

The deep change process in Zamorano: 1997-2002

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A case study

Keith L. Andrews

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e-mail: information@iiep.unesco.org
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Foreword to the series

Education for rural people is crucial to achieving both the Education for All (EFA) goals, and the Millennium Development Goals (MDGs) of eradicating extreme poverty and hunger, ensuring universal primary education by 2015, promoting gender equity and ensuring environmental sustainability. In 1996, the World Food Summit in Rome stressed increased access to education for the poor and members of disadvantaged groups, including rural people, as a key to achieving poverty eradication, food security, durable peace and sustainable development. The 2002 World Summit on Sustainable Development, held in Johannesburg, also emphasized the role of education.

As the majority of the world's poor, illiterate and undernourished live in rural areas, it is a major challenge to ensure their access to quality education. The lack of learning opportunities is both a cause and an effect of rural poverty. Hence, education and training strategies need to be integrated within all aspects of sustainable rural development, through plans of action that are multisectoral and interdisciplinary. This means creating new partnerships between people working in agriculture and rural development, and people working in education.

To address this challenge, the Directors-General of FAO and UNESCO jointly launched the flagship programme on *Education for rural people* (ERP) in September 2002 (<http://www.fao.org/sd/erp/>), during the World Summit on Sustainable Development. This initiative involves an inter-agency approach to facilitate targeted and co-ordinated actions for education in rural areas.

It is within this framework, and to provide inspiration for the flagship initiative, that the FAO's Extension, Education and Communication Service and UNESCO's International Institute for Educational Planning (IIEP) have jointly launched a series of publications. This series is co-ordinated and edited by David Atchoarena (IIEP) and Lavinia Gasperini (FAO).

Gudmund Hernes
Director, IIEP

Ester Zulberti
Chief, Extension, Education and
Communication Service, FAO

List of abbreviations

CEO	Chief executive officer
DSE	German Foundation for International Development
GTZ	German Technical Co-operation
IDB	Inter-American Development Bank
MBA	Master of business administration
MS	Master of science
NGO	Non-governmental organization
SIVE	Integrated student life system

Introduction

December 14, 1997. Everyone in the group was exhausted, most were confused and somewhat disoriented, and all realized that Zamorano would have to change. For the past seven days the academic leaders of Zamorano College had travelled by bus through Nicaragua and Costa Rica and really listened to the ‘stakeholders’ (that word itself had been new for some of them). The informants – medium and large agribusiness leaders, ministers, graduates, rural-development specialists, heads of human resources departments, futurologists and others – had bombarded the group with ideas regarding the agricultural sector, the profession of Ingeniero Agrónomo, Zamorano as an institution, and Zamorano’s graduates. The group had watched a half dozen movies on the subject of higher education, had been through two intensive pre-strategic planning sessions, and had shared ideas among themselves more intensely than at any time in recent memory.

*Now it is one thing for academics to talk among themselves in order to determine what the world should be, to debate why it is not that way, and to decide what the world should expect **from them**. It is an entirely different matter to ask outsiders – non-academics! – what the world is really like and what it needs, what the labour market values, and to what extent the outsiders feel that the current educational institutions are giving them what they need. Academics are generally talented at talking, debating and refuting, but during the past week these academicians had been allowed to only ask questions (non-technical questions) and were not permitted to defend their system or profession. Nor could they correct misperceptions.*

It had been a distressing week because many of the informants said that they did not really value many of the elements most important to the academics.

Most of those of us in the academy do not listen especially well, especially to those who do not hold advanced academic credentials and operate in the inexact work world. But that atypical week of travel, intense listening to discomforting opinions from surprisingly articulate people, and of the resulting introspection, created a sea change in Zamorano and marked

the moment in which most of us knew that we were in for some uncomfortable, but overdue change. It represented the moment in which several key institutional leaders committed fully to deep, multidimensional change. Many of the other participants, previously so sure of their own knowledge and potential opponents of any fundamental change, were effectively neutralized.

So mid-December 1997 marks the moment in which Zamorano recommitted to being – in the words of its founder, Sam Zemurray – “practical and first class”. December 1997 is when Zamorano, an already strong institution, stopped resting on its laurels and launched a process of rapid, deep change. This change was based simultaneously on the evolving needs of the college’s external constituencies and a re-evaluation and ultimately a reaffirmation of the enduring values of the institution. By making difficult programmatic changes that were consistent with the strengthening of the institution’s deepest values and the key external constituencies’ needs, Zamorano assured that its programmes respond to the priorities of the broad society, not just those of a complacent internal constituency.

Zamorano is a private, apolitical, pan-American centre of higher learning committed to providing a first-rate, holistic education that includes the key elements of sustainable tropical agriculture, agribusiness, agro-industry, natural resource management and rural development. This education is founded upon the pillars of pan-Americanism, learning-by-doing, academic excellence, and character and leadership development. Zamorano is a USA non-profit corporation located 30 km from Tegucigalpa, Honduras. Nearly 900 students of all socio-economic groups from 20 countries of Latin America live and study on the nearly 7,000-hectare campus that includes several distinct ecosystems located 600 to 2,000 metres above sea level. Graduates fill important positions throughout the hemisphere and are fiercely loyal to their alma mater. The vast majority completes postgraduate studies soon after graduation from Zamorano. The key elements of the current system are described in detail in the *Appendices*. Interested readers can also consult www.zamorano.edu.

In its broadest sense, during the period 1979-2002 Zamorano underwent deep, broad change, converting itself from an internally-focused, industrial model, second-wave institution concerned only with agricultural production into a market-oriented, third-wave institution focused on socio-economic

development in the broadest sense, and with a service culture (Toffler, 1980). During this period Zamorano converted itself from an excellent vocational agricultural school with deep financial difficulties, to a strong technical college with an unclear match between its offer and external demand, to a proto-university focusing on broad agribusiness and rural development and using a unique educational methodology. Change was especially profound during the period 1997-2002. Today Zamorano is dramatically different from most 'ag schools' that are still stuck somewhere between the first agricultural and the second industrial wave.

The story presented here is not about a simple curriculum adjustment or institutional growth by addition; nor is it about an externally mandated change. Rather it is about the internally driven, voluntary, rapid redefinition and repositioning of a traditional institution confronted by a dramatically changed environment.

The retrospective presented here is provided in response to a request from the Food and Agriculture Organization of the United Nations. In it I have tried to answer all of the questions posed to us in mid-March 2002 by Lavinia Gasperini, Senior Officer for Education for Rural Development. Several cautionary statements are in order:

- This paper concerns itself with the *change process* in Zamorano; it does not attempt to present the details of the changed curriculum. Nor does it document the inner workings of Zamorano. Readers who want more detailed information on the educational programme, administrative processes, or other details regarding the Zamorano system will need to consult other documents regarding the specifics of the new Zamorano curriculum; several of these documents are now in preparation. Please feel free to contact the author if you are interested in these documents as they appear.
- The focus is on the issues and ideas that will be of interest to non-Zamorano readers. I have not included those aspects of the change process that seem to me to be unique to Zamorano and therefore less relevant to other institutions.

- I have used broad brushstrokes in order to create as clear and uncluttered a chronology and analysis as possible. Of course, in the real world, cross and counter currents abounded and confused the issues.
- I welcome comments and clarifications from colleagues to enrich and improve the presentation of this complex history.

Before proceeding, it is essential to emphasize that this document does not represent an official position of Zamorano. In the spirit of full disclosure, the sole author admits to being the principal proponent and architect of the changes in the period 1993 until 2002, and an enthusiastic, active participant in the change that occurred between 1980 and 1992. Although I have tried to be objective, that is not entirely possible, especially considering that this document is being written as I complete my tenure as Director General. I thank Kate Semerad, Richard Knab, Mario Contreras and an anonymous reviewer for many useful suggestions on earlier drafts.

Chapter 1

Chronology of change in Zamorano

This document concentrates on the period 1997-2002, but in order to understand that recent period of intense, deep change, it is necessary to review several elements of the institutional culture and the relationship of Zamorano to society throughout its 60-year history. The most recent years of change are, in many ways, simply a period of intensified activity to consolidate those characteristics, some explicit, and some latent, that had existed prior to that time period. Many of the recent changes that were made, were in fact changes whose only function was to ensure full expression of the deepest principles and the comparative advantages of Zamorano. So we turn to a brief look at the history, beginning with the foundation of the then school in 1942. In order to learn more of the early history of Zamorano, the reader can consult a comprehensive history of the institution written by the former Director Simón Malo (1999).

Zamorano's history is not one of uninterrupted, gradual change and progress. It is far from that. It is a history of periods or spurts of rapid, deep change followed by relatively longer periods of consolidation. Gersick (1991) proposed the Punctuated Equilibrium Paradigm to explain such start-and-stop organizational change, and Gold (1999) applied this theory to explain change in educational institutions.¹

1.1 Change as punctuated equilibrium 1942-2002

Conceptually, the periods of Zamorano's punctuated evolution seem to have been the following:

- In the period of 1942 to 1950, the 'school' was founded, grew and evolved rapidly based on ample resources, strong, visionary leadership, and learning from experience. The guiding principles of the institution
1. When I came across these two papers, while preparing this report, I felt a sense of relief that earlier, our empirical observations on Zamorano's evolutionary periods were justified by theoretical constructs.

were *Labor Omnia Vincit* (work conquers all), learning-by-doing and Pan Americanism. A strong disciplinary system was applied to the 180 young men from throughout Central America, Mexico, the Caribbean and northern South America. Graduates of the three-year programme followed many career tracks, but the profile of the time called for them to either return to family farms or become extension agents. Few completed university-level studies.

- The same Director led during the second phase, 1951-1957. It was one of business as usual with very little further evolution in the extant Zamorano system.
- A period of dramatic programmatic change in Zamorano occurred between 1958 and 1962 under the leadership of the second Director, a dynamic and contentious man. It was during this period that Zamorano stopped being a secondary school and became a technical college. For the first time, all applicants were required to have a high-school diploma. The curriculum was modernized and science training was strengthened. A systematic work programme was instituted. Additional countries began to send students. The school calendar was changed and the academic year was extended from 9 to 11 months. Graduates were increasingly encouraged to complete their undergraduate preparation and then pursue postgraduate studies.
- When this Director who had led the charge for dramatic changes left the institution in 1962, change virtually ceased. Between 1963 and 1978, first the recent advances made were consolidated, and then 'business as usual' dominated, and then, some would argue, stagnation and even crisis set in. During this time the curriculum changed little, the student body did not grow significantly, infrastructure was not modified, and the financial situation of the institution began to deteriorate. Faculty quality suffered and turnover of professors became a constant problem. Applicant numbers dropped and self-perception among the faculty and students suffered.
- In 1979, a period of rapid, deep change was initiated with the arrival of the new Director, a self-confident, strong-willed graduate of Zamorano. Finances were put in order, the quality of administrators and teaching staff improved dramatically, and the number of students began to grow. Institutional self-confidence was restored. A strategic plan was developed by consultants in the early 1980s but was not made public; however, it

led to the admission of women, the creation of an outreach programme, a growth in size and many other advances. A fourth-year programme granting the *Ingeniero Agrónomo* degree was added and a joint Masters of Professional Studies programme was initiated with Cornell University. This phase ended in approximately 1987.

- As had been the case in the early and mid-1950s, even though the same Director continued to guide the institution, little new happened in Zamorano between 1988 and 1992. Programmes grew somewhat in quantitative terms, and considerable consolidation occurred, but little new was added or changed in the Zamorano system during that period. The staff members were convinced that the rapid and positive changes that had taken place meant that Zamorano had no serious competitors; confidence was at an all-time high. By the end of this period, most graduates intended to pursue postgraduate degrees; while many opted for the Master of Science (MS) in scientific areas, more often than not they planned to pursue a Master of Business Administration (MBA).
- In 1993, the author became the new Director. At that time few of us heard society's muffled cries for change because we were deafened by our own voices saying, 'We are the best, we have no competitors; we are on a roll'. The Board of Trustees mandated consolidation because they felt that during recent years there had been as much change as the institution could handle and they were concerned about deferred maintenance, cash-flow difficulties, and they had limited information with which to work.
- 1993 to 1995: Several substantial adjustments were made, all related mainly to 'picking the low-hanging fruit', that is, taking advantage of the latent opportunities in the existing system. Finances improved significantly, the curriculum was once again updated (within existing categories), the Administration tried to make systems more client friendly, and the numbers of applicants continued to rise. Attrition rates were cut significantly and outreach activities became ever more important. However, it became clear to a few of us that the institutional self-confidence that had been restored in the previous decade was also causing dangerous, self-congratulatory complacency – especially considering the rapid appearance of competitors and other important changes occurring in the context (see *Section 3.1.2*).

- The period of 1996 to 1997 was one of little change, great introspection and increasing confusion; it was the precursor to the dramatic changes of the past four years. During this period some of the changes of the previous period were consolidated. More importantly, a realization of how profoundly and rapidly Latin America was changing, combined with a concern that some recent campus change efforts had not been deep enough, motivated administrative leaders to look at very different, creative new approaches. Confidence was beginning to be tinged with discomfort and recriminations – from staff and graduates – that the Administration was ‘messing with a successful system’. Limited, ad hoc initiatives to address the poorly defined incongruities and dissonance added to the discomfort level.
- The deep change that occurred between 1997 and 2002 is the primary focus of this study and is detailed in the next section.

1.2 Key occurrences 1997-2002

The chronology of the most important changes that occurred in recent years is as follows (more complete descriptions of these changes are found in later sections).

- Prior to January 1997: a small cadre including the Director, the Dean for Outreach, the Academic Dean and the Assistant to the Director determined that fundamental change would be needed; few others were interested. The institution was complacent.
- February 1997: four outside reviewers invited by the Administration visited campus and assisted the academic community to understand the need for change. Several of the team members ‘gave us a going over’; we were told that Zamorano’s complacency was going to make it a fossil if something major was not done, and done quickly (see *Appendix 9* for a summary).
- August 1997: two outside reviewers from INCAE invited by the Administration conducted a study among faculty and staff to determine the preparedness for a new round of strategic planning. They found that such planning was needed immediately; the high degree of dependence on donor-provided scholarships made the institution vulnerable to financial problems. They also concluded that the organizational structure was

- inappropriate for the strategic orientation of the institution. Finally, they documented a serious lack of consensus and inadequate communication.
- October 1997: GTZ representatives presented the results of a follow-up study of recent *Ingeniero Agrónomo* graduates. The study showed that almost all worked as supervisors or managers; fewer than 8 per cent were in technical or scientific roles. Fewer than 10 per cent worked in the public sector. All graduates were satisfied with the technical content of their education, but were concerned about serious deficiencies in administration, especially in such areas as entrepreneurship, information systems, personnel management, organizational communication, financing, marketing, agricultural policy and others. They concluded that the emphasis on the holistic preparation of students should be continued. They recommended a detailed study of market needs in agriculture, agribusiness, rural development and natural resources.
 - December 1997: the week-long bus trip described in the preface and in *Appendix 10* involved all Zamorano administrators and academic leaders. In Nicaragua and Costa Rica we learned from stakeholders. People returned transformed by a new understanding of the dissonance between the Zamorano of that time and the labour market for graduates.
 - 1997 and 1998: market studies carried out by staff provided abundant information regarding the needs of employers, the satisfactions and regrets of recent graduates, the nature of the labour market in the key countries served, and the practices of new, competing institutions. We began to think and discuss much more in terms of education for the complex agribusiness sector and for rural development and less in agricultural education *per se*. We also came to understand deeply that outside stakeholders, including graduates and employers, appreciated and valued more the brand of holistic education for the person than the technical content itself.
 - June 1997 to March 1998: continuous soul searching, participatory development of a draft strategic plan occurred, but consensus was not reached.
 - March 1998 to June 1998: the new strategic plan was drafted by a reduced number of participants based on earlier input from all. The mood on campus was one of anxiety and unhappiness. Morale suffered. Everyone knew that significant change was in the works but did not yet know what that change would be or how it would affect particular programmes.

