAFAE a community-based review on the impact of economic restructuring policies, particularly the Law of Modernization and Development of the Agrarian Sector Since December 1996, a working group has been collecting information on the existing policy reviews and identifying experts interested in contributing to a participatory review process In addition to a steering committee of national actors that will include Nelson Montoya (Center for Agricultural Policy, Zamorano), the working group also plans to consult David Lee (Agricultural Economics, Cornell)

ANAFAE's Policy committee convened three times during this period to review its work plan and to select sites for the investigation The group has completed a database on existing relevant documents It was decided that the initiative would require a full-time coordinator for 18 months, so ANAFAE adjusted the proposal to the German consortium Beginning in August, the committee has begun the review process by providing courses to inform selected communities on the agriculture modernization law, to be followed up with community-based assessments of the impact of the law

Sustainable Farming Systems

Soil Health

Agriculturists increasingly appreciate the critical role of soil management in sustainable farming, particularly regarding the use of organic amendments Nevertheless, prescriptions for soil management have tended to emphasize physical and chemical manipulations, neglecting the essential role of soil organisms in the maintenance of "soil health" -- high soil quality, productivity, and buffering capacity There is great need for integrating the management of abiotic and biotic components of soil in order to achieve agricultural practices that favor healthier crops, environments, and people

Over the past year, farmers and experts from the fields of entomology, agricultural extension, microbiology, nematology, plant pathology, and soil science have been contributing their different perspectives to build new awareness of the processes involved in maintaining soil health, especially regarding the abundance, diversity, and ecology of soil organisms Numerous organizations, including CIAT-Laderas, CIDICCO, the Honduran Foundation for Agricultural Research (FHIA), the Natural Resources Institute (U K), the Silsoe Research Institute (U K), the University of Florida, CIIFAD, and Zamorano, have expressed interest in this topic During 1996-97, we have been planning an international workshop on soil health to be held at Zamorano in November Scientists and practitioners will come together in a collaborative effort to launch new ways of thinking about soil quality and to develop and introduce new tools for evaluating alternative management practices

In June 1997, George Abawi and Eric Nelson (Plant Pathology) and Mike Villani (Entomology) visited Honduras to participate in a two-week course on soil health for senior Zamorano students During this visit, they met with potential collaborators to begin planning a comprehensive program of research and training activities on soil health for Central America and beyond

Subsequently, Matthew Thornton (MPS candidate, Tropical Agriculture) began to work with Gaye Burpee (CIAT-Laderas), Jon Hellin (NRI), Brian Simms (Silsoe Research Institute), Robert Walle (University of Florida), and Michael Zeiss (Zamorano) to document soil health indicators, to test practical qualitative and quantitative methods of evaluating the impact of specific agriculture practices on soil biology, and to develop training materials Thornton has also been interacting with five Honduran training centers (CEAs) to collect and analyze soil samples as well as to enhance their training capacities in soil health The inter-institutional working group on soil health plans to use Thornton's field findings as part of the November workshop

Cover Crops and Green Manures

Mulch-based agriculture has strong comparative advantages to conventional farming, in terms of weed control, soil conservation, water management, and nutrient cycling In Southern Brazil, since the early 1950's, small to large scale operations producing basic grains and high value export crops have developed highly efficient mulch-based production systems, and their experience is helping to revolutionize how farmers think about their agriculture In April of this year an international group from Southeast Asia, Central and South America, Mexico, and the United States convened to share experiences and plan future regional activities

The International Center for Documentation of Cover Crops (CIDICCO) prepared a Central American case study for the conference that included the experience of Marco Esnaola (Animal Science, Zamorano) and Stephen Sherwood (UDLP Linkage Coordinator), and the two traveled to Brazil to share their experiences directly (funded respectively by CIIFAD and the Rockefeller Foundation) Esnaola presented his UDLP-funded research on the use of legumes, particularly *Mucuna* sp , as animal feed, and Sherwood presented concerns over how recent policies have led to the conversion of covercrop systems on the Honduran Atlantic Coast, leading to arguably less productive and less sustainable agriculture

As follow-up to the workshop, in May representatives from CIDICCO, along with Esnaola and Sherwood, convened a group of Honduran and Nicaraguan partners to share the results of the Brazilian conference Participants outlined an agenda for implementing priority actions to address agronomic research and training needs as well as marketing and policy concerns that presently limit the use of cover crops in the region The Brazil experience is also contributing to the November 1997 International Soil Health workshop

Maize Breeding

For the past two years, Francisco Gómez (Agronomy Department, Zamorano) and Margaret Smith (Plant Breeding Department, Cornell) have been conducting research aimed at developing improved maize varieties with, as well as for, smallholder farmers This year, Zamorano student Edwyn Flores is collecting a third year of data as part of his thesis research The objectives of the work are to

- maintain the unique gene combinations in farmers varieties that provide good adaptability,
- introduce gene combinations that can improve yields, and at the same time,
- maintain the essential genes for good storability, flavor, and cooking quality

Comparison of these different approaches, both on research plots and on the farm, of maize improvement for smallholder farmers ultimately will indicate how breeders can simultaneously conserve the genetic diversity that provides unique adaptation and improve maize productivity under harsh environments

