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The Social Sciences in Asian Forestry Curricula

*Issues to Consider for
Curriculum Development*

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INTRODUCTION

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Our theme for the Curriculum Development Workshop held at Pokhara, Nepal in July of 1989, came from deep in the Asian soil and culture. Though we gave all due attention to the rationalistic, econometric and practical domains of modern forestry, there was a deeper sense of connection, of circles within circles, of loops of information and action being closed. Long before European forestry had been born, let alone imposed upon Asia, Asians had forestry close to the village needs, tied to social and religious values, and infused with the wisdom of the arts.

Forests and tree communities were not set apart from human communities but held meanings of interdependence. Hinduism, Buddhism and other Asian religions emphasized the wholeness of society and nature, of the forester and the forest, the scientist and the poet. Those who used and protected the forests, the foresters, were part of the local community and they reminded us to approach nature with gratitude, with awareness of its immense unity and with awe.

Our theme, therefore was a search as to how Nepal's Institute of Forestry (IOF) and other Asian forestry educators could rediscover the early wisdom of pre-European forestry and combine it with the more appropriate practices and technologies of modern forestry. Like the field forester who uses the chain saw and the nursery as tools for using and restoring the forest ecosystem, the forestry educator uses the course syllabus and curriculum development as the tools for transforming students into professionals and technicians who can deal with a changing world. But for both the field forester and the forestry educator we can only succeed in the long run by learning to listen to the evolving nature, the still, inner voice of the systems we must manage--the forest ecosystem and its dependent human community and the educational system of students, faculty, administrators and employing agencies. Our theme then is the exploration of these mutual connections--past and future, practitioner and educator, student and professional, nature and society.

The Pokhara workshop is both a continuation and deeper specification of an earlier Asian-wide workshop held at Khon Kaen, Thailand in November of 1988. The Khon Kaen workshop, as this one, was supported by AID/Winrock and organized by Yale TRI and RAPA-FAO. At the earlier workshop a group of professionals: field foresters, forest administrators, forest educators, social scientists, ecologists, chemists, hydrologists, and academic administrators from a wide array of countries--Indonesia, Thailand, Nepal, Malaysia, India, Sri Lanka, Philippines, Netherlands, USA--found a community, not by country or by discipline but through a mutual interest in exploring what research and educational programs can do to restore and to

sustain our forest ecosystems so they may more directly serve the welfare of human communities.

It is important to emphasize that though we began that first workshop with the notion of how to best incorporate the social sciences with the biophysical sciences in forestry training, we devoted our attention to solving problems. Consequently, our interest was in what kinds of knowledge and experience were necessary to resolve the observed problems rather than how to gain some political balance between various competing disciplines. We continued that larger vision at our Pokhara workshop.

Throughout the world, forestry as an idea and as a practice is under challenge. For a brief moment, world leaders have looked up from their military, industrial, agricultural and urban strategies to see that they are all dependent upon a healthy forest ecosystem. Forestry has moved from the shadows of social indifference to the brightness of international media and television light. Meanwhile, back in the forest the local people are challenging traditional forestry practices. From the Chipko movement in India to Amerindians in the US Pacific Northwest asserting their traditional religious and social uses of indigenous tree species and forest ecosystems. Scientists and economists are reporting on the great importance of non-timber products, goods and services that often have much higher values than traditional commercial timber uses.

Throughout the world we are being challenged to move from a custodial, reactive profession to one of participatory and pro-active practices. And it is Asia that has pioneered these new approaches--community and social forestry have 20 to 25 years of field application in many Asian countries. But more importantly, as our colleagues S. Chinnamani, S. H. Shah and others remind us, before the colonial period, Asian forestry was practiced and taught as an integrated social and biological science. Rather than concentrating upon a few commercial species and excluding the local peoples experience, knowledge and needs, it was a multi-product, community directed practice.

Consequently, as noted earlier, this workshop is one part of re-discovering the natural resources wisdom of pre-colonial Asian foresters, and using it to re-direct modern technologies to enduring issues of village resource sustainability. Its second part is seeking how we can better combine the wisdom and insight of researcher and field forester, educator and practitioner, biophysical and social science knowledge, villagers and professionals and the forestry professionals with national policy makers. In short, we learn to listen anew to the systems we must manage. In this learning, IOF is the ideal venue to lead the region and the world in defining the directions and domains of the new forestry for the 21st Century.