- June 1998: in a tense, conflictive meeting, the Board of Trustees decided to support most of the Administration's key proposals to establish the 4 by 4 Programme (i.e. four career areas and four years of study). Certain other measures proposed were tabled. A new, succinct strategic plan (*Appendix 2*) was approved. The timeline presented as *Appendix 1* and *Section 2.3* details the many measures approved.
- July 1998: a major reduction in force and administrative shake-up took place.
- July 1998 to early 2000: new administrative leaders and teaching staff were promoted from within and recruited from outside.
- August 1998 to January 2002: the new curriculum was designed and implemented on a rolling, year-by-year basis.
- October 1998: Hurricane Mitch devastated the region, causing thousands of deaths and billions of dollars of damage. Zamorano suffered losses of US \$1 million.
- January 1999 to December 2001: Mitch reconstruction outreach activities carried out by Zamorano staff and students helped to restore communities and businesses and to transform the institution.
- 2001 and 2002: the final groups of students under the old programme complete their studies. Their professional expectations are varied, with almost two-thirds reporting that they intend to be owners, managers or CEOs. Another 20 per cent intends to pursue scientific careers and 10 per cent plans to go into politics.
- January 2002: the largest number of students ever enrolled in Zamorano; several new, large scholarship programmes began; the first off-campus internships for fourth-year students took place. The new curriculum was completely in place.
- Late 2001 and early 2002: the Integrated Student Life System (SIVE) became fully operational (see *Appendix 8*). There was a noticeable surge of initiative from the mid-level managers to assert their influence through this and other programmes. The search for a Director General occurred and a transition team made up of mid-level staff made their wishes and needs felt.
- December 2002: graduation of the first group of students enrolled under the 4 by 4 Programme.

1.3 Description of the major changes

In order to better understand the various dimensions of the deep change that occurred in Zamorano in the period 1979-2002, see the timeline presented as *Appendix 1*. Special attention is given to the period 1993-2002. Each key occurrence is placed in one of five categories: management and administrative activities, formal curriculum (that is the theoretical curriculum), the learning-by-doing programme, the campus environment (including the invisible curriculum²), and outreach activities. Brief explanations are presented below for the items encountered in the timeline.

1.3.1 Management and administration

Let us start with a description of changes in this area, not because they are the most important, but because they are the simplest to describe. A new Director, the first graduate of the institution to hold that position, arrived in January of 1979 and immediately established a strong presence as a decisive leader. He took over an institution with only three departments – General Studies, Crop Sciences and Animal Husbandry – and rapidly built it into six departments divided along disciplinary lines: Agronomy, Horticulture, Animal Science, Agricultural Economics, Plant Protection and Rural Development. Eventually the Department of Conservation Biology and Natural Resources was added. He replaced faculty members and administrators with low levels of formal education with new faculty with postgraduate degrees. The ‘school’ went from one Ph.D.-level faculty member to 40 in 10 years.

As the institution grew, the administration improved and enlarged. Increasingly competent administrators were brought in and new offices were created. But, as might be expected, there was a perception of a growing bureaucracy surrounding the central administration. The Director, Dean and

2. The invisible curriculum is defined as that constellation of all the formative experiences that students have outside of the formal curriculum; it includes the lessons internalized through extra-curricular activities and exposure to the institutional culture. The invisible curriculum is perhaps the strongest and long-lasting part of the college experience, especially in residential programs. While the formal curriculum is essential in what the graduate *knows*, the invisible curriculum is an important determinant of who the graduate *is* as a person and as a professional.

Business Manager together with the Finance Manager made almost all key decisions. Academics resented what they perceived as the top decision-makers' increasing centralization and unresponsiveness to their needs.

In 1993, the author of this paper moved from the position of Head of Department into the administration as Director. During the next 10 years, we made continuous, well-intentioned efforts to decentralize and to devolve authority and responsibility to the programmes; after all, we had been among the key complainers regarding the old-style centralization. We have, in general, a sense of frustration at not having achieved as much progress in devolution of responsibility and authority as we have in the other four areas discussed below. Certainly, some success has occurred, but this area has lagged. Even today the programme leaders feel that they are not adequately involved in the key decisions regarding their programmes and the institutional direction. Prior to 1998, decentralization and devolution of authority was left to good will. However, to a great extent, the same people and the same structure as in the previous decade were still in place. We were asking entrenched people to make big changes in behaviour; this was asking too much of most of the critical players. Since that date the effort to devolve authority and decentralize management processes has been more systematic, and we hope that there will be significant pay-offs soon.

In June 1998, the Board and administrators committed to create the 4 by 4 Programme. This is a four-year programme to replace the three year-plus one year optional programme. In it four careers, each oriented to a niche in the labour market, replaced the former seven departments, each oriented to an academic specialization. The Departments of Animal Science, Agronomy, Horticulture and Plant Protection were merged into the Career of Agricultural Science and Production. The Career of Socio-economic Development and Environment was created by the fusion of the Departments of Rural Development and Natural Resources and Conservation Biology. The Career of Agribusiness Management grew out of the former Department of Agribusiness and Agricultural Economics. The Career of Agro-industry was begun with elements of several of the former production-oriented departments.

The successful efforts in 2001 and 2002 to implement the Integrated System for Student Life (SIVE in Spanish; see campus culture below and

Appendix 8 for more information), as well as the increasing assertiveness of the managers of the ZamoEnterprises and the Career Chairmen and women, all reflect fundamental changes in the dynamic of power and authority in the institution. No longer is there a single strong man who makes the key decisions in the institution. Governance is increasingly shared, although in a less than obvious and totally efficient manner.

Another important aspect of management and administration concerns the total number of employees and management relations. Zamorano grew from 200 employees in 1979 to over 1,000 by the end of 1992. A policy was utilized during 1993 to 1996 to significantly reduce the number of employees by eliminating unnecessary positions, outsourcing some activities and hiring higher-quality individuals, each capable of doing the work of several less-skilled employees. By 1998, Zamorano had just over 600 employees. Today the college has the same number of employees with a much larger student body. Perhaps the most dramatic, difficult and painful activities that we carried out were the large-scale imposed faculty rotations of June-July 1998 and early 2001-2002. Zamorano does not offer tenure to its professors, but Honduran labour law is very generous; it requires just cause and a high level of severance pay when faculty members or other employees are released. The reductions in force that took place in mid-1998 and that occur as this paper is being written, while necessary, constructive and positive in terms of functioning of the institution, were very costly and generated a high cost in morale and uncertainty. The issue of morale loss applies almost entirely to the established faculty, specifically to the Career of Agricultural Science and Production. At the same time, many other people have become empowered and their spirit boosted; the functioning of the three new careers is encouraging and impressive. There must be a better way to reorient programmes than this rotation of employees, but we have not yet figured out what it would be.

Another important series of advances during the period concerned the development of publicly available strategic and business plans that were derived from a consultative process. In 1993, Zamorano created its first public strategic plan; the previous plan, developed by outside consultants in the early 1980s had never been made public. The 1993 plan was developed rather hurriedly with limited internal participation and no systematic involvement of external stakeholders. This five-year plan was replaced in June of 1998 by the strategic

plan included in *Appendix 2*. This succinct plan seems, especially in retrospect, to be an extremely insightful and comprehensive conceptual blueprint for institutional excellence and responsiveness; the four guiding principles compelled us to do things differently in accordance with external stakeholders' needs and interest as well as the long-term interest of the college, but the plan did not straightjacket us methodologically.

The development of a rolling four-year Business Plan, mandated by the Board and co-ordinated by the Executive Director, is the primary tool used to create a bridge between the strategic plan and the annual work plans and budget. This business plan is the principal mechanism that the Board and administration have for sharing ideas and co-ordinating opinions and activities. It allows monitoring by the Board of Trustees of institutional progress without demanding or allowing excessive micro-management or interference with the administration's authority. For the first time, the institution began to link a long term, qualitative institutional strategy derived in consultation with internal and external stakeholders with a specific, short-term development plan, capital investment plan, human resources plan and so forth.

1.3.2 Formal curriculum

Prior to 1979, Zamorano's solid formal curriculum was limited to three years and was concerned almost entirely with technical production activities in animal and crop sciences. Electives were uncommon and social sciences were not included. By 1986, several new departments had been created, including agricultural economics and agribusiness, plant protection, natural resources and conservation biology, and rural development; the curriculum was broadened accordingly.

In 1986, an optional fourth-year programme was established, providing for the first time the option to specialize in any one of the several technical areas and receive the degree of *Ingeniero Agrónomo*. Elective courses for third- and fourth-year students proliferated. Throughout this time, teaching (rather than learning) was emphasized and most professors believed that students needed to be controlled and taught. By the early 1990s, the GTZ Programme had helped many professors to rethink these attitudes, and

learning had become the focal point of many professors' activities. The teacher's portfolio had become an accepted idea (Moreno, 1998). In 1993, the portfolio was mandated as a central tool for both self-analysis and for formal faculty evaluations. At the same time, the administration called for all faculty members to participate in an institution-wide programme to cut attrition (in 1992 at over 40 per cent) by half without reducing quality.

Throughout the 1980s, the institution undertook several curriculum reforms. Some of these reforms were carried out in a few half-day sessions with a handful of key faculty members assisting the Dean. No formal studies of the market were conducted and no outside stakeholders were invited to participate. Oftentimes, new courses were added in an effort to assure that all faculty members who had been hired were teaching a sufficient number of courses.

In 1993-1994, there was an adjustment of the curriculum that was then very ample with a reduction in the credits required for graduation. There was much discussion among faculty including the creation of a professional profile.

During the 1990s there was a noticeable change of didactic emphasis, moving away from what is taught to what is learned. Concomitant changes involved the elimination of courses that emphasized only memorization of data and recipes to those that demand mastery of concepts and processes.

In late 1998 and throughout 1999, faculty members worked very hard under the guidance of the Dean to carefully define a graduate profile based on societies' needs (*Appendix 3*) and then to create a curriculum that would respond to the profile (*Appendix 5*). The implementation of the 4 by 4 Programme occurred on a year-by-year basis from 1999 through 2002. The new curriculum significantly reduced the total number of credits offered by Zamorano, eliminated courses with a recipe-based content, and consolidated many courses that represented over-specialization at the undergraduate level.

One essential consideration during the past four years was a commitment to the continuing students enrolled in the existing programme and to the older *Agronomos* who expected to have the opportunity to return for their final year. We had to maintain and assure the quality of the old programme being

phased out, at the same time that we designed and implemented the emergent programme.

More importantly, there was a significant commitment to change teaching methodologies and modernize expectations regarding learning outcomes. Group learning, active learning and student-centred learning all became common phrases that were reflected increasingly in teachers' experiments and practice.

In the 1980s and early 1990s, the emphasis was on the strengthening of the academic disciplines; this was supplanted in the mid and late 1990s by sincere, partially successful efforts to assure interdisciplinarity and to base academic programmes on students' needs and demands in the labour market rather than on academics' disciplinary affiliations. Another of the rather important changes during this time was that our perception of our business as 'agriculture' and agricultural education evolved into the understanding that we are in the business of providing young people with the best preparation for life; many of the graduates will go into agriculture, but others will not. The definition of 'agriculture' was replaced by a concern for the use of agricultural science and technology, complemented by applied social sciences for socio-economic and development ends. Zamorano moved from a concern with technology to technology management, markets and environment.

Based on yearly exit polls of graduating students, we know that the modifications of the curriculum have been associated with changes in the aspirations of the graduates; whereas in the early 1990s most reported that they wanted to be first-class technicians, today virtually all want to become entrepreneurs, managers or politically active leaders.

1.3.3 Learning-by-doing

Zamorano has always insisted that students benefit when they dedicate as much time to learning-by-doing as they do to formal classroom work. In fact, learning-by-doing and *Labor Omnia Vincit* (Work Conquers All) are two slogans that the institution has used since its founding. In 1979, learning-by-doing consisted almost entirely of generally repetitive, production-oriented activities carried out by students and directly supervised by the same professors

who taught theoretical courses; there was significant co-ordination between learning-by-doing and the content of technical courses. There was, however, little or no emphasis on management, marketing, cost accounting, environmentally friendly processes or other areas soon to be considered very important. One hundred per cent of the learning-by-doing activities were carried out on campus. There were no student-initiated activities.

Throughout the 1980s, as new faculty were brought in and course offerings were expanded, an increasing number of modules were added, until by the late 1980s, there had been the addition of significant new areas such as cost accounting, quality control, natural resource management, rural development and value-added activities. However, all of these new learning-by-doing activities were add-ons in what continued to be a programme focused on production of raw materials. Moreover, there was very little integration among these new areas and the more traditional production areas.

Learning-by-doing continued to become much broader throughout the 1980s and early 1990s. However, since no time was added to the overall learning experience – three years are after all three years – there was increasingly superficial treatment of each subject area. Some of us began to become very concerned with the high degree of fragmentation. Each subject was taught by a specific instructor or professor, and the time dedicated to each module was decreased until by the early 1990s, Zamorano had nearly 50 completely independent modules which were sometimes disparagingly referred to as mini- or micro-modules. Since many of these modules, plant protection for example, were further subdivided into sub-modules (entomology, plant pathology, nematology and weed science), the concept of micro-modules is in fact appropriate. By the mid-1990s, these problems had become so severe that the new administration imposed, with very little consultation with the professors, the concept of ‘macromodules’. The mandate was to focus on integrated systems. Professors from different departments (note: ‘different departments’) were supposed to collaborate on management, production, processing, marketing and environmental aspects. This well-intentioned approach did not bear positive fruits because the extant administrative structure made it extremely difficult for people from different disciplines and academic units to work together. A subdivision of the macro-modules into a new form of micro-modules rapidly occurred.

A significant enhancement of the learning-by-doing programme was the creation in 1986 of the fourth and final year that required an individual thesis for graduation. The thesis is considered the key individual learning-by-doing exercise.

With the June 1998 announcement of the creation of Careers instead of departments and the creation of ZamoEnterprises replacing the modules, the basic concept of delivery of learning-by-doing changed fundamentally. Professors from the four career areas are now supposed to support and enhance the learning-by-doing activities, but for the first time in Zamorano history, there are full-time specialists in administratively independent positions in charge of the learning-by-doing activities. These ZamoEnterprise-based learning-by-doing activities are designed to simulate real-world production, real-world businesses and NGOs. The ZamoEnterprise concept is explained in *Appendix 7*. Learning-by-doing is structured in a much more conscious manner with specific learning objectives. First- and second-year students are considered apprentices, carrying out physical work and basic administrative and record-keeping tasks. In the third year, students in different careers return to the ZamoEnterprises to carry out more independent projects. In the third year, they also begin their thesis. By the fourth year, students who return to the ZamoEnterprises act as innovators and assistants to the administrators. This new form of learning-by-doing is not yet fully accepted by many on-campus specialists or by the majority of graduates.