Bean Seed Systems

Highland farmers in remote villages of central Honduras do not commonly have access to commercially improved bean seed that is appropriate for their conditions, so they must depend on local varieties As a result, farmers plant mixtures of criollo germplasms that provide low, but consistent yields and varying resistance to pests, drought, and other phytosanitary factors Laura Meitzner (MPS candidate, Tropical Agriculture) is working with CIDICCO and other agencies interacting with farmers of this region who grow frijol milpero (*Phaseolus vulgaris*) and chinapopo (*P coccineus*) Meitzner hopes to identify ways of helping farmers improve local seed varieties as well as enhance the exchange of improved germplasm within and between communities Her methodology emphasizes the use of *in-situ* germplasm and broad selection criteria that include productivity, pest resistance, storageability, drought tolerance, and cultural appreciation She hopes to complete her study in early 1998

The Hydrology of Hillside Farms

In conjunction with total rainfall and stream flow, lateral subsurface flow is a major component of hillside hydrology To expose the relationships between hillside farming practices on lateral subsurface flow, Guillermo Mendoza (MS Candidate, Agricultural and Biological Engineering) studied water tables of small catchment areas in the Yeguare region and in Choluteca, Honduras

Mendoza found that the underlying soil layer did not have to saturate, meaning that interflow can be established faster than previously believed Mendoza found that under high water table conditions in catchment areas, lateral subsurface flow dominated, while in low water table conditions, various hydrologic processes participated He concluded that under high rainfall, widespread coordinated lateral flows increase drainage of excess water Overall, Mendoza observed that the farmers who participated in the study used conservation measures

(principally contour barriers and in-row tillage) in areas were surface infiltration was lowest This suggested that farmer perceptions were correct and that they applied conservation measures where most needed

On-going Cornell Graduate Student Research in Honduras

UDLP activities are linked to CIIFAD's broader scope of activities in Honduras that involve over 30 Cornell faculty and students Some of these projects are well integrated with one another, and others are stand-alone projects, but in all cases there is some degree of formal or informal interaction with Zamorano While all of these projects receive funding from CIIFAD, a few also receive money from the UDLP mini-grants or other support from the linkage coordinator and Zamorano faculty The following is a list of titles of Cornell graduate work currently underway in Honduras

- **Low technology moisture management systems for vegetative propagation of *Inga* species in the tropics** Dinie Espinal Zamorano graduate and Cornell PhD candidate, Floriculture and Ornamental Horticulture Dinie is currently at Zamorano conducting her research with the Agronomy department

- **Integrated pest management in onions** Alfredo Rueda Zamorano graduate and Cornell PhD candidate Entomology Alfredo is presently in Honduras where he is collaborating with the Honduran Foundation of Agricultural Investigation and conducting research in the Comayagua Valley

- **Institutional relations in Cerro Azul Meambar National Park in Central Honduras** Alan Barton PhD candidate Agricultural, Resource and Managerial Economics Alan is conducting research with PANACAM/Aldea Global in the Lake Yojoa area, Honduras until December of 1997 He briefly left the country in early April after breaking his arm but returned to resume his research in June Barton will lead several seminars for Zamorano faculty and students on relevant issues and he has been participating in activities related to environmental conflict management

- **Subsoil water storage by trees on hillside farms and its impact on stream flow in Honduras** Donald Hanson PhD candidate Agriculture and Biological Engineering Donald is presently conducting research in the Sierra Agalta range of the Department of Olancho in eastern Honduras

- **Communication barrier to effective environmental conflict management** Erik Nielsen MS candidate, Communications Erik is conducting research in Honduras, as part of the on-going effort of the network on collaboratiave resource management He is collaborating with Zamorano's Yeguare Program and plans to begin the field portion of his research in January of 1998

- **The economics behind the conversion of maize mucuna systems on the Honduran North Coast** Sean Neil MS candidate Agriculture Economics From May to August of 1997 Sean was stationed near La Ceiba where he visited and interviewed farmers and key informants on the North Coast to collect information for this important study

PROGRESS TOWARD COMPLETION OF OBJECTIVES

We feel that we have largely accomplished our first objective and that progress on the remaining three objectives, which are more or less open-ended, continues at a steady pace The fifth fiscal year will continue to emphasize the strengthening of priority areas, particularly the

MPS program, teaching, and outreach activities, as well as following through with our joint efforts with third-party institutions

Objective 1 *Establish an integrated, sustainable collaboration between Cornell University and Zamorano built around the integrated themes of sustainable development, natural resources management, and human resource development*

ACCOMPLISHMENTS

• **Bilateral ties** -- Phil Arneson's Fulbright-sponsored sabbatical at Zamorano has helped him, as Project Coordinator of the UDLP, to provide Zamorano faculty information about the resources at Cornell and to explore further opportunities for collaboration between the schools We hope that this sabbatical will be but the first of a series of regular, long-term exchanges of Cornell and Zamorano faculty for periods of several months to a year, which can only serve to strengthen joint activities

Over the last three years the UDLP mini-grant program has been instrumental in acquainting Cornell and Zamorano faculty, contributing to new relationships that will carry on far into the future With tight budgets and limited resources, we have clearly seen the advantages of working together to accomplish our common objectives CIIFAD has already contributed significant funds to expanding the linkage, and the Zamorano Board of Trustees has endorsed the linkage and indicated a willingness to commit resources to sustaining it Furthermore, the Cornell-Zamorano linkage has expanded well beyond bilateral ties to various multilateral networks (e g , ANAFAE, Soil Health, etc) that involve other universities, research institutions and numerous non-governmental organizations