CHAPTER I

PUTTING CURRICULUM DEVELOPMENT INTO ITS SOCIAL ECOLOGICAL CONTEXT--A FRAMEWORK FOR ASKING QUESTIONS [1]

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Abstract. Professional Forestry and other natural resources education programs must seek both continuity and adaptability in their curricula. In recent years many outside groups have attempted to define the nature of problems and the solutions they want in curricula. To move from a reactive to a proactive stance, forestry and natural resources faculties might explore organizational options for their knowledge production and distribution systems, and give closer attention to the internal and external socio-political environments that may inhibit innovation and alter continuity in curricula.

Professional forestry and other natural resource education programs have a dual responsibility—to retain the continuity in their core subject matter while adapting to changing needs by altering the mix and nature of course offerings. This dual responsibility is greatly affected by changes in our knowledge base that makes some practices outdated and confirms others. Also there are changes in the natural systems that we manage. Finally, there are natural changes in the human perceptions of the values, benefits and needs sought from natural systems.

This chapter will give central attention to the interplay between those changed perceptions, the adoption of curriculum innovations and those core essentials that are retained for our graduates. We consider several elements that affect our choices in curricula innovation and suggest some of the factors that may inhibit the adoption of innovation and encourage the retention of some traditional activities.

We are neither exhaustive nor fully scientific in our analysis. Rather, we suggest some of the social ecological factors that may be considered when faculties attempt to be innovative in curriculum development. In this effort, our attention is directed to understanding the knowledge production and distribution system. Knowledge being the transformation of information into understanding and skills for action.

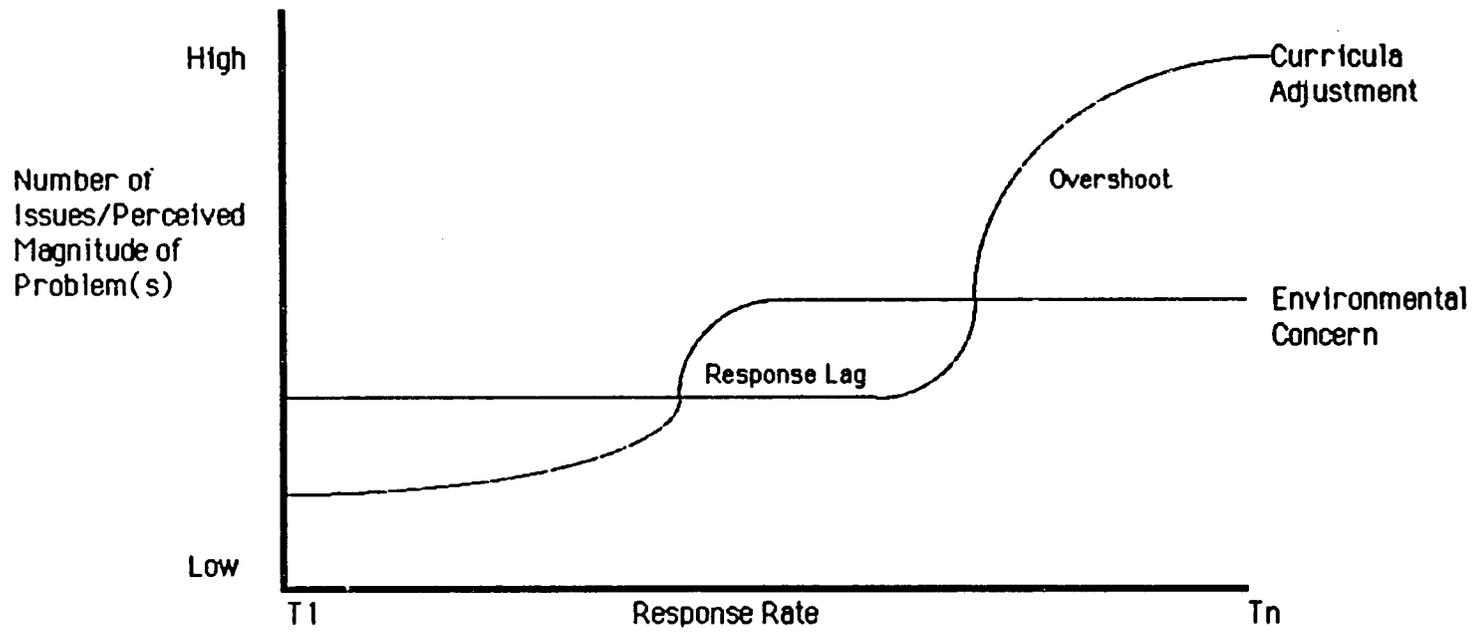
1. An early draft of this effort had the good fortune to be reviewed by my colleague and friend Cor Ver. I hope I have made most of the correct responses. Certainly, whatever wisdom is present must be attributed to him, the mistakes and whatever wit remains is my responsibility. J.K. Parker, Bob Clausi, and Jeff Bopp also helped me trim my verbal sails, while our colleagues at the workshop gave their inspiration. Thank you all.