In 2002, for the first time, Zamorano placed approximately 25 per cent of its fourth-year students off campus during the first trimester for their external in-service training. The other 75 per cent – students who did not meet all academic, disciplinary and English-language mastery criteria to allow them to go off campus – stayed in Zamorano and worked during the same period in internal in-service training. The Career-associated laboratories in Zamorano also have become much more actively involved in advanced students' learning-by-doing.

By mid-2002, it can be said that Zamorano's learning-by-doing is stronger, more diversified and, I think, better than it ever has been. There is continuing tension between the ZamoEnterprises and the careers; the latter feel that they should have more direct input into, even control over, the operations of the

ZamoEnterprises while the former feel that they do not receive sufficient support in their activities and that the careers should provide guidance and support rather than direction and supervision.

1.3.4 Outreach

A third area that warrants significant attention in understanding the changes that took place in Zamorano between 1979 and 2002 is outreach. Outreach consists of all those activities that are carried out for the benefit of off-campus clientele. Outreach includes continuing education, extension, technical assistance, consultancies, and applied research. While outside persons, communities and institutions are the obvious beneficiaries of the outreach activities, this is really a two-way street with the students and faculty receiving large benefits as well. The Zamorano web site (www.zamorano.edu) contains considerable information on the outreach programme.

In Zamorano's first two decades, world-renowned specialists worked out of Zamorano, especially on botanical studies making important contributions to knowledge of fruit crops, plant systematics and ecology. Apparently, however, students were rarely involved in these activities. This contrasts with outreach as it is conceived today, in which outside groups – whether they are small-scale producers, large businesses, communities, NGOs or government organizations – must benefit, and students and faculty must be involved in the outreach as part of their learning-by-doing activities.

In the 1970s, faculty members were explicitly prohibited from engaging in any outreach activities. The arrival of the new Director in 1979 changed this considerably; as a former professor and researcher in the University of Florida system, he allowed outreach activities that faculty members wished to engage in as long as he could use their interest in outreach as a way of attracting and retaining them as teachers; in addition, outreach generated income and salary substitutions that aided the institution's financial situation.

The first forms of outreach in the 1980s involved rather timid, on-campus training programmes and on-experiment station research. In May 1983, Zamorano received a grant from USAID Honduras to begin to carry out on-

farm research and training activities to deal with key pests in the maize/bean system. The plant protection programme and department grew out of this initial project; this effort eventually reached a million dollars a year from USAID/Central America and involved, at any given time, dozens of students working on their theses and research. By 1986, the W.K. Kellogg Foundation was supporting the new rural development programme, and the Swiss Development Co-operation was supporting a post-harvest improvement programme.

From the simple, project-based beginnings and no real institutional strategy, the outreach effort grew rapidly. More and more faculty members already on staff became interested in outreach activities. More importantly, dynamic young faculty with an interest in both teaching and engaging in outreach activities were brought into the institution. The bean and sorghum breeding programmes became important. Aquaculture grew to include many off-campus activities. Research to deal with industry needs, especially nutritional needs in various animal systems, became increasingly important. By 1994, the Zamorano administration was thoroughly committed to the explicit purpose of assuring that all departments would have outreach activities as part of their overall programme.

An important sub-motivator for the outreach programme was the creation in the late 1980s of the Jicarito Project. This programme was designed to turn over to the residents in a nearby town, the land that they and their parents had settled on but could not improve because they did not hold title; legally they were squatters on Zamorano land. By 1994, the concept of a simple land redistribution programme grew conceptually and was enunciated as the Programme for the Sustainable Development of the Yeguaré Region. This programme committed Zamorano to work for 25 years with neighbouring communities for mutual benefit in environmental, agricultural, business and governance issues. From the beginning, the programme was conceived of as a mosaic of projects combined as strategically as possible but recognizing that Zamorano would have to be opportunistic and might not be able to execute each facet in an ideal order. In the beginning, support from the W.K. Kellogg Foundation, the Canadian Government and the German Government all facilitated making this programme into a success that continues on an even larger scale today with support from many sources, especially Kellogg and

USAID. Today the concepts of watershed management, rational use of natural resources and of economic corridors orient this multidisciplinary effort.

One of the most significant happenings during the past four years has involved the three major economic reactivation and restoration programmes that Zamorano has executed post-Hurricane Mitch that struck Honduras, Nicaragua and neighbouring countries in October 1998. These programmes, all supported by USAID, are well described in the Zamorano web site www.zamorano.edu. They proved the value of the work-study approach to supporting fourth-year theses, provided dozens of Zamorano faculty members with off-campus experience and served as an extremely important source of financing during the tough years in the transition from the old to the new academic programme.

Many outreach programmes have been carried out in Zamorano in recent years and continue at present, but three not yet mentioned warrant special attention because of their feedback into our programmes and self-image. The first is the PROEMPRESAH Programme, financed by the IDB's Multilateral Investment Fund; it supported groups of micro-entrepreneurs, converting them from subsistence farmers into purveyors of quality, processed goods. The second is the work carried out on biodiversity issues by Zamorano's herbarium and Zamorano's entomology programme; these programmes resulted in the publication of the cover story in National Geographic magazine in February 2001. The third truly significant programme involves a constellation of new projects that provide support to secondary rural and agricultural education. These programmes all began in 2002 and are supported by the Republic of China on Taiwan, the W.K. Kellogg Foundation, the USA and Guatemalan governments. They allow Zamorano to strengthen rural secondary-education institutions in all Central American countries and Bolivia. The expectation is that the schools and institutes will come to better serve their communities as well as to better prepare their graduates for studies in rigorous university-level programmes like that offered by Zamorano.

In absolute terms, there has been no more important change in Zamorano during the past 23 years than that which has taken place at Outreach. Outreach has gone from anathema to becoming a central component of our overall educational programme. It has done this because we have developed it in a

way that is consistent with Zamorano's basic educational mission and values. See further discussion in 'Lesson/hypothesis 6' in *Chapter 3*.

1.3.5 Campus environment

The infrastructure of Zamorano has grown dramatically, as has its student body and its total resources. These easily described, concrete changes will be noted, but what is important is not the increase in the magnitude of Zamorano's operations. Rather, the key issues are the changes in interpersonal dynamics and the institutional culture that have taken place at the same time.

In 1979, just over 200 male students were studying in a demanding, three-year, essentially vocational programme. By 1993, 700 students were enrolled in Zamorano; approximately 11 per cent of them were women. In mid 2002, nearly 900 students were studying in Zamorano and 30 per cent of them were female. During the period 1979 to 1993, the area under roof was essentially tripled. In the period 1993 to 2002, additional expansion of facilities has taken place but, much more importantly, deferred maintenance has been addressed effectively for the first time in the institution's history. Old facilities have been completely renovated, updated and in most cases, reoriented. Huge advancements were made in telecommunications and information systems and in student services.

During the 1980s, Zamorano became infamous for the freshmen hazing taking place. The administration made sporadic and perhaps half-hearted attempts to suppress this hazing. There were mixed messages regarding the impact and acceptability of hazing. As it went more underground, it became increasingly violent and lost any pretension to alleged value. At this same time, women, although they were doing very well academically at Zamorano, were not accepted as legitimate members of the campus community, even as late as 1993 or 1994; essentially, women were studying in an institution that maintained its all-male culture. The new administration inaugurated in 1993 set about to change these issues. We consciously sought to attract more women to Zamorano in order to create a critical mass, and we began the creation of student residences. These residences replaced the dormitories that had existed before. A student residence is described in *Appendix 7*. In the residences

male and female students from all nationalities and all years live together and engage in joint cultural, academic, sporting, and social activities under the guidance of house parents or *padrinos*. The first residence was created in 1994, and by 2002 all students were living in a residence. When they are members of the same living unit, male and female students can no longer continue to not understand and respect one another. The combined growth of the total number of women, their success at Zamorano and as graduates, and the creation of the residence system under the wise guidance of *padrinos*, resulted in a situation that, by 1999, no longer involved active harassment of women.

Hazing, however, did not go away as easily. Although it was reduced from its dramatically high levels of the early 1990s, it continued to be a serious impediment to the creation of a truly formative environment on campus. In 1993 and 1994, large-scale expulsions clearly communicated that the Administration would not tolerate abusive behaviour, but sanctions and cajoling did not convince all students that hazing was undesirable and deformed the perpetrator as much as it hurt the victim. Throughout the 1990s the Administration put increasing emphasis on formative extra-curricular activities, reaching the point where in the new post-1998 curriculum, extra-curricular activities are required for graduation. Hazing decreased but did not disappear until 2002.

Perhaps the most important advancement in Zamorano in the past decade involves the creation and successful implementation of the SIVE Programme (*Appendix 8*). SIVE translated into English means Integrated Student Life System. This initiative, carried out in the second half of 2001 and the first half of 2002, has become the permanent basis for the true formation of leadership and character formation in the modern sense and for the elimination of hazing. It is the creation of a group of Zamorano graduates working at the institution and is supported by their colleagues from the International Graduate Association. This group not only successfully implemented a zero tolerance programme for hazing, but also converted the issue into the focal point for introspection and discussion that has transformed the ideas among students as to what leadership and respect are all about. My hat goes off to those students who, working with these exemplary professors and leaders, all of

them Zamorano graduates, have created this miraculous and extremely appropriate transformation. This is deep change.

It is important to reflect here that ‘deep’ change at Zamorano required not just a change of how and what we taught (the two aspects of the formal curriculum, both theoretical and learning-by-doing), or who was teaching, but the more subtle messages we were presenting (invisible curriculum). Zamorano is successful and prestigious because it places a premium not just on what graduates are going to do, but on whom they are going to be. During the time period under discussion the institution moved from an emphasis on ‘traditions’ to a concern not with the outward manifestation, but rather the values and principles that must underlie and guide real traditions; some ‘traditions’ (e.g. freshman hazing and many long days spent in routine, repetitive jobs) have been replaced with new practices because they did not concord with the principles that drive the institution. There has been a replacement of respect through intimidation and simple seniority to respect gained through exemplary leadership and experience.

One of the most important changes in recent years involved the substitution of multifaceted programmes for character formation, requiring of students maturity and commitment for the earlier total reliance on forced, coercive discipline. All of these add up to an improved system for forming positive leaders with attitudes, behaviours and skills consistent with modernizing societies.

Additional information regarding the chronology and nature of change is interspersed in the text of this paper. While it would have been interesting to document in a timeline issues such as graduate and other stakeholder involvement, core beliefs held by community members, and other rather soft issues, I was unable to use the timeline approach to document these issues that do not have distinct visible markers.

Chapter 2

Analysis of the change in Zamorano

2.1 Motivators for change, 1997

We have been asked to describe those factors that served as the motivators for change. I would like to propose three categories for these motivators. The first category includes the proximal motivators; these were those immediate symptoms we were aware of, that is, those factors that made us hurt or made us feel that we needed something. The second category lists the profound motivators; these were the drivers, the processes taking place in the broader society and on campus that were associated with or led to the proximal motivators. The third category I label the associated motivators; these were the ideas and concepts ‘in the air’ at the time, as well as the characteristics of the institution itself that were important adjuncts to the decision to make change.

2.1.1 Proximal motivators

Four proximal motivators were important.

- The enrolment trends were not positive. It seemed to be harder to enrol the desired number of qualified new students every year. We had to spend more money to interest applicants, and yield rates were dropping dramatically.
- The availability of scholarships was decreasing. The end of the Cold War meant that many international sources of financing dried up rather abruptly. For example, the German Government, through the DSE Programme discontinued its scholarship programme that had been, by far, the most important source of scholarships for Zamorano; in fact, nearly one-fifth of the institutional budget came from that single financial source. The other donors invested less in Latin America and were clearly less interested in supporting agricultural programmes. Some complained that the yearly increase in costs of the Zamorano scholarship was an additional disincentive.

- The trends in placement of graduates and the salaries that they commanded were not good. The prevailing notion had always been that all Zamoranos would have multiple job offers prior to graduation and that their salary level should be very favourable, even when compared to the cost of the education that they had received. This was clearly not the case in a number of countries. In some cases, such as Nicaragua, social disruption and general economic distress were clearly the cause, but in other markets there seemed to be different, deeper, more long-lasting causes for undesirable trends.
- Many graduates, especially those who had reached managerial levels, were openly critical or expressed regrets about not having received certain preparation while in Zamorano. The major complaint focused on the insufficiency of preparation in managerial, marketing and other business areas. A smaller group felt that the social aspects of the curriculum needed strengthening.

2.1.2 Profound motivators

More interesting are some of the profound motivators or drivers. Each of these factors warrants a deep analysis, but here I will only introduce each subject. Several of these profound motivators were external:

- Globalization brought the opening of markets and increased trade, and the agricultural sector itself had begun to undergo fundamental changes. Many of the traditional pillars of Central and South American economies had decreased in importance (coffee, sugar cane, bananas and corn among many others), or had disappeared altogether (cotton). Many new non-traditional products – especially vegetables, seafood and fish, fruits and flowers for export – were growing dramatically in importance. There was a general demand for efforts to increase the competitiveness of Latin American agribusinesses by becoming more market oriented, by increasing efficiencies and by adding value, that is by decreasing the amount of raw commodities sold and increasing the emphasis on processed, value-added products.
- There was a fundamental restructuring of the labour market. For example, the concept of the farm producing only raw material and run by a strong man through a foreman overseeing the activities of many low-skilled

labourers had been replaced by the concept of groups of specialized individuals, many of them professionals, working in a sophisticated, value-added agribusiness to achieve a common goal. The concept of lifelong learning and on-the-job learning had become very important in order to assure that technical people stayed up to date with rapidly changing market trends and technological innovations. The concept of mega skills, multiple intelligences or key qualifications had become extremely important in the hiring of new employees. These same key qualifications had come to be understood as important to the success of independent entrepreneurs as well. Women had entered the labour market in very large numbers. Latin America was not being left out of the transformation from a manufacturing or industrial society to an information society. In summary, there was an obvious dissonance between what society had become and had begun to demand and what Zamorano was offering.

- There was increasing competition that resulted from the dramatic changes in the higher-education sector throughout Latin America. Young people growing up in the 1990s had, by several orders of magnitude, more choices and opportunities than their parents had had. New private universities offering exciting new careers had sprung up everywhere. Agriculture had become a much less compelling career option for smart, ambitious young people. USA institutions were recruiting actively in the region, and even the public universities had begun to change their career offerings and improve their institutional culture to make the experience more satisfying and efficacious. The concept of distance learning was beginning to be discussed seriously and to have a significant impact.
- In all countries in the region by the early 1990s, democratic governments had replaced military dictatorships, civil society organizations were increasingly important, and human rights had become a major issue. Clearly the strongly hierarchical and relatively authoritarian Zamorano model, so appropriate for earlier, less democratic times, needed to adapt to these desirable new political and social realities.