BARRIERS

• **Distinct institutional priorities** -- Zamorano's primary mandate is undergraduate education, and its audience includes the full array of participants in agriculture from low to high input production systems While Cornell has a similar agenda in New York State, its primary focus in Central America is research and training for resource poor farming and protected area management This orientation has led to a small-scale farmer focus of the collaborative agenda, while some Zamorano faculty have wanted to give equal attention to other aspects of tropical agriculture -- namely larger scale farming and agribusiness Cornell has acknowledged this interest and supported a broad conceptualization of the MPS program to permit the inclusion of large-scale production and business concerns

• **Institutional restructuring** -- Despite severe restructuring at both schools, we are fortunate that all of Cornell's UDLP participants continue at the institution, while at least four key Zamorano collaborators have left the school, and others have changed roles within the institution In order to maintain its emphasis on education, Zamorano has shifted its limited resources away from research and extension and toward teaching This has severely limited the time that Zamorano faculty can dedicate to activities not directly associated with teaching, such as our off-campus collaborations with NGOs Recently we have been directing UDLP funds at identifying and linking Cornell resources that could help strengthen the quality of education at Zamorano

Objective 2 *Enhance the internationalization of Cornell University by creating new opportunities for international involvement of Cornell faculty*

ACCOMPLISHMENTS

• **Broadening the research agenda** -- ANAFAE has created many new spaces for participation by Cornell faculty and students The ANAFAE forum of 26 organizations has helped to integrate research with long-term development efforts, sometimes taking research into new thematic areas For example, a consortium of German organizations recently asked ANAFAE's working group on political reform to develop a community-based evaluation and counterproposal to the 1992 Agricultural Modernization Law This is attracting Cornell students from the fields of Communication and Agricultural Economics, linking them to on-going studies at other universities

• **Collaborative learning and action** -- In 1996, a UDLP mini-grant enabled Cornell's Program for Environmental Conflict Management and Zamorano to introduce CPECMs innovative work to Honduras and establish regional linkages with Costa Rica A National Network on Conflict Management has emerged with Cornell, Zamorano, the Catholic Church (Pastoral Social para la Tierra) and the NGO Global Village as the coordinating agencies This Network is helping to develop appropriate methodologies and to document experiences in Honduras It also interacts with a regional effort that the University for Peace in Costa Rica leads As a consequence of this initiative, as well as its activity in Indonesia and the Northeastern United States, the Cornell Community and Rural Development Institute awarded CPECM a 1996 "Innovator Award"

• **Generation of financial support for collaborative initiatives** -- Along with our partners, we were successful in generating complementary support for multiple initiatives, including conflict management ($100,000 from IDRC for regional work, $75,000 from IAF for the network, and $5,000 from ACDI for the documentation of activities), policy review ($79,000 from a consortium of German organizations), and ANAFAE ($26,000/year for an undetermined length of time from Bread for the World) This base support will enable consolidation of the various networks and longer-term planning and action

BARRIERS

• **Research for research's sake** -- All too often scientists define problems and carry out studies independently Even when the research is well focused and when the results are shared with communities, the research does not always contribute to the broader needs of development (i e , analytical skills, analytical ability and inspiration for action) Through the UDLP, CIIFAD has been working with Zamorano and other partners to construct new appreciation for the value of more collaborative and participatory research that provides greater levels of involvement of the broad array of actors, from farmers to government to private research institutions, and that must contribute to the process of change

Objective 3 *Broaden and strengthen Zamorano's ability to meet development needs in Honduras and Central America*

ACCOMPLISHMENTS

• **Multilateral collaboration** -- CIIFAD aspires to promote long-term collaborative efforts as an alternative to short-term projects We have seen that collaboration is a relatively inexpensive mechanism for helping institutions share resources to address common concerns As a result, the UDLP has sought to build ties not only between Cornell and Zamorano, but also with third parties that have common interests During the last year, our work with ANAFAE and other partners contributed to an atmosphere of cooperation in Honduras that has fostered new alliances and built more constructive, mutually beneficial institutional relationships among previous competitors

• **New and relevant knowledge** -- Through close ties with grass-roots organizations, Cornell and Zamorano have become increasingly in touch with and knowledgeable about development issues, and are thereby improving the relevance and accountability of research efforts As a result, Cornell and Zamorano researchers have helped collaborators to fill critical knowledge gaps in some key social and technical areas In the last year these include the ability to analyze and mediate conflicts, an understanding of the factors behind decisions in the use of natural resources, communication alternatives for health education, electronic media for research, teaching, and rural credit, farmer breeding of corn, limits and opportunities of biological pesticides, pesticide resistance, and forage systems and nutrition Thanks to our integration with national-level networks, this experience arrives to a broad audience

BARRIERS

• **Limited understanding of collaboration** -- Most educational and research institutions and many of our NGO partners are more experienced with competition than collaboration Collaboration demands new attitudes of mutual respect and shared responsibility, and it requires much time and energy We have seen that partners are often reluctant at first to commit human and material resources to collective efforts, particularly in this period of increasingly scarce resources in Central America Through our interactions, Cornell and Zamorano are hoping to demonstrate how progress can occur through collaborative learning -- i e , working with parties that share common hopes and dreams to identify needs and build better understanding on the biological, physical and social obstacles to agricultural progress

Objective 4 *Enhance and broaden the training of future leaders through the establishment of a pilot joint Master of Professional Studies Program in tropical agricultural development and natural resources management*