The highly stylized graph on page 5 indicates a nearly universal law that affects all human organizations when they attempt to respond to changes in perceived problems. In the early stages we are unaware of the importance of a particular developing problem or we chose to ignore it in the hopes it will go away. However, over time the problem perception builds up until it greatly exceeds our response. Sometime later we become aware of the problem, accept its basic aspects and rush to provide solutions. This usually has us getting everything in place with the right solutions only to find that we have now overshoot the concern and are now providing solutions that are no longer preferred.

This natural curve is due to the fact that most policy matters, particularly ecological and environmental matters, are composed of multiple causes of multiple problems. Interest in the role of natural resources in producing rural economic development is a classic example. The limits upon rural economic development have several problems which could be attributed to several sorts of causes at various times. For example, the idea that deforestation is a major threat to sustainable development may emerge and the acceptance of this idea may lead to the cycling of several key solutions at different response rates and times. At one time we may accept the idea that halting the perceived deforestation threat requires a firmer ability to police and to enforce regulations, later we may find that there are not enough armed guards to protect the forest so we emphasize the need to outgrow the problem through developing large plantations of fast growing species. Yet, still later we find that political or ecological constraints inhibit the full value of exotic plantations so we may seek to develop multi-purpose trees to encourage planting by farmsteads. Much later we may find that multipurpose trees are not the full salvation in all cases, so we may then stress a broader community forestry approach or emphasize more direct attention to matters of resource distribution, gender and other social factors.

Forestry and natural resource educators want to avoid teaching students outdated solutions. On the other hand we do not want to pander to the latest fad. In recent years we have had donor groups, interest groups and international environmentalists attempting to direct and re-direct the nature of our curricula. That is, our leadership role has been eroded to one of reacting to the perceptions of resource problems and implementing solutions provided by others. This chapter hopes to give hints as to how we can reclaim leadership by better understanding and appreciating certain traditional core subjects and being better able to anticipate emerging problems and solutions. In short, we want to minimize the magnitude of our response lag and minimize the magnitude of our overshoot.

We readily accept the idea that our global ecosystem has a certain unity, connectedness and interdependence; that multiple species of plants and animals form a necessary association; that trade policies of one nation reverberate throughout the global economy and that activities affecting major ecological cycles such as the carbon cycle ultimately impinge upon us all. What we may less equitably accept is the idea that human organizations also have ordered, predictable patterns and can be divided into something like species. That is, multi-national corporations have much more in common with one another than they do with universities, government departments, private voluntary organizations and so forth. For our immediate interest,



GRAPH 1 -- LAG - OVERSHOOT CURVE OF ORGANIZATIONAL ADAPTATION TO TRENDS IN PROBLEM PERCEPTION

universities throughout the world, regardless of their location, have a high degree of similarity.

Of course, universities have many specific variations in requirements, faculties, physical plant and so forth. Yet, the production and distribution of knowledge creates certain universal and invariant characteristics. Consequently, a professor from Nepal or Thailand will have a greater feeling of familiarity in a university in the Netherlands or Britain, and certainly a great deal more familiarity than they would have in a research division of a multinational corporation.