The four drivers mentioned above were all external and represented worldwide trends. However, at the same time, there were three important internal drivers that were equally important.

- The nature of the Zamorano faculty had changed and the institution had matured. During the 1980s and early 1990s, Zamorano had undergone the dramatic change outlined in *Section 2*. It now had many highly qualified Ph.D. and MS-level faculty members who expected a voice in institutional affairs. The concept of a single strong leader heading a vocational school was no longer viable. The faculty actively jostled for positions and sought to enhance their programmes. The improved quality and professionalism of the professors meant that needed change had already occurred in the abilities at the operational level, but had not yet manifested itself at the level of participation in institutional affairs.
- Even more important was the fact that Zamorano could no longer perceive itself to be an isolated, even hermetic, institution separated from broader society; the institution's outreach programmes guaranteed this. Outreach programmes may have been the single most important internal driver for motivating change at Zamorano. It had become impossible to ignore what was going on in a heterogeneous and dynamic Latin America. It was impossible to pretend that the old curriculum and, more broadly, the old, authoritarian, discipline-based, memorization-oriented educational recipe were still useful to form graduates for this new context (see 'Lesson/hypothesis 6' in *Chapter 3*).
- The failures of well-intentioned, but incompletely executed measures during the mid-1990s caused a crisis of confidence and motivated additional attempts at change until finally things began to work better. The concept of Gold (1999) of punctuated legitimacy as a mechanism and background to real educational change may be very applicable in this case.

2.1.3 Associated motivators

There were three associated motivators:

- The first of these was related to a growing understanding of what education can and should be. Due to small-scale, non-continuous, but nonetheless significant training programmes, many faculty members had become aware of what could be offered through different pedagogical techniques and through different social arrangements within the campus community. There was increasing awareness of the dissonance between

what was being offered to students and what the state of the art said it could be.

- Second, Zamorano as an institution and Zamorano as a group of graduates have a culture of self-criticism and a strong desire to always improve. The Zamorano culture does not encourage easy-going optimism. Zamorano graduates, administrators, and faculty are usually seen as self-confident, even haughty. They are not by nature or training complacent. In fact, the institution and the graduates constantly, at all times, day and night, judge, criticize and point out errors. They are always saying that things should be different. It is just part of the institutional culture.
- Another important associated driver was the nature of the students who were enrolling at Zamorano. Compared to early generations, they were much more sophisticated; they had great expectations and had chosen Zamorano after considering many other options. Moreover, many of them were paying what was considered to be a high tuition fee by Latin American standards. Many of them were highly media and computer 'savvy'. Increasing numbers of young people, especially those from Ecuador, were enrolling in Zamorano not because of an interest in agriculture but, rather, because of Zamorano's holistic education and because of a perceived ability to make connections for life with people who would be movers and shakers.

2.2 Key protagonists and opponents of deep change

Over the time period being considered, hundreds of students, hundreds of graduates, hundreds of employees, a score of trustees, and dozens of international collaborators and donors played roles in the change process – a story with a 'cast of thousands'. There are four categories of actors based on their behaviours (not their opinions):

1. the protagonists, those who first believed in and provided impetus and conceptual leadership to the deep change effort;
2. the supporters, those who participated actively and enthusiastically to make the ideas become a reality (although many of them were oftentimes outspoken in their doubts and concerns);

3. the followers, those who sat on the fence and waited and then went along with the movement (it was common to not know whether they were for or against the change);
4. the contrarians, the sceptics who spoke and worked openly and actively against one or another part of the project and tried to slow or reorient it.

Several, perhaps the majority, persons moved from one category into another over time.

The *protagonists* included the Director General, the Executive Director, the Dean and the Assistant to the Director. Together they listened, looked for broad trends, saw patterns, synthesized and articulated what others were saying, generated and synthesized the ideas that guided the change process. They acted as facilitators and organizers. The members of this group oversaw the development and implementation of each of the elements of the new curriculum and the other major changes. The essential leading role played by the 25 member Board of Trustees is discussed in Lesson Learned No. 5. It suffices to say here that had the Zamorano Board of Trustees not been as engaged, decisive and deliberative as it was, the change process would not have succeeded. As a group, they brought to the process the skills and perspectives that were necessary complements to those of the four on-campus change leaders. The original ideas for change may not have been theirs, but their experience, guidance and prodding allowed it to occur. Some faculty members, especially junior and new professors and those in the new careers, became important protagonists in specific areas once the change process got under way.

It is very important to state that the *supporters* were oftentimes actively involved in the discussions and debates surrounding the goals and procedures of the change process; they were far from passive followers. The supporters included the majority of the young faculty, and virtually all the new hires were active supporters of the new plan of studies and of the other innovations. Many graduates in virtually all countries were also actively involved and participated in sessions on and off campus to provide feedback on what was occurring; much of the feedback had a rather negative tone but was always intended to make the institution stronger. Especially vocal and ultimately

supportive were the groups of graduates in Panama City, Panama; El Salvador; and in Guayaquil, Ecuador.

The *followers* were the majority of the faculty, especially the older, established members. They were sceptical and demonstrated a wait-and-see attitude.

The *contrarians* were a diverse lot. Certain faculty, including several very good teachers, did not (and still do not) share the vision. Those least convinced of the value of the change process tend to be specialized in the traditional production disciplines of agronomy, animal science and horticulture. Some graduates, many of them highly vocal, opposed the changes, expressing their displeasure in formal and informal meetings, through the Internet, and using other mechanisms. It is important to note that many of the contrarians helped the change leaders immensely by insistently pointing out problems with the concepts or their implementation. Some were very helpful while others used counterproductive techniques that had a high public relations and morale cost for the institution.

Chapter 3

Hypotheses generated, lessons learned and pending issues

The preceding analysis of the period 1979 to 2002 – and especially the last four years of intensive, deep change – allow us to generate many hypotheses regarding change at institutions of higher learning in the developing world. Some of these hypotheses might qualify as lessons learned, but I would prefer to propose them as ideas that arise from Zamorano’s specific experience that need to be corroborated by other institutions’ efforts. These hypotheses/lessons can be divided into two principal categories. The first consists of seven important lessons that I have not come across in the literature or I have encountered only very infrequently. The second group of seven hypotheses/lessons are in many cases equally useful, but they seem to be more conventional, or sometimes more tactical; in all cases, other authors have already said better what I attempt to report here.

3.1 Seven central hypotheses or lessons

Lesson/hypothesis 1: Deep change can occur if change agents see the institution from the outside inward³

The most fundamental accomplishment in Zamorano over the past 10 years is that it has institutionalized a public promise that leaders will *always* view and judge the institution through the eyes of those on the outside, and the college has created and consolidated several mechanisms for doing this on an ongoing basis. See the Strategic Plan (especially Goals 1 and 2, *Appendix 2*) to better appreciate how important this is for Zamorano.

3. This section should be read in conjunction with ‘Lesson/hypothesis 4’ in order to gain a balanced view of the complementary roles of outside demands and internal principles as guiding forces in the change process.

Change is made possible when potential change agents view their educational institution from the outside inward. Educational institutions exist to serve. An academic institution in the developing world should serve society by providing it with the human resources that are needed to generate wealth, assure that the poor can participate in and benefit from that wealth creation, and otherwise increase well-being. Educational institutions are also committed to serving the interests of the individual by helping him or her to know how to navigate in and effectively contribute to that society.

It surprises – and it distresses – me that so many schools, colleges and universities seem to always be looking inwardly from an internal vantage point. Rarely will leaders and professors look at the institution from the perspective of outside stakeholders. This seems to be almost universally true for institutions focused on agriculture in the developing world. An institution that does not look at itself from the outside, from the point of view of the stakeholders, will become rapidly disconnected, mediocre and irrelevant. If quality is defined as ‘meeting the expectations of the clients’, then the disconnected institution, the autonomous institution, the inwardly looking institution will not deliver quality. At least for the professions and the technical disciplines, any discussion of what should be done through and in the academy has to begin with a deep understanding of what needs to be done in and for those sectors in which the professional or technical specialists, the graduates-to-be, will work. In turn, an understanding of what these sectors must accomplish needs to be based on the requirements of the wider society.

The institution that only asks itself what makes our professors happy, what do our professors want to teach, or what do the disciplines that our teachers represent want to discover or teach, are asking much less useful questions than those that should be asked. We need to ask on a periodic basis: what business are we in, who are our clients, what is our role in the broader society, what do we really do, are we involved in agricultural education or something else, something bigger? Just as important as those questions are themselves, are the sources that we consult to get the answers. It is not just what *we* perceive and what *we* want, but what is expected, perceived and demanded by *outsiders*. It is the employers, the parents, the potential students, the policy-makers and the potential beneficiaries who must have a say in what it is that our institution does and contributes.

Outside consultation is especially important to find out not just what we *should* be doing, but also what and how we are *already* doing. In this case, discussions with graduates, their employers and their workforce peers allow us to go far beyond the understanding of the professors and Dean who know what they *teach*; these consultations allow us to understand what the students have *learned*, as well as the values, behaviours and attitudes that they have internalized and use post-graduation. This is perhaps the most important monitoring procedure that we can use. When we find out what our students are taking away from their educational experience, then we can begin to judge what we are *accomplishing*, not just what we are *doing*. We can then begin to plan to make the adjustments that are necessary.

Essential is the invisible curriculum, that is, all those experiences the institution provides, both intentionally and unintentionally, that do not form part of the formal curriculum. It is a powerful force in the educational experience, but very few professors and administrators consciously, systematically and efficaciously manipulate the invisible curriculum in a way that can benefit the graduates-to-be. It is by discussing with the most perceptive graduates, parents and employers (and occasionally with students themselves) that we are able to determine what we are, in fact, accomplishing and not achieving. By discussing with them we determine what value we are really adding. For example, in the case of Zamorano's planning in 1996-97, we found that graduates and employers were virtually unanimous in their insistence that the curriculum can, even must, change, but do *not* undercut the formation of character.

A note of caution is in order: be careful to not fall into the trap of accepting too literally the unfiltered, short-term messages from stakeholders who may want some specific vocational task accomplished when, in fact, it is in their interest to prepare people for the longer-term and for more complicated roles than the tasks they may be immediately concerned with. This cautionary statement is especially important when working with business people. For instance, in our planning process, we were advised to create university-level programmes focused only on coffee, on cotton or on dairy cattle – as majors! Clearly such a vocational focus would have been a major step backwards.

Significant change in an institution occurs as a result of truly seeing the academy from the eyes of 'the society'. If you prefer, you could substitute

for ‘society’ any of the following: ‘the market’, ‘the labour market’, ‘the stakeholders’, ‘the clients’ or any similar term. The market and society are not synonymous, but if we consult with the market and with other representatives of the society, they can provide antidotes to academics’ and administrators’ self-centredness, myopia and inertia.

Moreover, it seems that if we establish the habit of looking at the institution from the outside in, we will have the tendency to focus on the present rather than on the past. Hopefully, if we get good at looking at the institution in the present from the outside inward, we may even be able to anticipate, to some extent, the future and orient our curriculum more toward that.

Lesson/hypothesis 2: Current faculty will not be protagonists of deep change

Do not count on the faculty to be protagonists of significant, deep change. Somebody else must be. Teachers teach, instructors instruct, and professors profess. Leaders must lead. It is important to not confuse roles. I have spent considerable time in an initial review of the literature regarding change in academic institutions, and so far I have not found a single example of significant, deep change being a faculty-initiated process.

Please note that I very much appreciate faculty; they are the heart, the muscle and the intellect of any educational institution. Faculty often work 60-80 hours per week giving to students. Most are extremely committed and highly knowledgeable in their particular field. They are not, however, the ones likely to conceive of or actively support deep change. While professors and teachers are the heart of the institution, the way that most institutions are organized around teachers as a politically powerful interest group makes substantive, important change unnecessarily difficult. I have read and heard of many examples where faculty members aggressively second guess, and often actively oppose change even when that change is necessary to confront institutional crisis and/or easily observable major changes in the milieu. The one notable exception to this general rule may be business schools that teach and practise constant change as a best practice.

Even excellent established faculty members are rarely proponents of deep, substantive change because they have been trained to ask why, to be

sceptical, to be individualistic, and to study deeply. Senior faculty are often efficacious proponents of change that adds or enlarges programmes, but will not undertake the cuts and reorientations associated with deep change. For the most part, dedicated faculty will not change easily because they are deeply committed to doing well those things that they are already doing. Their role in the academy does not predispose them to decisive actions for change. Professors often exercise effective leadership in the maintenance of the current situation and, like all other humans, they do not want uncertainty. Let me also clarify that it is not that the faculty are lazy. On the contrary, when resources are abundant, faculty love to complicate their lives by adding programmes. But the faculty become immediately wary and even negative when it is time to reorient or, worse yet, reduce particular elements of the programme in which they are involved. Faculty concerns at a time of change come from those units that would have to 'give up' part of their representation and distribution requirements; it's-the-principle-of-the-thing arguments become proxies for their basic concerns about the outcome on enrolment and resource allocation.

A deep change process that intends to be successful should assume that established faculty are innately pro-status quo and that they will not easily become active allies of change. So a deep change process must either activate them by transforming their vision (an unlikely and in any case very costly and time-consuming outcome) or find some way to neutralize their opposition to change. The December 1997 bus trip (*Preface and Appendix 10*) and other exercises carried out in Zamorano had as an objective the latter. We did in fact to some extent accomplish this neutralization of opposition by exposing professors who had long been isolated to the reality of the broad external world. Junior faculty recruited from the outside will tend to be more open to deep change efforts.

While some change can come through dialogue, listening, education and cajoling of existing faculty, it may be necessary to rotate faculty in order to achieve the deep change that stakeholders demand and deserve. At Zamorano, we extensively used reassignment of responsibilities, moving Ph.D.s out of administrative positions back into areas in which they were better prepared – such as research, student counselling and teaching. We also hired new people, generally with extensive administrative experience, usually with MBAs, to

assume these administrative positions. We attempted to identify excellent young people with great potential and put them in fast-track promotions. We were obliged to let many of our faculty go. The only criteria that we used were whether or not their disciplinary skills were important in the new curriculum and whether or not they could contribute to the creation of the institutional culture of co-operation and teamwork that we were looking for. I have no doubt that firings have a huge cost in terms of personal suffering, secondary damage, reduction in morale and so forth. However, I have no alternative mechanism for fundamental restructuring of a programme like ours in the time frame in which we accomplished it. Can the readers suggest an alternative?

Once the deep change was under way, the course was set, and some restructuring of the faculty had occurred, the professors became actively involved in the design and the implementation of the details of the curriculum and the other changes. This is a step that must have faculty buy-in through genuine participation.

Let me close this section by asking several questions that I will not try to answer: if this hypothesis is correct, what does it mean for the possibility of change in those institutions in which faculty parity reigns and at those organizations with a highly politicized environment? Can institutions with leadership elected from the faculty, strong faculty unions and/or tenure in one form or another, undertake and achieve the deep change that is necessary to respond to society's legitimate expectations? Or will the new private institutions – founded on the business principle of agile programme adjustments, free of tenure, without the tradition of shared governance, and with decisive leadership – eventually replace those institutions that are unable to change because of their archaic internal governance structure? If outside stakeholders cannot exercise more influence than can the entrenched interests, is real change possible?