ACCOMPLISHMENTS

• **Institutionalization of the MPS in Tropical Agriculture** – The joint MPS program is well established and on its way to helping regional leaders to strengthen their abilities, thereby enhancing regional progress in agricultural development Interest in the program, as reflected by the number of applications, is growing as the first graduates return to the field and the program gains recognition In our recent planning meeting we voted to change the program's status from a pilot program to a permanent program with administrative support from both institutions We have included a section on the joint degree program as part of the IARD web site, and we have completed an updated Spanish-language MPS brochure (See Appendix B) Presently, we have nine students enrolled in the joint degree program and one candidate already chosen for the 1998-99 academic year

• **New MPS Course at Zamorano** -- A new masters-level course has been created at Zamorano, which for its first offering received very good reviews by its participants This course has the endorsement of the Zamorano Administration and its Board of Directors, but more importantly it has the support of the Zamorano faculty whose commitment has made the course the success that it is To be sure, some refinements will be necessary, not the least of which is a plan to open up the course as a short course to agricultural professionals outside the MPS program This will help to make the course financially viable and will enhance the opportunities for learning interactions among its participants

• **New initiatives from the MPS Committee** -- The joint MPS committee has integrated the MPS research with on-going development efforts, and has begun to identify and gain alternative sources of support for the program The committee has made a concerted effort to include broad array of professionals in the program, including the agribusiness as well as the rural development sector

BARRIERS

Funding

• **Funds for professional study** -- While development work may be spiritually rewarding, careers in the field are not normally lucrative, particularly for Latin Americans choosing to work in their own countries Furthermore, most of the financial aid resources for the support of graduate students at Cornell are directed at traditional research and not professional study Consequently, most candidates require significant third-party financial assistance to support their participation in the MPS program While we have been fairly successful at helping individuals obtain funding support, particularly for Latin American professionals with strong track records, it has been difficult to identify funds at the program level UDLP funds have helped us jump-start the joint degree program, but its sustainability will depend on our ability to identify a base of program-level support to assure high levels of student participation

Participation

• **Overall recruitment** -- Historically, individual professors and staff have identified the majority of the candidates for Cornell professional programs, and this has been the case with the Cornell-Zamorano joint MPS as well General mailings of promotional material are of limited impact The joint faculty committee plans to work more closely with the faculty at both institutions to encourage their greater promotion of the program, but it also needs to incorporate other strategies Now that some outstanding graduates and present participants have experienced the program, their strong presence in the professional sector can help us identify and recruit future candidates

• **Emphasis on rural development** -- The joint committee has been eager to attract not only professionals from the rural development and natural resource management sectors, but also people from the agribusiness sector In the coming years, we intend to target the business population with promotional materials and to attempt to identify scholarships specifically for these agribusiness professionals who would like to upgrade their skills

Intensive course

• **Cost-effectiveness** (at Zamorano) -- Zamorano is a relatively small institution with a staff of about 30 full-time professors fully committed to teaching While the school gave a very successful intensive course in 1997, only four students participated Zamorano estimates that it must increase the number of participants to at least ten for the school to cover its direct costs Presently, three participants for the 1998 course will come from the joint MPS program Zamorano needs to develop promotional material to complement participation through the recruitment of additional non joint degree individuals Given the open-ended nature of the course, the diversification of the group would enrich the learning experience

QUANTITATIVE OUTPUTS OF LINKAGE ACTIVITIES

The following figures apply to the period October 1, 1996 to September 30, 1997

• Number of Cornell PhD candidates who have interacted with Zamorano 7

Alan Barton, Rural Sociology
Dinie Espinal, Horticulture
Donald Hanson, Agricultural Engineering
Joffrey Mendoza, Agriculture Economics
Alfredo Rueda, Entomology
Luís Vásquez, Entomology
Raúl Zelaya, Education

• Number of Cornell BS and MS candidates who have interacted with Zamorano (does not include the joint-degree program) 5

Mariela Fourli, Agricultural Economics
Jennifer Ketzis, Animal Science
Guillermo Mendoza, Agricultural Engineering
Sean Neal, Agricultural Economics
Thad Wengert, Agricultural Economics

• Number of Joint Degree Cornell/Zamorano MPS students 9

Jose Garcia (Guatemala)
Keith Chanon (USA)
Milton Flores (Honduras)
Laura Meitzner (USA)
Fernando Neri (Bolivia)
Carlos Piedrasanta (Guatemala)
Gonzalo Rodríguez (Guatemala)
Thomas Solomon (USA)
Matthew Thornton (USA)

• Number of Zamorano faculty and staff who have participated directly with Cornell faculty and staff in UDLP-related activities 32 (listed below)

Juan Jose Alán
Keith Andrews
Margoth de Andrews
Mario Bustamante
Ron Cave
Silvia Chalukian
Wilfredo Colón
Mario Contreras*
Roberto Cuevas*
Nancy Erickson
Daniel Kaegi
Tim Longwell
Isidro Matamoros*
Alfredo Montes
Nelson Montoya
George Pilz
Luis Pinel
Abelino Pitty
Mario Ramirez
Aurelio Revilla

Marco Esnaola*
Antonio Flores*
Gladys de Flores
Abel Gernat
Francisco Gómez
Allan Hruska*
Jaime Rojas*
Gloria de Rojas
Juan Carlos Rosas
Raúl Santillán
Miguel Vélez
Michael Zeiss

• Number of Zamorano faculty who visited Cornell this year 7 (indicated above with an asterisk, all supported on UDLP funds)

• Number of Cornell faculty participating with Zamorano faculty in UDLP-related activities 23