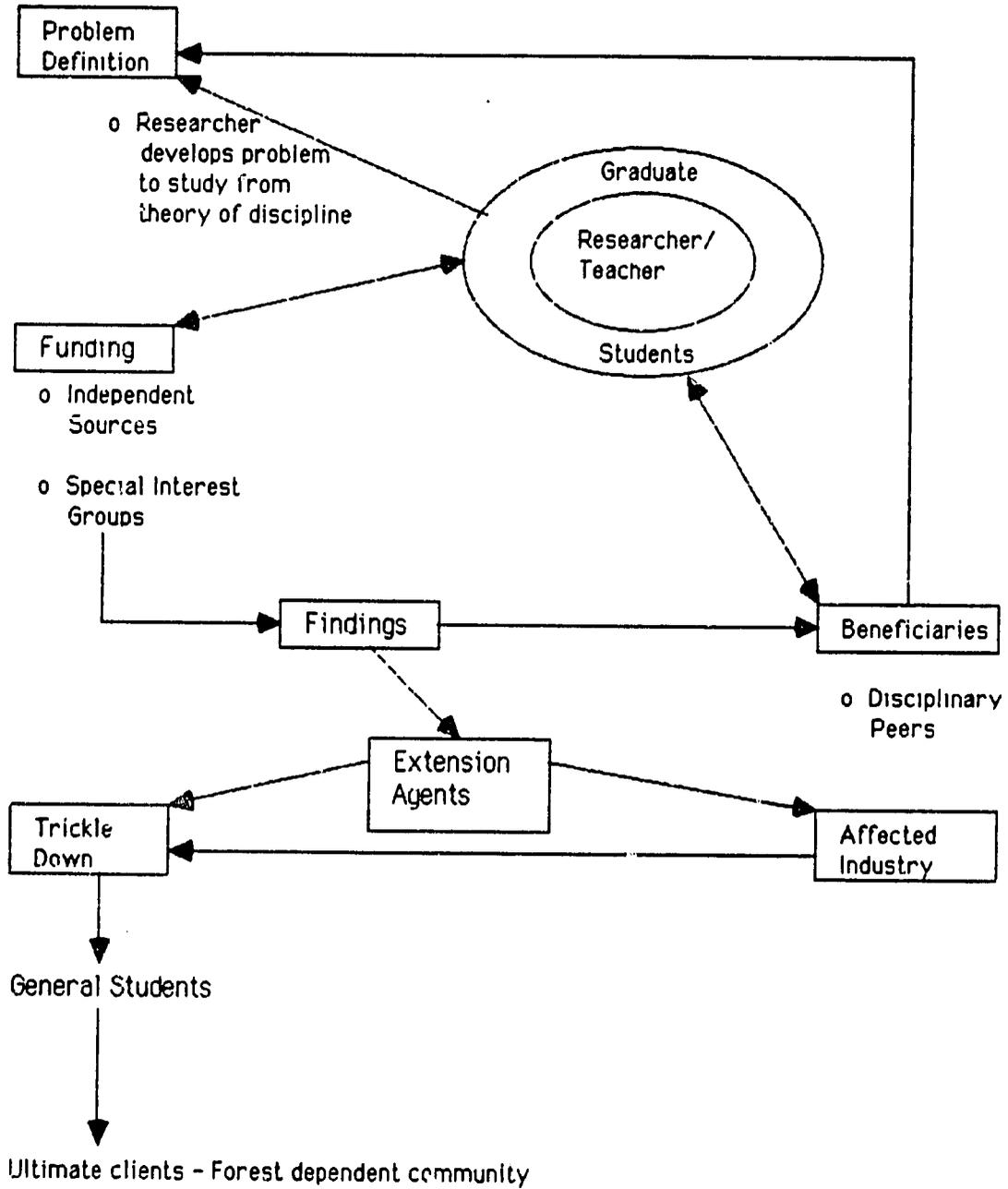
In forestry and other applied natural resource disciplines, the anchor of the system is the individual researcher/teacher and their surrounding graduate students. (See Chart 1 page 7) The researcher develops problems as derived from a given disciplinary theory, they seek funds from some independent source such as a foundation. This traditional knowledge system may direct the findings to its primary beneficiaries--the discipline and the researcher's peers. Such findings may then filter to extension agents who translate the findings for leaders of affected industries. There is a trickling down of the findings to general students other than the researchers own graduate students, and further trickling down to the ultimate clients in a forest dependent community.

The important point is that the traditional knowledge production and distribution system assigns accountability to the researcher for producing new knowledge within the checks and balances of a particular discipline. A further dissemination of knowledge is the responsibility of persons other than the researcher. Such a pattern is fairly universal regardless of where the knowledge system is found. The traditional model is based upon a clear division of labor between research, education, extension and application. Each function exists within its own loop and only makes certain diplomatic exchanges at the margin. Self correction is within the loops as are the means for incentives.