Lesson/hypothesis 3: Determine what needs to be done, then 'just do it'

Determine what needs to be done then stake your whole existence on three clichés: 'Just do it', 'Burn your bridges', and 'Damn the torpedoes, full

speed ahead'. Change, if it is to be successful and useful, should be preceded by extensive study, participatory discussion, listening and more listening, attempts to define opposing points of view, and the seeking of a consensus. The planning phase must respect academics' special needs and attributes. But when it comes time to implement decisions, go for the 'Nike Prize' for having just done it. I am not trying to be 'flip'. I certainly do not want to encourage precipitous, poorly thought-out action or insensitivity, but I do recognize that powerful entrenched interests and academic inertia are so omnipresent that without decisive, dramatic, go-for-it-all, rapid actions, it is very easy to slip into costly, ineffective, time-consuming internal debates that take precedence over the results that the stakeholders demand, are paying for and deserve.

I consider this to be an ethical issue. In developing, poor countries and in the resource-scarce institutions common in those countries, we do not have the luxury of overly drawn out, self-centred, expensive debates. We cannot tolerate stonewalling techniques when there is a job that has to be done. When the change objectives have been defined, the change leaders should announce, as we did, that people should lead, follow or get out of the way; the latter meant leave if you do not like what is beginning to happen.

In retrospect, in 1998, we probably did not act decisively enough to restructure the faculty at the onset of the implementation of the new programme. But students' perceptions and sensibilities, political realities, financial limitations and stakeholder credibility considerations made it seem inadvisable to restructure our faculty more or move faster than we did.

Lesson/hypothesis 4: Modernization must respect and reinforce the fundamental principles of the institution ... but do not confuse traditions with principles

Modernization should involve the reaffirmation of fundamental institutional principles, but not necessarily of traditions. When inducing deep change, it is necessary to build on the existing institutional culture in so far as possible. In Zamorano, we found the change process to be the ideal venue for discovering what our real principles are and reinterpreting them in manners that better express them in a changing context. Modernization should lead to a reinforcement of principles.

However, it is important not to confuse traditions and conventions with principles and values. Let me give a couple of examples. Zamorano is an institution that has, as a fundamental principle, a strong respect for experience and accomplishment. Such a principle can lead to a strong respect for hierarchy. However, a pseudo-tradition that grew up in the 1970s and 1980s was that of freshmen hazing. It was justified in many ways, including the need to assure respect for upper-class men. By the 1990s, many people incorrectly argued that hazing was a tradition central to, even necessary for, the Zamorano experience. But by 2002, and after a huge amount of work by hundreds of people – faculty, administrators, students and, most important of all, wise graduates – it is now clear that respect is important only when it has been earned by exemplary behaviour, by social service and by true leadership. It is never legitimate when obtained through intimidation or the abuse of power.

Another example is the principle that character is best formed through the confronting of challenges. A mere five years ago, many, perhaps a majority of faculty members, still argued that swinging a machete in the hot sun day after day or clearing fields by hand of heavy boulders, was a learning-by-doing exercise that was essential for character formation; no other mechanism was as efficacious for teaching character. However, upon joint analysis, the principle we defined was that hard work, sacrifice and delayed gratification are characteristics that underlie a successful professional life. Moving heavy rocks was in earlier times a legitimate way of inculcating the values. Today this principle is expressed very differently in Zamorano; students work even longer hours than before, but using modern technologies and sophisticated procedures. They still have to delay their gratification, and we expect them to confront working situations that compel them to go beyond physical and psychological limits that they once thought impossible, but they now also learn important technical and business skills at the same time that they strengthen character.

Each institution will have its own culture. Most institutions will have principles that are to some degree different from Zamorano's. All institutions should seek change in ways that assure that their deepest principles are expressed in manners that are most appropriate to respond to clients' and stakeholders' needs and expectations. Principles should endure. Traditions may not.

Lesson/hypothesis 5: Board/Administration tension and co-operation are key

While the leadership for deep change in Zamorano came from the on-campus team, had the Board of Trustees not participated actively both as a co-protagonist and as a constructive counterweight to the administration, the change process might not have been successful. The Zamorano Board is an independent, self-perpetuating entity consisting of 25 people from South, Central, and North America and Europe. It has business people, academics and representatives of other social sectors. Zamorano's Board is designed to represent diverse skills and points of views. To say that a typical Board member's world view, experience and style clash with the mindset of those of us who feel most comfortable in the academic milieu is untrue only because it is an understatement. But the Board of Trustees' presence and commitment made possible and facilitated the change that took place. Within the Zamorano Board of Trustees there are listeners, questioners, strategists, interpreters, loose cannons, sages, peacemakers and implementers. Board of Trustee-administrator tension may be uncomfortable, but our experience proved it to be invaluable.

Let me clarify. The kind of fertile tension that I refer to has nothing to do with antagonism, disrespect or distrust. Constructive tension must be based on respect for different perspectives, good communication and mutual confidence, but it is not based on an entirely compatible vision. Positive syntheses come out of the discussion of differing interpretations and effective use of diverse talents.

In the Zamorano system it is the role of administration to envision and propose change. And then it is the responsibility of a Board full of mostly very wise people representing many different points of view to listen, question, interpret, question, debate, question, require more information, question and finally provide selective approval of the proposal. During the period 1997-2002, the Board provided important support to the conceptualization and implementation of the approved initiatives. Several Board members played an essential role in asking 'what-and-why' questions. Then other Trustees focused on the 'how-and-with-what' questions. As Director General and

conceptual protagonist of the change, I most benefited from working with the first group. The Executive Director, who was in charge of implementation, worked very effectively with the ‘how-and-with-what’ people.

Several Board members who had gone through similar re-engineering activities in their private companies provided extensive and indispensable coaching and support. They helped us to separate the essential from the optional. They helped us to determine best practices to emulate and to design a monitoring process. They ‘held our feet to the fire’. The Board, once it had committed to the change, became a group that was primarily interested in monitoring progress and demanded accountability. All of these interactions involved controlled, constructive tension.

Zamorano owes its successful change process to a ‘jazz ensemble’ in which the Board of Trustees provided change counterpart and, to some extent, rhythm to the on-campus musicians who provided the melody and the harmony (and were the stage hands!).

As I have done in several previous sections, let me ask questions to close: what is the future of those institutions that do not have a strong, committed, wise, diverse *outside* governing board to work with the administration to ensure properly oriented and effective change? How can an institution change when it does not have extensive, powerful outside advice and guidance?

Lesson/hypothesis 6: Field-level, action-oriented outreach activities create support for programmatic change

Field-level, results-oriented outreach (that is extension, non-formal education, off-campus applied research, consultancies and similar activities) is one of the most efficacious means to create on-campus support for necessary changes. Institutional outreach that allows faculty, students and administrators to interact with people who live in the reality in which graduates will be working, facilitates institutional change. An understanding of what the graduates-to-be will confront and what those who provide scholarships need will help faculty and administrators to commit to appropriate change. When you spend a good part of your time in the real world, you see better what parts of the programme, especially the formal curriculum, make sense and what do not.

Outreach creates strong incentives for interdisciplinarity and is an excellent tool for learning-by-doing. Clearly it is a way of creating additional impact for the benefit of society.

Outreach is an excellent means for predisposing the institution to change because it attracts those faculty members, and presumably administrators, who see broader social issues and are open to change. I can say with no doubt that, in Zamorano's case, those professors who were most unwilling to embrace institutional change were the same ones who were unwilling to become involved in outreach activities. No other factor – not age, academic discipline or degree held – was more positively correlated with the resistance to change than was unwillingness to become involved in outreach activities.

One final cautionary note: this hypothesis is based on the use of a model of outreach that emphasizes off-campus training, applied research and consultancies, most of them highly interdisciplinary and applied in nature. My limited observations in other institutions make me believe that conventional, campus-based, disciplinary research will not have the same positive effects. In fact, conventional, campus-based, disciplinary research is another way that professors isolate themselves and maintain their hubris because professional colleagues are the primary peers and the researchers concentrate more on the generation of knowledge than on the solution of problems. They do not benefit from the feedback from stakeholders.

Lesson/hypothesis 7: Society rewards appropriate, effective change that responds to stakeholders' needs

Society rewards successful, appropriate, positive institutional change. The period 1997-2001 was a time of great tension, strain and, at times, even pain in our institution. However, in 2002, it was clear that the institution's clients, stakeholders and allies were pleased with what had been accomplished, and they were voting with their words, their wallets and their feet. Never has Zamorano had broader or larger-scale donor support. Never have parents been willing to invest so much of their scarce resources to support the studies of their sons and daughters in Zamorano; many parents able to send their children to top USA, South American or European universities are opting for the Zamorano education because of its perceived modernity and value. The

quality of students entering Zamorano this year is the highest that it has been in 25 or 30 years, despite intense competition from other quality programmes in the region. Employers are actively seeking Zamorano graduates today just as they have in the past. However, they are not seeking Zamoranos as foremen or technicians, but rather as management trainees and as future institutional leaders.

Many different sectors of society do care about quality education and will reward those institutions that make the necessary adjustments. Why are other institutions dragging their feet when the pay-off is so substantial?

3.2 Seven additional hypotheses or lessons

There are seven other lessons we learned in Zamorano that seem, in general, to be conclusions that have already been extensively cited in the literature, in professional meetings and in informal conversations. These lessons are all extremely useful but, in general, will not be treated in so much detail here.

Lesson/Hypothesis 8: There is no limit to the need to communicate during the change process: internal communications

There is no limit to the need for effective communication as change is being planned and implemented. Zamorano change leaders never did enough internal communication, maybe by an order of magnitude. Throughout the change process and in the earlier sections of this paper I have spoken of ‘stakeholders’ in reference to external people and institutions. In retrospect I am glad that we focused on them, but admit that within Zamorano today there is not universal support for the changes because some internal stakeholders do not feel they were treated and informed as key stakeholders. It is necessary to communicate, communicate, communicate – both providing information and listening. Had we had the resources, the time and the eloquence to communicate more effectively, we might have been even more successful. Certainly, we could have avoided certain misunderstandings and some unnecessary friction, demoralization, and defections. Kotter (1996) emphasizes the need to ‘Repeat, repeat, and repeat’. He is right, right, right.

Lesson/Hypothesis 9: There is no limit to the need to communicate during the change process: external communications in the age of the Internet

Graduates are or should be key external stakeholders in any change processes. Zamoranos are passionate about their alma mater and many stay very involved in key activities, especially student recruitment, fund-raising and placement. All have strong opinions about their student experience, and they want the new generations to be ‘good Zamoranos’. They tend to be very sceptical, jealous and passionate about that quality.

Internet-based debate presents new challenges in a time of change, whether adjustments or deep change. Mark Twain once commented to the effect that a lie can travel halfway around the world before the truth puts on its ‘walking shoes’. This is no longer true; in the Internet age misperceptions and opinions mistakenly labelled as facts now travel around the world a hundred times via the Internet before those who are responsible in the institution for stakeholder communications even become aware that a debate has initiated. This happened to us many times during the period 1996-2002.

Not all committed, passionate graduates who are sincerely concerned about their alma mater and its well-being know how to use this powerful new tool to share information. A few of them may view it simply as a means for expressing their opinions, however founded or unfounded those opinions may be, but they do not understand the potential cost and damage they can cause if not careful. In no time, even an innocent doubt can create near hysteria, literally overnight. A malicious or poorly thought-out comment or criticism can do incalculable damage to morale, disorient efforts and absorb time in damage-control efforts.

Zamorano has yet to learn how to effectively use the Internet for efficacious, truthful, interesting, two-way communication with graduates. The graduates are only beginning to learn how to use it for effective, constructive dialogue among themselves.

Face-to-face visits with graduates as well as site visits to the Zamorano campus often opened up an honest dialogue in which graduates could ‘get

the facts' and 'see for themselves'. These forms of communication are expensive but necessary in times of change. In retrospect, we should have done even more face-to-face, two-way communication; and we should have concentrated much more – maybe by an order of magnitude – on learning to use the Internet for pre-emptive, mutually satisfying, constructive dialogue with graduates and others on the outside.

Lesson/hypothesis 10: Maximize the opportunities for participation, dialogue and listening; then be prepared to hear that there was not enough opportunity for these activities

The change leaders must facilitate dialogue and participation. They must seek consensus as far as possible, but if there is honest debate in an academic community there will be dissonance. The leaders will have to listen and pay full attention to corrective, constructive ideas and feedback, however uncomfortable. They must have the ability to select valuable feedback from within the deluge of less valuable commentary and noise. Audacious change that involves some degree of trial and error or learning-by-doing is doomed to fail if the change leaders do not seek and use feedback, especially when that feedback is justifiably negative. But today, more than ever, critics – especially some chronic complainers and those who intrinsically, emotionally oppose change – can become dominant factors in this feedback (see preceding two lessons/hypotheses). It is essential that the change leaders know the difference between sincere, although not always articulate, constructive criticism and the criticism that is either uninformed or strictly emotionally based. It is a humbling experience when you realize that you have mistaken one form of criticism for the other. It is important – please excuse the clichés – to keep your ears and mind open, be willing to admit you have made a mistake, and to have a thick skin.

Lesson/hypothesis 11: Accept trade-offs and focus on the big issues

Most constituents and participants do not understand deep change. More often than not, they focus on what change agents consider details. Expect to make trade-offs and try to always focus limited time on accomplishing the big tasks. You cannot do it all.

The new curriculum at Zamorano is much better than the old one, but many interesting and potentially useful elements contained in the old curriculum had to be eliminated; we can ask students to do only so much in four years. In order to add new elements and experiences, we had to eliminate others. In order to invest heavily in SIVE and in improvements in the learning-by-doing, we had to postpone or scale back some potentially valuable improvements in the theoretical components. We did all this as consciously and deliberately as possible.

Give in gracefully on these issues that the internal and external stakeholders consider to be central issues but are not really keys to the change process. For example, graduates and many professors felt very strongly about issues like shirts having to be tucked in at all times (we enforced that rule), and the preservation of the basic botany course (we should have done that). They were also interested in other more substantive issues such as a perceived financial crisis, and the structure of the courses in Zamorano. However, they did not express opinions on the other issues of central importance to the leaders advocating deep change.

Some issues are non-negotiable with the key stakeholders: ‘You can make the changes you want in the curriculum, but do not undermine the discipline system at the core of the Zamorano experience’ was a message we heard loud and clear.

The change leader must focus his or her attention on the big, essential opportunities and on the drivers. These factors merit an entire essay. Also, he/she must identify the emotionally charged, minor issues and potential flashpoints and deal with them before allies become obsessed with them and divert attention from the more substantive issues.

Lesson/hypothesis 12: Put the right people in place

Put the right people in place as early as possible and support them well. Putting the right person in the correct place makes successful change a possibility. On the other hand, a mediocre person in a key position assures failure and frustration. Several of our conceptually valid adjustments failed because we did not get quality people in place opportunely. Change is about

people, people, people. Focus on hiring, placing and supporting the right people; the rest will happen. It may be invaluable to hire one great person costing 50 per cent more than normal, but this person will be worth more than two or ten cheaper, less capable ones. People who believe in and can effectively participate in positive change tend to be either young, or more expensive older ones with a demonstrated track record. Mediocre graduates of the same institution with little outside experience are the most damaging ones available when deep change is needed.