George S Abawi*
Phil A Arneson*
Robert W Blake*
W Ronnie Coffman
Eric Fernandes*
Francille M Firebaugh*
Ann Hajek
Michael Hoffman
William Lacy*
David R Lee*
Dennis Miller
Kenneth W Mudge
Jane Mt Pleasant*
Eric B Nelson*
Pilar A Parra*
Max J Pfeffer*
Eloy Rodriguez*
Anthony M Shelton
Margaret E Smith*
Tammo Steenhuis*
H David Thurston
Norman T Uphoff
Michael G Villani*

• Number of Cornell faculty who visited Zamorano this year 15 (indicated above with an asterisk, not necessarily supported on UDLP funds)

• Total number of "mini-grants" awarded to date 22

• Total amount of "mini-grant" support awarded to date $78,000

• Number of NGO's directly involved in UDLP collaborative research and outreach activities during Year Five 9

Aldea Global
ANAFAE (network of 26 NGOs)
CIDICCO
COSECHA
IIRR (ECUADOR)
PANACAM
Pastoral de la Tierra/MISEREOR
Proyecto Guayape
PRR
World Neighbors

APPENDICES

A Phil Arneson Sabbatical Leave Report A copy of the final report submitted to the Fulbright Scholar Program

B MPS Brochure (in Spanish)

C Resistance of Agricultural Pests to Insecticides in Nicaragua Causes, Current Situation, and Management (in Spanish) A publication from a collaborative program that grew out of a UDLP mini-grant

Appendix A.

Phil A. Arneson
Sabbatic Leave
Report

Escuela Agrícola Panamericana
August 1, 1996-July 31, 1997

AMERICAN FULBRIGHT GRANTEE REPORT FORM

GRANTEE NAME: Phil A Arneson

U.S. HOME ADDRESS. [redacted]

U.S. HOME INSTITUTION: Cornell University
Ithaca, NY 14853

CATEGORY OF GRANT: Lecture/Research

HOST INSTITUTION: Escuela Agricola Panamericana
(Zamorano)
Apartado Postal #93
Tegucigalpa, Honduras

HOST COUNTRY Honduras

FIELD OF SPECIALIZATION: Plant Pathology (Agriculture)

PERIOD OF GRANT: August 1, 1996 to April 30, 1997

Part I. Administrative

1. **Selection and Notification:** Understandably, the review and selection process takes a long time, but for me the announcement of the award came uncomfortably close to the time that I was supposed to depart In order to have time to get settled and bring my Spanish up to speed before having to start teaching on August 16, I had intended to arrive in Honduras on July 1 But since I did not receive my notification of the award until June 28, I had to delay my departure until August 1

2. **CIES Information Packet:** I did not attend a CIES orientation meeting but depended solely on the information provided in the packet That plus the information that I received from my host institution was adequate

3. **Transportation Arrangements:** On our trip to Honduras, we shipped our car and our household goods in a Zamorano container and flew to Tegucigalpa with the maximum allowable checked luggage and carry-ons On the return trip we packed our belongings into our car and rode a ferry from Puerto Cortes to Brownsville, Texas The ferry trip turned out to be a five-day ordeal If I were to do it again, I would fly round-trip, and I would ship only the bare essentials necessary for my project I would buy a car and the necessary household goods in Honduras and sell them at the end of my stay

4. **Financial:** The stipend was adequate to meet our needs, and we were able to stretch it out over a full year because we were getting our house rent-free from Zamorano We did not have to pay Honduran income tax, and we were able to get MI (tax-free) status for our automobile on the condition that we re-export it at the end of the year

5. **Logistical Arrangements Abroad**

   Housing: We had a very comfortable 3-bedroom house on campus provided by Zamorano

   Household furniture and furnishing: The house provided by Zamorano was furnished with a refrigerator, electric stove, dining table and chairs, beds, and a basic living room suite (couch, 2 chairs, a coffee table, and 2 end tables) We purchased some inexpensive bookshelves and bedside tables, which we sold when we left

   Food: Virtually all the food to which we were accustomed in the States was available in supermarkets in Tegucigalpa

The prices on imported goods were substantially higher than the prices we paid in the States, but the domestically produced goods were considerably cheaper Good quality fruits and vegetables could be obtained very cheaply in the local markets Zamorano has a market outlet for its farm produce, where the quality is good and the prices reasonable Unlike in the States, where we have grown accustomed to having whatever fruit or vegetable at any time of the year, the availability of produce in the markets in Honduras followed the local season

Schooling: There is a wide range of choices of private schools in Tegucigalpa with widely differing programs, including a military school, an "American" school, a Montessori school, several Catholic and other religious schools, and many others Although we are not Catholic, we sent our 14-year-old son to a bilingual Catholic school (Macris School, 504 21-3824), primarily for the cultural and linguistic experience The academic program was not as good as that of the public schools in Ithaca, but the non-academic experience that our son gained was well worth it Zamorano provides bus transportation to the children of faculty, and depending on the school, it is a 40- to 60-minute bus ride from Zamorano

Local transportation: Within all of the major cities taxi transportation is readily available and cheap Bus transportation is inexpensive and available virtually everywhere in the country However, the busses (often renovated US school busses) are usually crowded and uncomfortable Small-scale farmers often use them to carry produce (including live chickens) to market, and pick-pockets and thieves are not uncommon I consider bus transportation risky because (1) they generally are in very poor condition mechanically and are not safe on mountain roads, and (2) the drivers often take incredible risks, such as passing on blind curves and racing downhill at unsafe speeds Horrible bus accidents occur with frightening frequency