The traditional system has worked well for many decades and is likely to work well for many activities for many more decades. However, for the forestry and natural resource professions our need to avoid obsolescence without being caught in following the latest cycle of fad, may require a different structure. In many parts of Asia the need for a different structure is certainly evident; practices and ecosystem characteristics of small scale, local, human resource communities are some examples.

Chart 2, page 9 illustrates the nature of this emerging system. Here the problem definition represents negotiation between the researcher, the clients, the resource management agency and the extension agent. This problem is then translated into the theoretical and methodological approaches of a particular discipline and submitted to rigorous testing. The findings are then directly fed to the beneficiaries who critique the relevance of the approach and outcome. Later, such findings trickle up to the researcher's peers and discipline. The advantage of this idealized model is its participatory nature. A decade ago Less Developed Countries expressed an analogous concern of being exploited by richer, developed countries' researchers without any apparent participation by or use to the host research country.

CHART 1
 TRADITIONAL SYSTEM OF NATURAL RESOURCE
 KNOWLEDGE PRODUCTION AND DISTRIBUTION



A further outcome of an emerging framework as suggested in Chart 2 is to return leadership to resource faculties and professional schools. Rather than having the problems and solutions be top down perceptions of donor or other outside groups--with miracle trees one week and community participation the next--the educators would be in touch with the emerging resource needs and would be leading the search for solutions. This model attempts to close loops between research, teaching, extension and application. Accountability is maintained within the full, interconnected loop, with clients having standing in decisions affecting their lives. Rigor for the scientific effort and the quality of teaching remain with disciplines and institutions, yet a wider community helps to direct attention and to critique outcomes.

I want to emphasize that these are two idealized models for organizing a system of knowledge production and distribution. Such models probably have only a coincidental relation to anything that exists in reality. However, the central point is for the reader to see that we greatly change the character of the knowledge system by manipulating how we organize that system. Indeed, the re-structuring of the knowledge system may have a much greater effect than manipulating course syllabi and curriculum requirements. It is an absolute certainty that simply manipulating course syllabi and curriculum without a corresponding change in the organizational structure, will have very little effect upon meeting the emerging pressures upon world forestry and natural resources management.

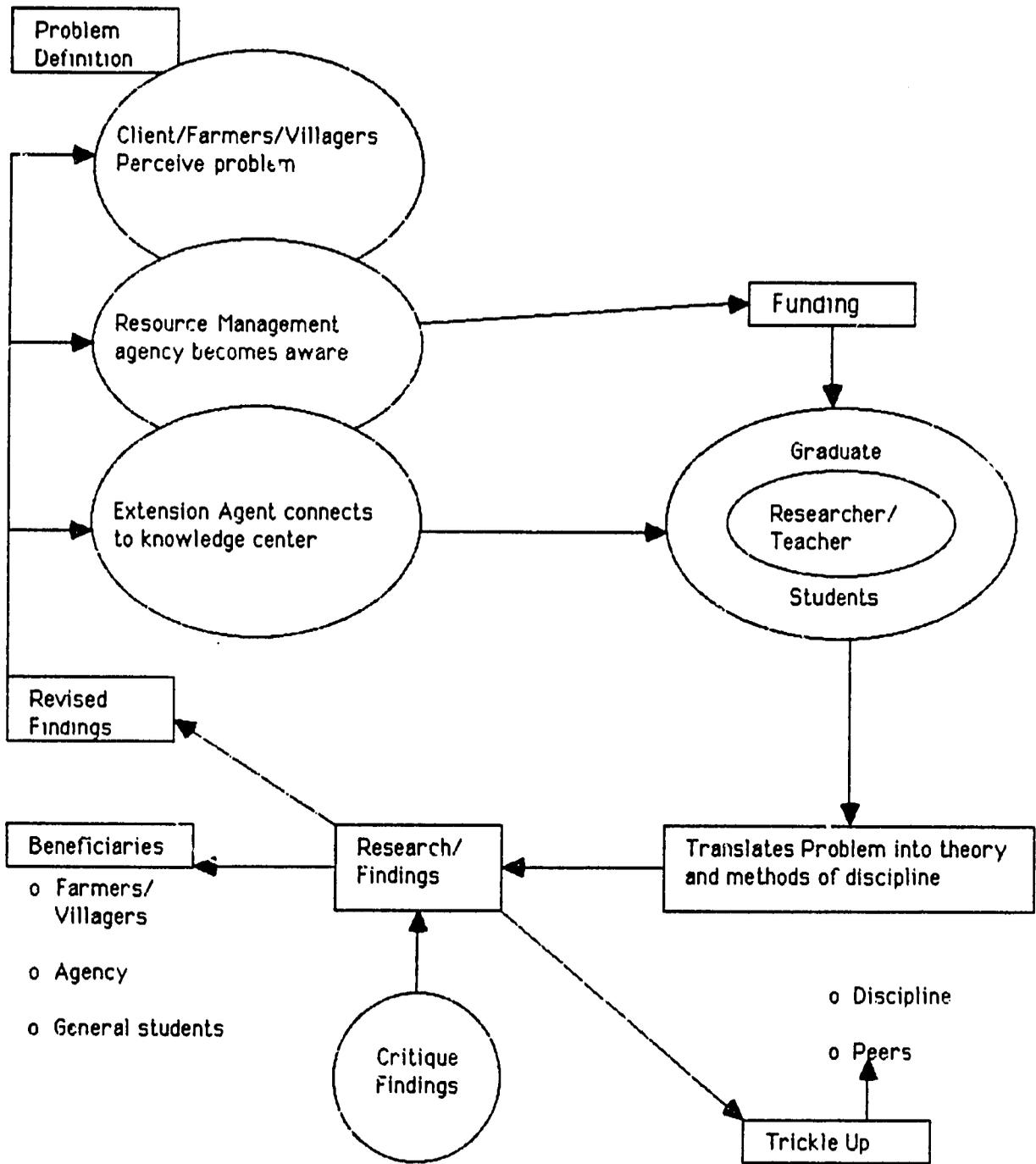
A second way to consider encouraging continuity and adaptability in curricula is to turn from the knowledge production and distribution system to the populations that drive the system. Essentially, these populations comprise the environment for the knowledge system. It is the interplay of the elements in the environment that establishes the tasks or occupational needs to which knowledge is directed.