I am concerned that many agricultural schools and universities in Latin America simply do not have the quality people necessary to carry out significant change, and the employment environment in these institutions is such that they cannot attract high-quality human resources. Is this such a critical limiting factor that it will make successful deep change impossible?

Lesson/hypothesis 13: Structure the change process to strengthen the institution's culture

The leader should attempt to carry out change in a manner that is consistent with the institution's culture, or that allows the change group to strengthen those valuable aspects of the culture that should persist. In the highly cerebral institution it would be appropriate to plan, debate and discuss deeply before beginning deep change efforts. However, alternatives exist. Zamorano practises learning-by-doing; reflection and action are interspersed and mutually supportive. During the change process we set out to 'walk the talk', and in the change process we built institutional muscles. Today Zamorano has vastly more experience in change through initial contemplation, vigorous action, monitoring, reflection, adjustment, and then more action. Other institutions must seek a style of change that is not only consistent with their current culture but that will provide secondary, long-term strengthening of the desired culture.

Lesson/hypothesis 14: Change, even when successful deep change is accomplished, does not obviate the need for more change

We tire of hearing the truism that we live in a heterogeneous and rapidly changing world. But we must never forget that while the principles for personal success and social progress may be constant over generations, other conditions, especially technological and economic ones, have short half-lives. Any institution that has changed successfully has not only responded to existing challenges and opportunities, but has also done two other things. First, it has created greater expectations from external stakeholders who are likely to demand even more in the future than they did in the past. In addition, an institution that has successfully changed will have created a culture of change and evolution; internal stakeholders will want continuing change. This is a valuable characteristic, and in the case of agricultural institutions a rare asset. It should be protected and nurtured through practice. No one would advocate change for change's sake, but there is always something new or better that an institution can do. It is the institutional leaders' responsibility to find these opportunities for continuous change and improvement and to use them to maintain and strengthen the culture of constant improvement that should characterize any effective, quality institution that pretends to respond to modern societies' needs.

Chapter 4

Closing remarks

During the period 1979 to 2002 – especially from 1997 to 2002 – Zamorano underwent deep, broad change, converting itself from an internally-focused, industrial model, second-wave institution concerned only with agricultural production, into a market-oriented, third-wave institution focused on socio-economic development in the broadest sense, and with a service culture. During the period 1979 to the early 1990s Zamorano evolved from an excellent vocational agricultural school with considerable financial difficulties into a strong agricultural technical college, but with an unclear match between its offer and external demand. During the past 10 years it became a proto-university focusing broadly on agribusiness and rural development and using several unique educational methodologies. Today Zamorano is dramatically different from most ‘ag schools’ that are still stuck somewhere between the first agricultural and the second industrial wave.

This is not a story about a simple curriculum adjustment or institutional growth by addition; nor is it about an externally mandated change. Rather it is about the internally driven, voluntary, rapid, substantive redefinition and repositioning of a traditional institution confronted by a dramatically changed environment.

What changed? Zamorano in the late 1970s was an institution that resisted change. By 1993 it had converted itself into a rapidly changing institution that – ironically – stressed tradition and denied competition. In the past decade, it converted itself into an institution that affirms change based on enduring principles and acknowledges and uses competition. Zamorano converted itself during this time from an institution focused on technology in-and-of-itself to one that seeks broad rural development and uses technological, social, business and other tools for that end. Zamorano evolved from an hermetic institution into one that is systematically and strongly interconnected with rural communities and agribusinesses. The archaic traditions of hazing and unending repetitive work in the fields are gone.

There was much that did not change. The underlying principles of the institution were systematically catalogued and used to judge the prevailing traditions. The emphasis on character formation and preparation of self-confident leaders continues. The use of an integrated system of student living allows the students to develop their potential. The commitment to learning-by-doing, rigour, hard work, academic excellence, and service to society continues in strengthened and modernized form.

Zamorano should be very proud of the progress and accomplishments of the past two decades. It has been tough and demanding. Some of the changes reported here are far from consolidated and may or may not persist. Some may not prove to be best for the institution, and further changes will be necessary. The point here has less to do with the details of the change, than that Zamorano has found how to undergo deep change in a way that is consistent with outside stakeholders' needs and its own principles, and that Zamorano is more capable than ever to continue to carry out change – even change to correct the mistakes made in earlier stages of change.

As nations progress and change, institutions that claim to serve the needs of those societies have to evolve in ways that are consistent with society's needs. Most educational institutions find it very tempting and easy to simply add new programmes to meet new needs. It is tougher for these schools and universities to adjust and to innovate by changing the focus of existing programmes. It seems to be virtually impossible for agricultural education institutions in Latin America to eliminate programmes that – at least in relative terms – no longer justify investment. It is extremely uncommon to see institutions undergo the extremely painful and traumatic change involved in elimination of anachronistic programmes or the deep transformation of existing ones.

If we summarize Zamorano's recent twenty-year history, we see that the institution fundamentally transformed itself through a complex, start-and-stop process involving trial and error, decisive leadership, and strong feedback in a highly self-critical, principled institution committed to learning-by-doing. The Zamorano change process was not a modest curricular change. Nor was it change based on quantitative growth. It involved the fundamental redefinition of the way in which the institution's mission and principles were to be best

expressed in a changed and rapidly changing context. While the deep change affected most parts of the programme, it was based on a clear definition and respect for the deepest principles that have guided the institution since it was founded.

Zamorano is the only institution that I am aware of at the tertiary level in Latin America that has achieved such a thorough modernization in such a short period of time. To effect deep change the institutional change leaders used bulldozers to eliminate old programmes and move entrenched faculty to the side. They also endured outspoken opposition from a number of unhappy graduates. The approach used caused considerable ancillary damage and immediate discomfort. But I wonder if the discomfort persists among displaced faculty, all of whom have gone on to well-paying prestigious jobs elsewhere. Is the level of frustration today less in Zamorano than it is in those institutions that agonize and debate for years over change, remaining in limbo during the whole time? Most importantly, the majority of the faculty, graduates and other stakeholders are increasingly very proud of the new programme, morale is high and student numbers and quality are increasing.

The changes from 1979-2002 in Zamorano were all self-induced. They were not mandated by any external pressure, although external stakeholders' opinions and needs were ultimately the key motivators. The institution's independence and vulnerability, its strong relations with its context through outreach programmes, coupled with its self-confidence and a business culture derived ultimately from the for-profit private sector were the characteristics that permitted the change. Had Zamorano been a different kind of institution – for example, a public institution with tenure, shared governance and autonomy – the change would not have taken place in such a sweeping manner or as easily.

Zamorano enjoyed special privileges over those of certain other institutions facing the same contextual challenges. Zamorano had the advantage of a small size and a very strong Board of Trustees effectively representing outside stakeholders and providing business savvy. Moreover, Zamorano is beholden to no ministry or other political entity. But it seems to me that the change that happened in 1993 to 2002 in Zamorano would not have happened without: (a) the success of the previous administration in providing a very

strong base upon which to build, and (b) a small group of committed true believers who were willing to do what was necessary to make it happen. That group demonstrated persistence, a sense of sacrifice, and unity of purpose during extremely difficult times and systematically led the institution through the change process.

Certainly, special conditions were present in Zamorano and may not be replicable elsewhere. Does that bode well for the rest of Latin America?

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Appendix 1

Chronology of change in Zamorano

Year	Administration and management	Formal curriculum	Learning-by-doing	Outreach	Campus environment
Prior to 1979 (new Director)	3 departments; professors with low levels of formal education	3-year programme focused on agricultural technology	All on-campus and production related; managed by professors	Explicitly prohibited	260 male students; hazing accepted; lack of confidence
1986	6 departments; strategic plan; many new Ph.D.s; upgrading of staff; improved central administration	Optional 4th year added; curriculum reformed without outside participation; many electives	First rural development work experience; management modules added but not integrated; increasing fragmentation of modules; senior theses	Post-harvest project; Integrated Pest Management (IPM) in Honduras; Rural development project	Hazing accepted; emphasis on expansion of physical facilities
1993 (new Director)	7 departments; strategic plan; 1,000 employees; efforts to decentralize begin	Curriculum reform based on graduate profile; reduced electives; teaching portfolio mandated as tool for self-analysis and evaluation	Micro-modules predominate	IPM in Central America; Sustainable Development of Yeguaire initiated; all professors expected to be involved in outreach	720 students; 11% female; hazing punished by expulsion; emphasis on renovation of physical facilities; confidence prevails
1994		Efforts to reduce attrition continue			First Student Residence created
1995		Continuing efforts to stimulate active learning and interdisciplinarity			Increasing sense that over-confidence is unwarranted
1996	Decentralization efforts lag	Growing importance of active learning	Macro-modules created and do not prosper	Support to microentrepreneurs begins; Dean for Outreach established	

Chronology of change in Zamorano (Continued)

Year	Administration and management	Formal curriculum	Learning-by-doing	Outreach	Campus environment
1997		Market studies			Uncertainty
1998 (June: 4 by 4 programme approved; October: Hurricane Mitch)	New strategic plan; 4 careers replace the departments; ZamoEnterprises created; decrease to 600 employees; faculty restructuring	4 year-long phase of 4 by 4 begins; new curriculum based on graduate profile and extensive consultation	ZamoEnterprises created; extra-curricular activities increasingly emphasized	Dean for Outreach position eliminated; PROEMPRESAH	
1999					
2000				Major post-Hurricane Mitch recovery programmes in Honduras and Nicaragua; watersheds and agribusiness	Decreasing incidence of hazing
2001	Increasing assertiveness of middle management				All students live in residences; SIVE initiated
2002 (new Director)	600 employees; new round of faculty restructuring	4 by 4 completely phased in; first graduates in December	First off-campus internships	Support to secondary-education programmes	900 students; 30% female; hazing has disappeared

Appendix 2

Zamorano's Strategic Plan 1999-2003

Vision

Zamorano is a pan-American centre of higher education committed to providing a first-rate, integrated agricultural education that includes the key elements of sustainable development, tropical agriculture, agribusiness, natural resources management and rural development. The foundations of this education are the principles of pan-Americanism, learning-by-doing, academic excellence, and character and leadership formation.

Mission

Zamorano prepares leaders for the Americas in sustainable agriculture, agribusiness, natural resources management and rural development.

Goals and objectives

Zamorano's Strategic Plan is organized into four broad goals, each with a number of objectives that will be developed into concrete, measurable action plans. These goals are to:

1. sustain Zamorano's traditional values and adapt them to a changing world;
2. strengthen the social and market orientation of Zamorano's programmes;
3. assure the strong financial base needed to achieve short- and long-term well-being;
4. efficiently and effectively manage Zamorano's resources.

Goal 1: Sustain Zamorano's traditional values and adapt them to a changing world

Zamorano's examination of its context has revealed that many of its traditional values remain highly relevant in today's workplace and should continue to serve as guiding principles for our institution. Both the essence of the Zamorano education (learning-by-doing, pan-Americanism, academic excellence, and character and leadership formation) and the values we strive to develop through this system (a strong work ethic, honesty, proactivity, initiative, responsibility, punctuality, accountability, flexibility, self-evaluation and leadership, etc.) continue to be highly valued by employers and society. At the same time, however, the strategic planning process underscored the need for Zamorano to constantly reexamine these values in order to apply them effectively in a rapidly changing environment and to complement these traditional values with others that are demanded by modern societies (e.g. creativity, full bilingualism, the ability to work as part of a team, etc.).

One of the most important factors that distinguishes Zamorano from other educational institutions is that Zamorano provides an integral residential educational experience. Every aspect of student life, whether in the classroom, laboratory, field activities, recreation or informal interactions with faculty and staff, should reinforce values and traits that are key to professional success. In this sense, every aspect of Zamorano's educational programmes and administrative structure must reflect the best practices of the most successful firms and organizations, and in some cases societies.

In order to fulfil its unique and challenging educational mission and to be a strong and vibrant institution, Zamorano's institutional culture must foster among faculty and staff the very same ideals we propose to instil in our students.

Accordingly, Zamorano will:

- maintain and enhance pan-Americanism and socio-economic diversity;
- enhance academic excellence;
- update and maximize the benefits of learning-by-doing;

- maximize the formative impact of the character-building system that fosters leadership and the development of key values and personal characteristics.

Goal 2: Strengthen the social and market orientation of Zamorano's programmes

Zamorano orients its education and outreach activities to prepare its students to meet the changing demands of the market and to address the region's most pressing social and environmental needs.

Accordingly, Zamorano will:

- offer four-year Baccalaureate degrees in: agricultural production and science, agribusiness, agro-industry (with emphasis on food technology) and rural development and environment;
- continue providing the option of a three-year Associate degree.

Goal 3: Assure the strong financial base needed to achieve short- and long-term well-being

To carry out its educational mission in a world of financial uncertainty, Zamorano must build a financial base sufficient to sustain its operations and its ability to accept qualified students unable to finance their studies.

Accordingly, Zamorano will:

- fund its current operational needs with a combination of: tuition; scholarships and financial assistance; contracts in support of outreach activities; and the sale of products and services of the ZamoEnterprises;
- simultaneously expand its effort to build endowment capable of assuring its long-term financial independence.

Goal 4: Efficiently and effectively manage Zamorano's resources

To a great extent, Zamorano's well-deserved reputation for excellence and impact depends on the effective use of the institution's human, physical, natural, and financial resources. If Zamorano is to increase its leadership role and maximize its impact, the administration must pay significant attention to the way it manages these essential resources.

Accordingly, Zamorano will implement changes in its administrative systems, management practices and mechanisms for identifying and responding to long-term institutional needs.

Appendix 3

Profile of the Zamorano graduate

The Zamorano graduate is a diligent professional, capable of resolving problems and taking decisions. (S)he is respectful of others, of his/her environment and committed to the society (s)he serves. A Zamorano is competitive and conscious of his/her strengths and limitations in the constant search for success and personal and professional growth.

The efforts made by Zamorano in its intensive four year-long programme result in a professional with a personal formation strong in personal values and a very strong basic scientific formation with a strong practical orientation, fruits of the philosophy of learning-by-doing and the constant search for excellence.

Graduates are expected to:

- possess the abilities needed to perform successfully in a demanding society and global market;
- act ethically, with respect, loyalty, honour, responsibility and credibility;
- possess the criteria, attitudes, skills and abilities to efficaciously perform in the production, transformation and commercialization of value-added agricultural products;
- understand the importance of quality; and understand, apply and stimulate the use of standard systems of quality in all of his/her activities;
- seek, apply and obtain efficiency, efficacy and profitability in the organizations where (s)he works;
- promote, guide and orient the development of the agrocommercial sector with a high degree of social and environmental responsibility;
- demonstrate excellent human relations and considerable leadership, and perform well as a member of multidisciplinary groups;
- utilize effectively information systems as a tool of professional development;

- be capable of carrying out his/her professional development continuously and systematically through the application of learning-by-doing, self-directed education and postgraduate studies.