There are well paved roads connecting all of the major cities in the country However, one has to drive with extreme caution One may suddenly encounter unexpected and unmarked deep potholes, washouts, or landslides in otherwise excellent stretches of highway Traffic is often heavy, and the same road is shared by trucks going 10 mph and cars racing by at 80 mph A very high proportion of the drivers take ridiculous risks, passing on blind curves and hills, passing a car while it is overtaking another, passing on the right, running stop signs, and driving at speeds unsafe for the conditions At night it is not uncommon to encounter a vehicle running without lights

Clothing: In the tropical climate of Zamorano, informal short-sleeved shirts and light slacks are the daily wear Shorts, T-shirts, and sandals are reserved for the weekends During the months of November through February, many days and most evenings are cool enough to require a sweater or light jacket, and occasionally there are "northers" lasting 2-3 days that require both a sweater and a jacket Coats and ties are worn only on a few occasions, such as graduation, and for evening functions in Tegucigalpa, such as plays and the opera For somewhat formal dinners and other occasions, men commonly wear the short-sleeved, pleated, and sometimes embroidered shirts called "guayaveras", available and not expensive in Tegucigalpa Compared to what is customary in Ithaca, the women at Zamorano are generally far more elegantly dressed, and even for picnics and other occasions that we would consider informal, they dress up Unlike a few years ago in Honduras, when pants on women were all but forbidden, women now commonly wear slacks and even blue jeans For the most part, styles follow fairly closely what is in fashion in the US

Medical and Dental Services: Zamorano has a clinic and infirmary for students and staff, manned full time by doctors on contract from a Tegucigalpa medical group Their referrals are to a private hospital in Tegucigalpa The standard of care is good, but for serious problems most Americans go to the US For example, a Cornell graduate student, who had severely injured his arm in a bus accident, was treated in a private hospital in Tegucigalpa, where they X-rayed the arm, found a radial fracture, and applied a cast We sent the student back to Ithaca the following day, where an orthopedic surgeon surgically repaired the wrist and inserted a metal plate in the elbow to treat fractures totally overlooked in Honduras and which would have healed to leave the arm with less than its full range of mobility The conditions in the public hospitals in Honduras are appalling, and I would not recommend going to them except for emergency trauma treatment and stabilization for transport to another facility There are good dentists in Tegucigalpa, but we did not have any dental work done there, and many of the Americans at Zamorano go to the dentist while on home leave in the US

Part II. Educational Resources and the Academic Program at the Institution of Affiliation.

1. Availability of reference works

Zamorano has a small library with a very limited collection, and the Crop Protection Department also has a small

collection of books and reprints on crop pests and pest management This collection, along with what I brought with me, met most of my reference needs I made one trip to the Fundación Hondureña de Investigación Agrícola (FHIA) on the north coast (about a 5-hour drive away) to take advantage of their excellent research library I was also able to find some of the information that I needed on the World Wide Web Because of the technical nature of my reference needs, I did not attempt to use the USIA library

2. Local suppliers

Although I could have taken advantage of Zamorano's supply system, I did not attempt to order any books or supplies from the US Because of the frequent visits of Cornell students and faculty in our various collaborative projects, I was able to order the few items of computer supplies and software that I needed by E-mail from the Cornell campus store, charge them to my project account, and have them brought down by one of the travelers

3. Textbooks

The textbooks used in the plant pathology course were written by a former Zamorano faculty member and published by Zamorano Academic Press They were adequate, relatively inexpensive, and accessible to the students in the Zamorano bookstore

4. Recommendations for other teachers

Textbooks in Spanish on Crop protection are available Unfortunately the best ones have not yet been translated into Spanish or are prohibitively expensive for the students I suggest checking on the availability of locally published textbooks for general student use and bringing down reference copies of supplementary textbooks that can be made available to the students through the library

5. Other educational materials

There are many excellent videos available in crop protection, and my host department had a good collection of them Unfortunately, most of them are in English, and while nearly all of the students at Zamorano understand some English, most of them do not understand it well enough to get full benefit of the videos

My host department has developed a collection of 2X2 slides with photographs, charts, graphs, and cartoons contributed by the various faculty over the years as they prepared them for their lectures Many of the drawings had been done by a

very good graphic artist in the department A set was available in the departmental library, which proved to be an invaluable resource for me in preparing for lectures

By the standards of my department at Cornell, the state of the laboratory equipment in the teaching labs At Zamorano would not have been acceptable They have an eclectic assortment of microscopes many of which are in horrible condition Ocular lenses have been dropped and cracked, lenses are out of alignment, lenses are dirty inside and out, prisms have been dislodged, objective lenses have been scratched, objective lenses have been mismatched so that they are no longer parfocal, screws are missing, mechanical stages are loose, rack-and-pinion focus mechanisms do not work properly, light sources do not work, and the list goes on Nevertheless we managed to put together enough functional microscopes to make do

In the labs at Zamorano it seems that nothing is disposable, including the two dozen or so "disposable" plastic petri plates that are now so scratched from repeated use (as moist chambers--not sterile, of course) that they are almost opaque Microscope slides and cover slips, also, are used again and again They, too, are scratched and chipped, not to mention still somewhat contaminated with spores and miscellaneous fragments of debris remaining from previous uses Learning plant disease diagnosis under these conditions is exceedingly difficult for novices, who still can't distinguish a bubble from a spore or a scratch from a hypha