That is, the occupational needs are never static. Some tasks once considered essential are no longer practiced while hundreds of jobs that were never considered a decade ago are now considered essential. The task of curriculum development is to anticipate the trends and patterns that shape those changes. In the words of the famous American philosopher, Kenny Rogers, "you gotta know when to hold and when to fold." That is, we need to anticipate which courses to hold as a core and which to alter or to close out.

There are many elements that comprise a professional educational program--students, faculty, administration, graduates, employing agencies and various population clusters in the general society. Each of these elements represent internally dynamic patterns with reasonably measurable and predictable aspects. There are basic population characteristics whose distribution dynamics shape highly probable outcomes. There are predictable life and career cycles that drive each of the elements. There are attrition rates as members of the various populations depart. And there are task cycles that drive patterns of each of the populations. Chart 3, page 12, attempts to indicate those external pressures that press curricula toward change and those internal pressures that inhibit the adoption of curriculum innovations.

CHART 2

EMERGING SYSTEM OF NATURAL RESOURCE KNOWLEDGE PRODUCTION AND DISTRIBUTION



Obviously these processes are more complex than any analytic approach can fully capture. That is, however, the nature of all of our applied research. We use these simplified models to guide professional action in the field. We can use them in the design of our training programs. Perhaps the most appropriate metaphor for our discussion is to think of an educational environment like the patterns and processes observed when several species of wildlife are sharing and interacting within a species grouping and between species groupings on the Serengeti Plain. The following discussion will add details for each of the elements.

The student element is dynamic and reverberates through the entire system. The size of the student pool and the size of the cohort as it passes through the system can greatly affect curriculum outcomes. For example, a substantial drop or increase in the size of the student pool can lead to actions that increase, decrease, or eliminate departments. Gender, ethnic and caste/class factors can have substantial influences. A shift from an all male student population to one that is 20 or 30 percent female, from an under-represented ethnic, class or caste group to one of majority representation alters the status and practice of an activity.

Student career cycles add a clear element of predictability from applicant to graduate and alumnus. At each stage of experience the cohort follows predictable behavior patterns and makes predictable demands upon the system. As attrition removes some members of the cohort it selects for those who conform to the demands of the system. Finally, the student cohort both reflects and creates fads and fashions in courses, disciplines and professional specializations. For example, the information media may present a vision of environmental crises, and peer values may change to favor acceptance of preservation values over utilization values. Hence, park and wildland management curricula may be fashionable whilst logging, engineering and other utilization courses may decline significantly in student demand.