To assure the formation of a professional with these characteristics, all of the components of the curriculum contribute to the gradual and orderly development of the following capabilities:

- to communicate effectively, both orally and in writing, in Spanish and English;
- to understand and approach processes in a holistic and integrated fashion;
- to manage computers and information technology;
- to analyze and synthesize situations and events;
- to resolve problems;
- to make decisions;
- to establish effective interpersonal relations;
- to work effectively in groups;
- to face challenges with discipline, courage and character.

In addition, each of the four careers has specific profiles that apply.

Appendix 4

Overview of Zamorano

Zamorano is a private, non-profit corporation incorporated in the United States of America, located in Honduras and dedicated to the preparation of the leaders that Tropical America needs in the areas of sustainable agriculture, agro-industry, agribusiness, rural development and the rational use of natural resources. The Zamorano educational programme is based on four pillars:

- pan-Americanism: Zamorano seeks to enrol students from all socio-economic groups from 20 Latin American countries;
- academic excellence: Zamorano's intensive, rigorous university-level programme prepares students conceptually;
- learning-by-doing: students gain conceptual understanding, practical skills and character through demanding experiential learning activities;
- leadership and character formation: the strengthening of character and leadership abilities are considered to be co-curricular activities of equal importance to the conceptual and practical components of the curriculum.

The Zamorano system consists of the four interacting components:

- four careers, that is, academic majors;
- the ZamoEnterprises and other learning-by-doing activities;
- outreach, that is continuing education, applied research, consultancies, and other forms of collaboration with rural communities and agribusinesses;
- the Integrated Student Life System (SIVE).

The Zamorano system is student-centred, demands active learning, and focuses on the mastery of concepts and fundamental skills as well as the development of criteria. The entire system is based on the management of processes and systems; the processes permit the student to integrate understanding around specific cases and generate the capacity to propose learning objectives, seek information, work in groups and resolve problems.

The educational programme does not focus on any particular ecological system, but the campus is located in the seasonally dry tropical mid-elevation area.

The Careers are in charge of conceptual formation with specialized academic programmes in four areas: Agribusiness development, Agricultural science and production, Socio-economic development and Environment, and Agro-industry. In each one of these careers, students have the opportunity to develop both general and specific theoretical concepts, while receiving the necessary preparation to efficiently apply them in practice.

The ZamoEnterprises constitute one of the special factors of Zamorano education. In them, students develop practical skills and enrich their theoretical understanding by active participation in the processes of six enterprises within the institution, in areas of: Intensive crops, Extensive crops, Rural development and Environment, Dairy and Meat products, Agricultural services, and Forestry products and services. These enterprises operate on a commercial scale and generate actual goods and services for both the national market and Zamorano's neighbouring communities.

The Outreach Activities represent the services and direct contributions that the institution makes to the social, economic, environmental and human development of Latin America by way of extension, continuing education, applied research, consultancies and other activities. Zamorano, in co-operation with international agencies, public institutions, NGOs and private industry, carries out development projects in co-ordination with communities, organized groups, and producers. Within these projects, students and faculty actively participate in facilitating solutions to the challenges of sustainable rural development and its complex relation within the agricultural, socio-economic, agro-industrial and natural realms. Outreach is a two-way street and the feedback of outreach into the Zamorano community and educational programme is essential.

Graduation projects and fourth-year internships are also part of the learning-by-doing process in Zamorano. All final-year students carry out graduation projects (theses). Students apply their curiosity as they work on campus and in the marketplaces and communities of Latin America. Thesis projects require students to work closely with specialists and provide them

with immeasurable experience and opportunity. The opportunity to concentrate in one area of study and on one specific project is a rewarding pinnacle to a Zamorano career. Under the new system all Zamorano students spend a trimester working with companies, NGOs and governmental agencies throughout the Americas and Europe or in the ZamoEnterprises on campus. Students concentrate not only on production and technical aspects but also on the management, long-term vision and decision-making processes that are required to run these organizations. Student internships broaden students' knowledge and experience, and allow potential employers to see first-hand the initiative and capabilities of Zamorano students.

SIVE (the System of Integrated Student Life) is the component that underlies all of the others. The SIVE is a way of organizing student life in coordination with the faculty and other members of the residential community on the Zamorano campus. This component includes group activities that reinforce studies, provide opportunities to develop leadership, and the sense of solidarity that contributes to the well-being and quality of student life. As a part of the SIVE, students organize and participate in extra-curricular activities and thematic clubs that consolidate and contribute to their overall development. The campus environment is designed to provide and stimulate the use of values and positive behaviours such as punctuality, responsibility, perseverance, honesty, service, order, proactivity, respect, hard work, constant learning and professionalism.

Appendix 5

The 4 by 4 curriculum instituted in 1998

Common core

First year

<p><i>First period</i></p> <p>Spanish and written communication Philosophy and logic of thought Introduction to computer science Introduction to agriculture and natural resources in LA Mathematics I General practices Sports Learning-by-doing in the ZamoEnterprises English</p>	<p><i>Second period</i></p> <p>Anatomy and physiology of plants and animals Cellular biology and micro-organisms Mathematics II General and inorganic chemistry Learning-by-doing in the ZamoEnterprises Participation in student and community activities English</p>
<p><i>Third period</i></p> <p>Business administration Soil and water science Accounting for business decision-making Crop protection Learning-by-doing in the ZamoEnterprises Participation in student and community activities English</p>	

Second year

<p><i>Fourth period</i></p> <p>Agro-industry and food science Ecology and environmental management General physics Mathematics III Learning-by-doing in the ZamoEnterprises Participation in student and community activities English</p>	<p><i>Fifth period</i></p> <p>Analysis of business credit and finance Microeconomics Biochemistry and organic compounds Animal production Learning-by-doing in the ZamoEnterprises Participation in student and community activities English</p>
<p><i>Sixth period</i></p> <p>Sustainable social development General statistics History and agriculture in Latin America Marketing and market theory Project preparation and evaluation Learning-by-doing in the ZamoEnterprises Participation in student and community activities English</p>	

Third and fourth years

Agro-industry career

<p><i>Seventh period</i></p> <p>Food microbiology Food and nutrition chemistry Experimental design Learning-by-doing in the ZamoEnterprises Participation in student and community activities English</p>	<p><i>Eighth period</i></p> <p>Guaranteeing quality control Food engineering Food analysis Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>
<p><i>Ninth period</i></p> <p>Processing agricultural products Processing animal products Systems for business decision-making Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>	<p><i>Tenth period</i></p> <p>Special projects and activities Intensive English Participation in student and community activities Personal Development Seminar Advanced seminars</p>
<p><i>Eleventh period</i></p> <p>Food chains and the consumer Agro-industrial engineering Management of water and agro-industrial waste Processing non-food products Learning-by-doing in the ZamoEnterprises Participation in student and community activities English communication Personal Development Seminar Advanced seminars</p>	<p><i>Twelfth period</i></p> <p>Context of agro-industry and agribusiness Product development Preserving and packaging food Food services Learning-by-doing in the ZamoEnterprises Participation in student and community activities English communication Personal Development Seminar Advanced seminars</p>

Agricultural science and production career

<p><i>Seventh period</i></p> <p>Biology of insects and other pests Soil management and crop nutrition Machinery and irrigation Experimental design Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>	<p><i>Eighth period</i></p> <p>Crop protection Genetics and crop improvement Pastures and forages Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>
<p><i>Ninth period</i></p> <p>Animal nutrition and feeding Animal reproduction and breeding Aquaculture Systems for management decision-making Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>	<p><i>Tenth period</i></p> <p>Special projects and activities Intensive English Participation in student and community activities Personal Development Seminar Advanced seminars</p>
<p><i>Eleventh period</i></p> <p>Integrated watershed management Food chains and the consumer Post-harvest management of agricultural products Production of horticultural and ornamental crops Intensive ruminant production Learning-by-doing in the ZamoEnterprises Participation in student and community activities English communication Personal Development Seminar Advanced seminars</p>	<p><i>Twelfth period</i></p> <p>Context of agro-industry and agribusiness Poultry and swine production Fruit and perennial production Production of basic grains and industrial crops Learning-by-doing in the ZamoEnterprises Participation in student and community activities English communication Personal Development Seminar Advanced seminars</p>

Socio-economic development and environment career

<p><i>Seventh period</i></p> <p>Fundamentals of development theories Natural resources management Project management Elective I Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>	<p><i>Eighth period</i></p> <p>Environmental economics Statistics for social sciences Social research Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>
<p><i>Ninth period</i></p> <p>Systems for business decision-making Geographic information systems Agroforestry Elective II Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>	<p><i>Tenth period</i></p> <p>Special projects and activities Intensive English Learning-by-doing in the ZamoEnterprises Participation in student and community activities Personal Development Seminar Advanced seminars</p>
<p><i>Eleventh period</i></p> <p>Environmental management Integrated watershed management Biodiversity Learning-by-doing in the ZamoEnterprises Participation in student and community activities English communication Personal Development Seminar Advanced seminars</p>	<p><i>Twelfth period</i></p> <p>Context of agro-industry and agribusiness Development environmental policy Micro and small business development Learning-by-doing in the ZamoEnterprises Participation in student and community activities English communication Personal Development Seminar Advanced seminars</p>

Agribusiness development career

<p><i>Seventh period</i></p> <p>Analysis of international credit and finances Production economics Informatics for business management Learning-by-doing in the ZamoEnterprises Participation in student and community activities English</p>	<p><i>Eighth period</i></p> <p>Sales management Market research and strategies Statistics for social sciences Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>
<p><i>Ninth period</i></p> <p>Analysis of the business environment Personnel management and organizational change Systems for management decision-making Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>	<p><i>Tenth period</i></p> <p>Special projects and activities Intensive English Participation in student and community activities English Personal Development Seminar Advanced seminars</p>
<p><i>Eleventh period</i></p> <p>International commerce Export management Food chains and the consumer Post-harvest management of food products Biodiversity Learning-by-doing in the ZamoEnterprises Participation in student and community activities English Personal Development Seminar Advanced seminars</p>	<p><i>Twelfth period</i></p> <p>Operations research Macroeconomics and the world economy Product development Context of agro-industry and agribusiness Learning-by-doing in the ZamoEnterprises Participation in student and community activities English communication Personal Development Seminar Advanced seminars</p>

Appendix 6

Detailed description of the four careers offered by Zamorano

After many decades offering a single programme focused almost entirely on basic sciences and agricultural technology, Zamorano now offers four degree-granting programmes designed to form leaders in areas that are important to the well-being of rural areas and the competitiveness of the agribusinesses of Latin America: Agribusiness development, Agricultural science and production, Socio-economic development and environment, and Agro-industry.

Most universities are divided into departments that are defined according to the disciplinary interests and affiliations of the teachers; this arrangement makes it difficult to achieve interdisciplinary actions. Zamorano's four careers or academic programmes are focused on the needs of students and graduates-to-be. The interdisciplinary groups of professors oversee programmes designed to prepare leaders for clearly defined niches in the labour market. The graduates' profiles respond to the diverse challenges of the socio-economic well-being of rural Latin America and the challenges confronted by the components of the Latin American agro-industrial complex.

During the first two years, all students carry out general studies and follow the same common core of practical activities. In their third and fourth years, students concentrate on the specific activities that they have chosen, but also stay involved in some general activities in order to avoid over-specialization.

In December 2002, the first students of the new 4 by 4 Programme would graduate.

Agro-industry career. As Latin America adjusts to globalization, agro-industrial operations throughout the region struggle to find professionals capable of processing food products and non-food products like textiles, wood, rubber,

paper, industrial oils and renewable energy, for demanding markets. The Agro-industry Career responds to their needs by offering a unique, multi-disciplinary programme that integrates and applies elements of agricultural and social sciences, food technology and agro-industrial engineering to the production, transformation and marketing of agricultural products in a cost-effective and environmentally sound fashion. The programme stresses critical themes such as food security, food quality, valued-added processes, product development and client and consumer orientation. Currently almost one-fourth of advanced students are enrolled in this programme.

Agribusiness Management career. The opening of national and regional markets to external competition provides considerable challenges and opportunities for agribusinesses in Latin America. However, the region will not be able to capitalize on many of these opportunities, or overcome many of the challenges, without human resources with the right combination of skills and vision. The Agribusiness Management Career forms professionals capable of identifying and taking advantage of business opportunities, optimizing the use of production factors, and accessing national and international capital markets. Graduates of the programme have a comparative advantage as professionals because in addition to mastering important skills taught in the best business and administrative programmes, they learn – both in theory and practice – to produce and sell agricultural products and services, obtain financing, and take advantage of export opportunities. Most importantly, they possess initiative and a strong entrepreneurial spirit. Approximately one-fifth of Zamorano’s students major in this area.

Agricultural Science and Production career. The days of simple technological recipes are over. Today, competitive and sustainable crop and animal production requires professionals who understand concepts and systems; who can generate, adapt and apply scientific and technological knowledge; and harmonize environmental and socio-economic needs. The Agricultural Science and Production Career combines Zamorano’s strong capabilities in animal production, horticulture, agronomy, silviculture, plant protection, and biotechnology into an integrated and innovative programme. Students participate in the application of emerging technologies, learn administrative skills, and help develop improved techniques for information management and decision-making. They also learn to manage and administer production

processes, and improve the bioecological and economic efficiency of production in a wide range of socio-economic and physical conditions. Somewhat less than half the students are enrolled in this programme.

Socio-economic Development and Environment career. In recent years natural disasters throughout the continent have reminded us of the close links between human activities and the environment, and of the tremendous social and economic costs associated with the ongoing environmental degradation throughout rural Latin America. The Socio-economic Development and Environment Career is founded on the philosophy that it is impossible to confront environmental problems without a profound understanding of issues related to rural poverty, and that the sustainable socio-economic development of rural areas is not possible without responsible management of the environment. Students learn to understand the complex relationship of these factors, and how to develop and manage local and regional programmes in areas such as integrated watershed management, community capacity building, poverty alleviation, rural credit, development of environmental services, rural education, and rural tourism. Approximately one-fifth of Zamorano's students choose this major.

Appendix 7

Detailed description of the six ZamoEnterprises

The ZamoEnterprises, the six on-campus simulated business enterprises, constitute one of the special factors of Zamorano education. In them, students develop practical skills and enrich their theoretical understanding by active participation in the processes carried out by the enterprises, in areas of: Intensive crops, Extensive crops, Rural development and environment, Dairy and meat, Agricultural services, and Forestry products and services. These enterprises operate on a commercial scale and generate actual goods and services for both the national market and Zamorano's neighbouring communities. In 2001, the ZamoEnterprises completed successfully their third year of operation. The commercial scale, market-driven approach to learning-by-doing that characterizes the ZamoEnterprises helps keep the institution and its students abreast of developments in regional markets and compels them to integrate technical, managerial, processing, marketing, social and environmental aspects.

In addition to their educational benefits, the ZamoEnterprises create products and services that generate US \$4 million income for the institution. A broad range of processed dairy, meat, horticultural, fruit and ornamental products along with certified seed, grain, lumber, tree seedlings, feed concentrate and many other products carry the Zamorano label and are distributed internationally and domestically. ZamoEnterprises are contracted by regional companies to provide diverse services, training, and agribusiness development. This past year the ZamoEnterprises researched and developed many new products, improved marketing strategies, introduced new label designs and packaging for products, and further developed infrastructure to allow for on-campus private-sector training programmes.