The person in charge of maintaining the teaching labs told me that it takes about a year and a half from the time an order for supplies is placed until the order is received Because of tight budgets, they reduce, reuse, and recycle as much as possible

6. Administrative Organization

The Escuela Agrícola Panamericana (now better known as Zamorano) is a private agricultural college founded in 1943 It offers a 3-year "Agronomo" program, a fourth-year "Ingeniero Agrónomo" program, and, in collaboration with Cornell University, a Master of Professional Studies in tropical agriculture It has about 700 students (25% women) from about 20 different countries Admission is highly selective (including a rigorous entrance exam), and only 250 of about 2000 applicants are accepted About one-third of the students receive full scholarships, one-third receive partial scholarships, and one-third pay their own way A strong effort is made to recruit indigenous students and students from small, rural, disadvantaged schools

There are 8 academic departments at Zamorano Agronomy, Agricultural Economics, Animal Science, Basic Sciences, Crop Protection, Horticulture, Natural Resources, and Rural Development In addition to the academic program, Zamorano has a Production and Marketing program and an Outreach program The former provides the students with practical experience in production and marketing as well as providing a substantial portion of the food consumed in the cafeteria and a portion of the school's revenues through sales to the public The latter also provides learning opportunities for students while providing continuing education, extension, and technical assistance to the people in the surrounding communities

7. Instructional organization.

The academic year is divided into trimesters running over 11 months, beginning in January All of the Agronomo students follow the same curriculum (no electives) throughout the 3-year course of study The curriculum includes mathematics, basic sciences (chemistry, biology, physics), computers, Spanish, English, and a wide range of courses in crop production, crop protection, animal science, food science farm business management, rural development, and natural resources The Agrónomo students spend half their time in "field laboratories", where they get hands-on experience in all aspects of agriculture Zamorano's motto is "Learn by doing"

In the Ingeniero Agrónomo program there is a core of required courses for all 4th-year students (communication, writing, research methods, statistics, and management) and a set of four courses that depend on the specific departmental focus selected by the student The students are required to do a research project and submit and defend a thesis based on the research

In the Master of Professional Studies program, the students spend one year at Cornell, taking classes and participating in seminars, followed by 2 months of intensive courses at Zamorano and 6-8 months in the field participating in a problem-solving project under the direction of a Zamorano faculty member

8. Departmental organization

The Department of Crop Protection (within which I worked) is responsible for three courses at the Agrónomo level (Entomology, Plant Pathology, and Weed Science) and four courses at the Ingeniero level (Pests in Tropical Crops, Biological Control, Agricultural Chemicals, and Integrated Pest Management) In addition, the Department offers field

laboratories in plant protection, pest identification, and pest management

Besides its formal classroom teaching, the Department conducts numerous short courses and workshops to farmers (from small-scale "campesinos" to large-scale export producers), extension agents, Peace Corps volunteers, and non-government organizations Some of these workshops are conducted on the Zamorano campus, while others are given in rural training centers throughout Honduras and in parts of Guatemala, El Salvador, and Nicaragua

Most of the Department's faculty also conduct research programs, generally in conjunction with the Ingeniero Agrónomo students Current research areas in the Crop Protection Department include botanical pesticides, transgenic crops, biological control, white grubs, leafcutter ants, the whitefly and the geminiviruses, insecticide resistance, phytoplasmas of Gliricidia, minimum tillage systems, pesticide externalities, and evaluation of extension activity

Another important activity of the Department is a diagnostic service offered to farmers, extension agents, and anyone who sends a sample or walks in the door bearing a diseased plant or an unidentified insect or weed

The Plant Protection personnel are also responsible for managing the pests in over 30 tropical and sub-tropical crops on Zamorano's 6,000 hectares

Part III. Professional Activities

1. Academic Assignment

When I arrived, the Department of Crop Protection at Zamorano had had a vacant plant pathologist position for two years The introductory plant pathology course, which is a required course for all second-year students, had been taught by Dr Mario Contreras, the Dean of Outreach Dr Contreras has a Ph D in plant pathology, but his administrative responsibilities as Dean made it difficult for him to continue to teach He sincerely enjoyed teaching and was reluctant to give up the course altogether, and he did not want me to be burdened with having to prepare lectures in Spanish, so we decided to share the job He gave most of the lectures, and we planned the labs together, but I assumed responsibility for their preparation and execution It was still basically his course, and I became a senior teaching assistant

The plant pathology class, with an enrollment of 210, had two lectures and one laboratory per week The lectures were divided into two equal sections, one in the morning and one in the afternoon, and the labs were divided into six sections of 35 The labs were two hours long, with two sections on Thursday afternoons and four sections on Fridays, beginning at 6 30 AM Attendance was required, and students were given demerits (in a disciplinary system similar to that of a military academy) for absences or for arriving late

For the class I developed two new interactive exercises in disease management decision making using computer simulation, which I presented during the laboratory sessions For the classroom presentation I used an LCD projection panel borrowed from a faculty member who had recently purchased one for use in his lectures For the second exercise, we invited the Zamorano faculty to observe one way in which some of these new electronic technologies can be used in the classroom About a dozen faculty showed up The first of these exercises has now been incorporated into the textbook on the World Wide Web, and the second soon will be

2. Progress Toward Objectives

My first objective was to teach the introductory plant pathology course and in so doing enhance and expand the material that I offer in a similar course at Cornell Through my interactions with Mario Contreras, this objective was fulfilled well beyond my expectations