The student population dynamics have a certain internal consistency, they must respond to the rules and regulations of faculties and administrative bodies. There is overlap between the regular processes of change driving the dynamics of the student population and similar processes driving the faculty population. Faculties have patterns of age, gender, class and other background elements. They follow regular pressures of life and career cycles and attrition rates. Often, the ranking of faculty do not have a mixed age and discipline structure, but are even-aged and single discipline structure. Many have populations skewed toward older faculty in higher ranks so there will shortly be a large number of retirements. Or it may be a predominantly male faculty when the student population has become predominantly female. Or we may have a large cluster of faculty in a particular discipline or specialization that were hired during one peak of a market demand, and now that demand has dried up and the faculty are unwilling to retool so we have an element in the system resisting adjustment to the changed environment.

Administrative populations overlap both students and faculty and though they have life cycle and career patterns like the other elements, their ranks, incentives and reward structures are much different. While the faculty has more of a collegial structure, the administrative structure is

hierarchical. Faculty persons appeal to peers for advancement, whilst administrative folk look to bureaucratic superiors for a promotion of usually a grade and/or salary increase.

Another difference is that the career cycles of faculty have some expectation of an orderly and gradual rise from lecturer to senior professor. For administrative persons there are real ceilings. No secretaries to the Dean have much hope in advancing to a deanship (though in reality many faculty might hope for such a shift.) Further, faculty express loyalty to a particular discipline or profession rather than directly to their institution, whilst administrative persons direct their loyalty to the bureaucratic structure that rewards them for such loyalty.

Never-the-less, administrative populations are usually responsible for seeking funds to sustain the institution, and therefore are often more in-tune to the emerging demands from the larger social environment. Also, administrative cohorts often have more contact with more of the students in a professional school than do any group of faculty persons. Consequently, administrative cohorts serve as early warning of changes in task or career. Faculties take a certain pride in resisting such warnings, treating them as merely "fads." The faculty, of course, seldom respond to fad, rather they carefully identify the changed scientific needs emerging in the future, such as the decline of botany and rise of molecular biology, and make appropriate prescriptions. At least, that is the image the faculty like to hold of themselves.

The employing agencies are often the most directly perceived clients for the products of professional education programs. We want these agencies to accept and to employ our graduates. Consequently, any curricula changes are made with one eye on how the agencies will react. In the United States during the 1960s several forestry programs broadened their employment base from the traditional government and industry agencies and trained people for the non-profit and environmental sectors. This antedated the dramatic decline in forestry jobs in the late 1970s and early 1980s. The programs that made the shift were well positioned to continue placing their graduates, whilst those who retained the traditional programs faced the prospect of their graduates accepting technical or sub-technical positions, or no positions.