The ZamoEnterprise philosophy of education is student and active learning-centred. Students are given more responsibility with each year spent in the ZamoEnterprise. During their first two years, students spend seven weeks in each of the ZamoEnterprises. They learn from the bottom up how

the ZamoEnterprise provides a service or produces and processes raw products into marketable goods that satisfy the demands of the market. Students also gain a strong appreciation for the labour required to run an agribusiness or NGO. In their third year, students may choose to concentrate in one or more ZamoEnterprises, using technical knowledge related to their Career area to help improve operations. For example, a student in the Agribusiness career can choose to work in any one of the six ZamoEnterprises using his/her business skills to help make sure the ZamoEnterprise is cost-effective and responds to market demands. Likewise, a student from the Agricultural science and production career could be working for the same ZamoEnterprise using his/her skills to ensure efficient and responsible agricultural production. Fourth-year students become more involved in strategic business planning and are given full management responsibilities in internal internships. Fourth-year students may also develop their thesis project within the operations of the ZamoEnterprise. By the time a student has completed four years in the ZamoEnterprise system he/she possesses many of the necessary skills to effectively run his/her own agribusiness.

Dairy and meat ZamoEnterprise. Students learn first-hand about the entire value chain. They strengthen their production and administration skills as they manage pastures and forage production lots, dairy cattle, beef cattle, and hogs. They apply their knowledge of food technology as they produce a wide range of high-quality products, including fresh and aged cheeses, pasteurized and homogenized milk, yogurt, ice cream, fresh-cut meats and processed meats. They strengthen their marketing skills as they study demand for the products they have produced, and implement marketing strategies for the ZamoEnterprise's products. They also acquire product development skills by playing an active role in design of new products, packaging and labelling.

Extensive crops ZamoEnterprise. Whether swinging a machete or planning a sophisticated marketing programme for improved seed, students are always learning the concepts of quality, management and sustainability in this unit. They produce seed, grain, silage, feed concentrate, fruits and industrial crops. This ZamoEnterprise manages hundreds of hectares of basic grain production, fruit trees and model coffee and plantain plantations. The seed-processing plant is one of the most modern facilities in Latin America.

Intensive crops ZamoEnterprise. Students practise modern, environmentally responsible horticulture production and processing. They focus on niche markets and modern technology as they produce a variety of products including common and exotic vegetables, jams, juices, canned vegetables, processed coffee, hot sauces, vegetable seedlings, and even earthworms for soil improvement. Managing 50 hectares of field production, 11,000 m² of greenhouse production, 1,000 m² of seedling production, an organic farm, and a modern fruit and vegetable processing plant, students develop skills that prepare them to take advantage of the many professional and business opportunities available in this area.

Agricultural services ZamoEnterprise. Here students develop a businesslike approach to farm operations, come to appreciate the importance of client-orientation, and learn how to optimize the use of farm resources. Students offer a variety of services to other ZamoEnterprises and to producers off-campus. They provide irrigation services, topographical studies, agricultural machinery services, machinery repair, meteorological services, and stream and river flow monitoring.

Forestry products and services ZamoEnterprise. Students produce lumber, firewood, posts, seedlings and green manures. They manage 2,300 hectares of natural forests and tree plantations, including watersheds that are critical sources of water for human consumption and irrigation in Zamorano and in neighbouring communities. They also manage the 1,200-hectare Uyuca Biological Reserve, a cloud forest that is considered one of the best-managed bio-reserves in Latin America. Every year students plant tens of hectares of mahogany and other high-value trees that will generate scholarships decades in the future. They build self-confidence through fighting fires and other physically demanding work, and develop a greater appreciation for nature and the tremendous social and economic benefits associated with sustainable forestry activities.

Rural development and environment ZamoEnterprise. Functioning like a private development organization, this unit provides students with a deeper understanding of the complex issues facing rural communities. Students learn project development and management skills and extension techniques as they participate in a number of development projects and programmes.

They work with organized groups to transform micro- and small-scale producers into successful and environmentally responsible businessmen and women, through technical assistance in agricultural and animal production, value-added processing, marketing, administration, human relations, and project preparation and evaluation. Student groups also develop and implement their own community development or environmental projects in neighbouring villages.

Appendix 8

Detailed description of the Integrated Student Life System

The Integrated Student Life System (SIVE in Spanish) is an institutional effort begun in 2001 aimed at improving the reality of student life at Zamorano and maximizing the benefits of the residential programme. Professors, staff and students are creating a programme that combines student residences, student services, leadership development and student counselling into one comprehensive system. The SIVE is characterized by student initiative and responsibility for the well-being of others, close student-faculty interaction and a strong sense of community within each student residence. The faculty plays a key role in the new system. Each student residence has *padrinos*, a faculty member and spouse who live in a house adjacent to the residence and serve as mentors and help with the organization of student activities and orientation. The *padrinos* work with a committee of other faculty to assure the smooth transition of new students and the general quality of life for students. Each residence is staffed by one or two recent Zamorano graduates who serve as student residential assistants. Each residence is also organized into groups co-ordinated by fourth-year student leaders. These students take a large responsibility for the organization of most extra-curricular activities, residence maintenance and improvement; and for motivating students to work together and support one another in academic pursuits. The SIVE underlies all other Zamorano components.

Appendix 9

Summary of the recommendations of the February 1997 External Review Panel

In February 1997, four external reviewers visited the Zamorano campus at the request of the Director. Following are representative excerpts from their report that were major motivators for our then incipient deep change efforts:

- “Zamorano continues to rise to meet the changes in its environment. It has demonstrated an admirable combination of traditionalism and continuity on the one hand and flexibility on the other. Now it is at another crossroads, maybe one that presents it with unprecedented challenges. It is the mission of this team to show some of these into high relief, if only to stimulate your thinking. The Institution has already raised, out of its own internal processes, all the issues mentioned here. Furthermore, in many areas people already have begun to collect the data needed to enable a more informed ‘next step.’... You are ...‘on a roll’ – at least parts of the Zamorano community are.”
- “Zamorano’s programme has to evolve and improve in a time of diminishing resources and increasing external challenges to the well-being of the institution.”
- “(T)he world has rapidly changed around Zamorano. You need to catch up, and that will be extremely difficult.”
- “There is a general consensus that the long-term competitiveness of Zamorano might require substantial reorientation of programmes and that the time has arrived to reinitiate the strategic planning effort.”
- “To accomplish this, Zamorano leaders should interact with people who understand where Latin America is going and what are the institutional challenges as the twenty-first century approaches.” In addition to extensive use of consultants, “(t)eams should go out from Zamorano to review and study the dynamic changes in the region so as to bring back a summary of things seen and how they impinge on Zamorano.”
- “It is essential that Zamorano focus on its context.”

- “It seems to a number of the ‘evaluators’ that many people associated with Zamorano have ... what I would call a Harvard complex. These individuals believe that Zamorano graduates as a whole (admittedly, with exceptions) form a class of their own above and beyond the graduates of other institutions. For example, when I ask about Zamorano’s ‘peer institutions’ or ‘competitor institutions’ these people cannot think of any. This view is largely supported by the belief that Zamorano *graduates* themselves have few peers in the fields they enter.”
- Our “purpose ... is partly to goad Zamoranistas out of what some of our team perceive to be unwarranted complacency, maybe even smugness about the School’s image. Not just that you have to keep on your toes; but more seriously, that you’re out of touch with reality in this area, and maybe that ‘the real world has passed you by’ – or has begun to. You’re no longer as great as you think; the relevant public know this but you do not...Zamorano should take the image and standard issue seriously and try to subject it to some objective analysis, because it constitutes the heart of many policy decisions in the near future.”
- “I recommend submitting virtually all of the School’s sacred mantras to radical but honest and earnest re-evaluation.”
- Zamorano should “list and then systematically question a dozen or more of your most sacred mantras, such as the lengthy ‘basic’ required curriculum; intensive work in the fields six half-days a week; relative uniformity of course levels and indeed of courses regardless of student preferences; and other mantras.”... Zamorano should “examine, freshly, such basic assumptions as the value of what you call ‘discipline’ and ‘character’, the role and extent of farm work in the curriculum, the very usefulness of the farm itself, the School’s generalist approach to agricultural education, the uniformity of the curriculum, the ‘real world’ value of immersing a student in every step of production, the importance of a ‘pan-American’ identity, the School’s claim to produce leaders and its current notion of leadership – to mention but a few fundamentals that need questioning. All of them are on the line.”
- Zamorano must “see these mantras in terms of real *trade-offs* (not simply in moral absolutes – ‘they are good, we must ...’) presented by alternative uses of students’ and professors’ time.”
- On the issues related to admissions: “although I trust the Zamorano alumni, administration, and current students’ insights ... again I

recommend an *outside* investigation. Zamorano suffers from insularity (one team member referred to ‘living behind a thick wall’).”

- Referring to possible information exchange with peer institutions: “some of my team members and I have the impression that at the moment Zamorano may feel too invulnerable to admit the need for such arrangements.”
- “Top administrators on the one hand speak of continuing to turn out leaders and on the other hand (professors and others) describe middle-management (technical specialists) positions in large agribusinesses as the ideal private-sector job. ‘Our graduates won’t ever *own* and *run* businesses, they will supply the technical component’ – was an aspiration I heard from several administrators or department heads. Entering the field and bringing Zamorano up to date in it with these attitudes and understandings can assure the Institution’s survival, but not its leadership in Latin American agriculture.”
- “(A) major obstacle to shifting the Institution at least partly towards this ‘real world’ orientation will be the faculty ... for many reasons including Zamorano’s idyllic isolation, and other factors, apparently deprive them of involvement (maybe even of *contact*) with the extraordinary transformations taking place throughout Latin America.”... Zamorano must have “an active *market-involved* (not just -oriented) faculty.”
- Regarding the character and discipline claims and issues: “It is not clear to ... our team that these issues and other mantras can any longer be defended empirically. The new world around Zamorano may come to hold you objectively accountable for matters and claims that are only secure in your own subjectivity. Nor do I think that what the alumni cling to should govern, in and of itself. They may be part of the problem.”
- “The Director’s role in Zamorano must be increasingly conceived as one of co-ordination and facilitation. In this way a representative culture in which students can learn how modern institutions function and one in which the upper- and mid-level administrators can exercise their authority on broad institutional issues. At Zamorano the Executive Council exercises considerable authority. This group works effectively together to manage the institution. If teamwork exists at the higher levels then it can be employed more widely at the lower level.”

Appendix 10

Summary of the methodology and findings of the December 1997 bus trip

The day following the commencement ceremony, 21 campus leaders plus two Trustees boarded a bus and began a transforming, week-long tour of Nicaragua and Costa Rica. When they returned to campus, they were convinced that change would come in their institution. Some were highly motivated to lead that change. Others who could have been serious roadblocks to change were effectively neutralized by the experience. In the following paragraphs the reader will find information on the methodology used and the findings of the trip.

Methodology

- The visits to the two countries allowed us to experience the range of conditions found in the countries we serve. Costa Rica represents one of the most advanced countries in Latin America as measured by general standard of living; the social setting is advanced, its economy is highly developed and the agricultural sector is focused on non-traditional export crops. Nicaragua, on the other hand, is one of the poorest countries in the hemisphere, has serious socio-economic problems and has an agricultural sector that produces virtually only traditional commodities.
- Participants included all heads of departments, managers, deans, other top administrators, several senior professors, two junior professors, and two Trustees.
- Virtually all the time available was used, even travel time, to better understand strategic issues related to the institution's context and role in a changing world.
- A library carried on board included dozens of works on strategy, Latin America, planning, education and other related subjects.
- The bus was equipped with an excellent public address system that allowed lectures, debates and discussions to be heard by all.

- The bus had television monitors that allowed the participants to watch half a dozen full-length Hollywood-produced films (e.g. ‘Stand and Deliver’, ‘The Dead Poets’ Society’). Participants discussed the meaning and lessons of the films both informally and using the microphone.
 - Several sites were visited each day. These included a broad range of farms, other agribusinesses, ministries of agriculture, ministries of education, ministries of rural development and business schools.
 - At each site, two of the group served as spokespersons for the entire group; all other group members listened and participated by submitting questions in writing to the spokespersons.
 - Questions could be related only to the purposes of the trip, i.e. to better understand the role that Zamorano is and should be playing in a changing world. No strictly technical questions, the kind that disciplinary specialists love to ask, were permitted.
 - Participants were encouraged to concentrate on an understanding of the informants’ opinions; they were not allowed to promote our programme. Therefore, no rebuttals or explanations were permitted – even to the most outrageous misperceptions or accusations. Only follow-up questions to better understand the informants’ opinions were allowed.
 - After each site visit, generally on the bus, one of the team members led a debriefing session during which the key messages were identified and discussed. At this time, among ourselves, we could discuss the validity of the informants’ opinions.
 - Daily presentations by outstanding graduates, futurists, educational specialists and analysts of the rural and agribusiness sectors completed the itinerary.
 - At mid-week and then again on the penultimate day, participants spent full days on the campuses of INCAE⁴ where they listened to regional specialists discuss the dimensions of globalization, the impact on the agro-industrial sector, and participated in team building and planning exercises.
 - Frequent exercises were used to help the participants digest, assimilate or internalize the messages being received.
4. INCAE is the pre-eminent business school in Central America, and one of the best in Latin America; one campus is located near Managua, Nicaragua and the other outside of San José, Costa Rica

Findings and conclusions

- The films reminded participants of the human dimensions of our role as educators and of the frequent unintended negative influence of well-intentioned adults on young people's lives. We also were forced to confront the idea that excellence has costs and requires huge levels of energy, sacrifice and dedication.
- We concluded that Zamorano as an institution was well known and respected, but viewed by many as somewhat outdated and complacent.
- Zamorano graduates were universally respected for their technical abilities, but a frequent criticism levelled against them was that they 'know how to order subordinates around, but they are not good at personnel management'. Some considered that graduates tended to underutilize the newest technologies. Many felt that graduates were weak in administrative, business and entrepreneurial skills.
- We heard time and again from key informants that when they hire new employees, they do not look for a command of technical knowledge, but rather for human qualities. Technical knowledge is ever changing, often proprietary, and can be taught to any eager, competent new employee. On the other hand, personal characteristics are enduring and make or break the employee.
- Among the most valued attributes sought in new employees were loyalty, honesty, integrity, ability to learn and grow, communication skills, ability to work in a team, and ability to manage personnel.
- Zamorano had lost its monopoly as the source of top employees; many new programmes, largely private business schools, and good industrial and civil engineering programmes provided graduates highly valued in the agribusiness sector.
- Zamorano graduates were often found to be the 'right-hand men' for the owners and top managers of successful, competitive agribusinesses. They often effectively occupied mid-level management positions, but their advancement to the highest levels of management and ownership seemed to be limited by their lack of formal preparation in entrepreneurship and business.

- Starting salaries for recent graduates were surprisingly low and did not justify the high levels of investment made in the education; only if graduates could advance rapidly could the costs be warranted.
- In summary, Zamorano and its graduates continued to be respected. But change was imperative in order to protect and later enhance Zamorano's reputation, a reputation gained in a different, earlier context.

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Inquiries about the Institute should be addressed to:
The Office of the Director, International Institute for Educational Planning,
7-9 rue Eugène Delacroix, 75116 Paris, France.