The second major objective of my assignment was the production of a bilingual, interactive textbook in plant pathology on the World Wide Web While I did not complete the work, I was able to make considerable progress toward its completion The material available to date can be found on the World Wide Web at

http //www zamorano edu hn

and

http //ppathw3 cals cornell edu/OLplpath/Plpathol htm

The Department of Crop Protection had long been in need of the services of a plant pathologist to conduct short courses and workshops and to address some of the diagnostic problems In responding to these needs, my time was diverted somewhat from work on the textbook, although many of the materials I prepared for the workshops can be easily adapted for incorporation into it Likewise, much of the

research required for some of the diagnoses has provided a basis for writing plant disease profiles to be included in the text

A third objective has been to get better acquainted with Zamorano (the institution, the curriculum, the students, and the faculty) in order to facilitate my activities as faculty Coordinator of the Cornell/Zamorano Joint MPS Program This objective also has been fulfilled

3. Professional Relationships

On an institutional level, I feel I have gained a deeper understanding of Zamorano that will help me in my future interactions in the planning and administration of our joint degree program Cornell's linkage with Zamorano will continue, and I will continue to visit Zamorano periodically and to host visiting Zamorano faculty at Cornell I developed strong personal and professional ties with several faculty in the Department of Crop Protection, the Department Head, and the Deans of the college I will continue to communicate and collaborate with these people in the years to come I also developed a special professional relationship with the newly hired plant pathologist and will be able to serve a mentoring role as she begins to develop in the position

4. Problems

My major source of frustration throughout my stay at Zamorano was the unreliable Internet access, and since one of my goals was to develop materials for the Web, this was more than just an inconvenience I was there for three months before I was able to get Internet access at all, and it continued to give me problems up until the day I left In an effort improve my chances of communication, I opened E-mail accounts on two independent systems, and one or the other of the systems was frequently down, sometimes for days Not infrequently both were inaccessible, and in May, after my primary access had been down for over a month, I opened an account on a third system Even when the systems were working, it would take me six to ten attempts and 20 to 30 minutes just to get connected Once connected, the connection typically would last only two to fifteen minutes The longest I was able to sustain a connection was about half an hour E-mail had to be downloaded or uploaded as quickly as possible, often requiring several attempts, and it had to be read or written off line Use of the World Wide Web or large file transfers by FTP were nearly impossible I was unable to install anything on our server at Cornell, and I was unable to edit our electronic journal

5. Local speaking Engagements

One of the outreach services provided to the agricultural community by the Department of Crop Protection at Zamorano was a series of workshops on the diagnosis and management of various pest problems On two occasions I offered a two-day workshop in plant disease diagnosis and control to groups of about 15 extensionists who had come to Zamorano to learn concepts and practices that they could take back to the small-scale farmers that they advised I also presented a similar workshop to a group of agricultural extensionists in Nicaragua and in an agricultural education center run by a privately-funded nongovernment organization dedicated to teaching methods of organic agriculture

Zamorano also contracted with the US Peace Corps to run training sessions for new volunteers On three occasions I ran a half-day portion of the training session in which we addressed plant diseases and their control I also gave a guest lecture in a workshop on the control of leaf-cutter ants and a half-day lecture/demonstration on fungicide resistance to a group of private pest control technicians

6. Evaluation of Experiences

This experience certainly will enhance the quality of my teaching at Cornell I have developed a rich, new array of examples that truly will "internationalize" my classes, and I will far better be able to relate to the particular problems of my students from the tropics, especially the Latin American countries

One of my colleagues who teaches the pest management course at Zamorano was a student in my first pest management class at Cornell in 1977 He and I had a good many discussions about crop protection and about teaching during my stay at Zamorano, and I am sure that I have learned more from him this year than he did from me 20 years ago From him, as well as other Zamorano colleagues, I have gained new perspectives on pest and crop ecology and on teaching and learning

I have developed a new sensitivity to and understanding of issues in development

7. New Research Interests

I have gained an appreciation of and an interest in leaf-cutter ants as agricultural pests In the tropical forests they are important agents for conditioning the soils and

cycling nutrients, but in agricultural systems they can cause devastating losses They are exceedingly difficult to control by conventional means, but since they are absolutely dependent on the fungus that they cultivate on the leaf mulch that they produce, inhibition of fungal growth offers an opportunity for management of the ant population As a plant pathologist, I have had considerable experience in suppressing fungal development and see some possible alternatives to test for the management of leaf-cutter ants

8. Teaching Changes

I will approach my integrated pest management course this fall pumped up with new information, new perspectives, and new energy I will be able to address issues of pest management in tropical agriculture and make the course far more relevant to the approximately one-third of the class who are from tropical countries

The person who filled in for me in my spring semester course was so taken with the class that he is reluctant to give it up The Department Chairman has already discussed with me the possibility my playing a new role in a revised International Agriculture curriculum

9. Continuing Relationship

I will continue to collaborate with colleagues at Zamorano in a number of different areas First, I will continue to serve as mentor to the newly hired plant pathologist, sharing teaching materials and backstopping her in difficult diagnostic problems and in advising Ingeniero Agronomo students Second, I will continue to participate in some of the projects with which I became involved, such as the late blight forecasting and the leaf-cutter ant management Third, I will continue to update and add to the textbook on the World Wide Web, installing new files on the Zamorano server as they become available Finally, in my role as coordinator of the Cornell/Zamorano joint degree program, I will continue to engage in joint curriculum planning, evaluate applicants for admission, counsel students in the program, and help match students with advisers I will promote further exchanges of Cornell and Zamorano faculty