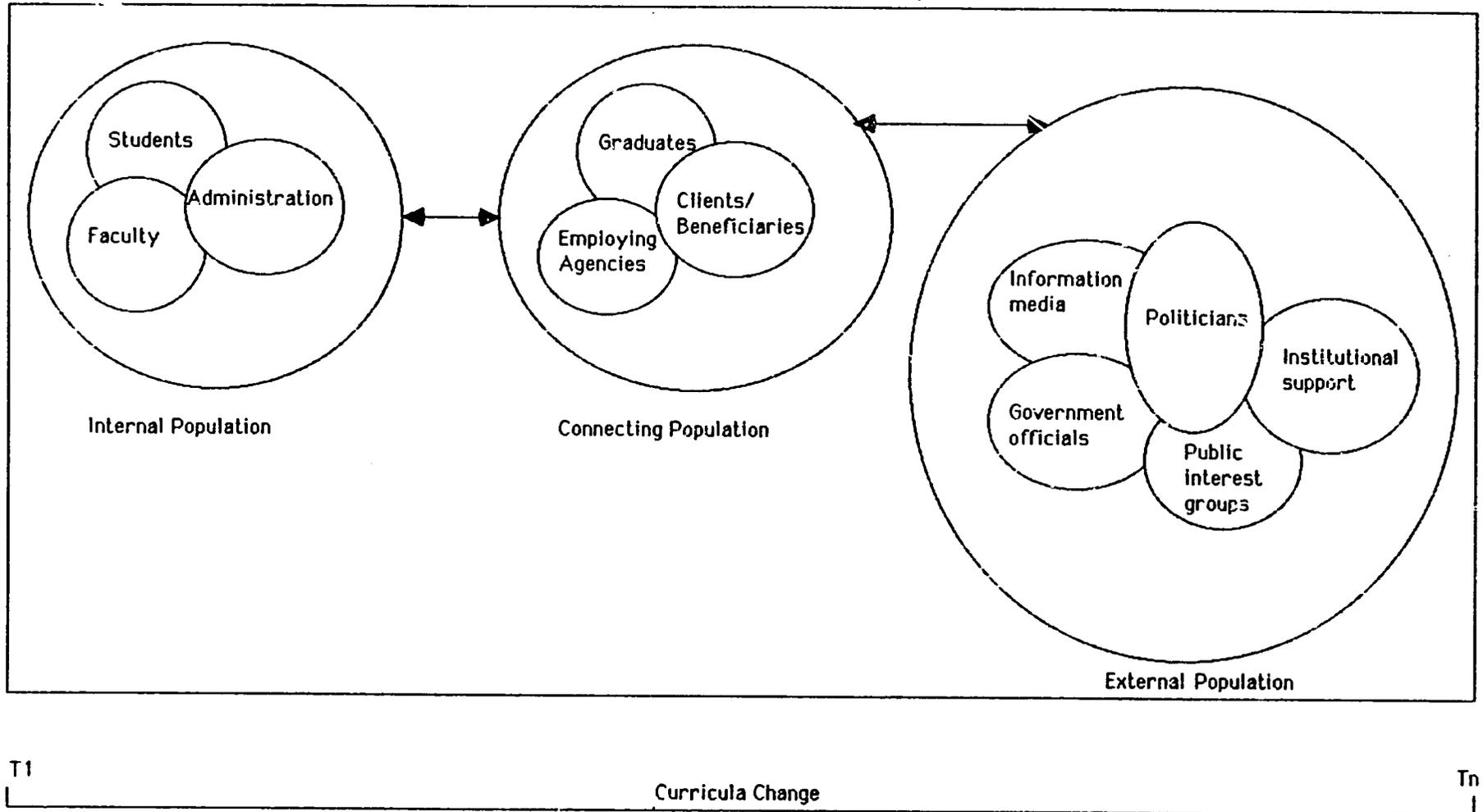
Employing agencies have their own cycles of growth and decline. Also, independent fee professionals follow a different pattern than those employed in private for profit extraction agencies. Consequently, analysis of the impact of curriculum change and development upon employing agencies would need to consider population growth and structure of a variety of potential agencies--independent professional associations; extractive private for profit and non-extractive private for profit organizations (e.g. wildland and tourist enterprises); private, nonprofit organizations such as foundations, activist groups, service groups and educational groups; and employment agencies without direct natural resource interest such as banks, construction firms, newspapers and so forth.

In the natural resources fields the client tends to be a collective entity--users of a national forest, a paper company, a home construction firm, a rural village. Never-the-less, we have some conception of the ideal

CHART 3

PATTERNS AND PROCESSES IN POPULATIONS DRIVING CURRICULA CHANGE

Patterns of Interdependent and Overlapping Populations That Affect Curricula Development:



12

Processes:

- o Population Dynamics
- o Career Cycles
- o Life Cycles
- o Attrition Rates
- o Political Cycles

typical client or beneficiary of our professional activities--women planting trees for fodder, shade and fuelwood, downstream towns that benefit from reduced flooding due to upstream plantings, a local sawmill that has a more dependable supply of wood. It is these clients and their changing needs and expectations that focus the changing patterns of the elements in the external social system. Clients are the source of pressure upon our curricula that is driven by the public elements. A professional training program that loses sight of its clients and the public elements behind them is a professional program soon to be displaced. The elements of the external system have their observable population dynamics and cycles of change. For example, in North America and Europe we have populations with an older median age. This means that a more articulate and politically active sector will demand services that are appropriate for their age, and will wonder why in public parks and forest lands the bulk of investments are devoted to the young and their wilderness desires. We may safely predict that soon courses and curricula for managing forest recreation services appropriate for elderly visitors to the forests will soon appear in many forestry schools in the US and Canada.

Though we like to think that curricula development is the result of wise people handing down some final solution that results from their in-depth commitment to basic principles of knowledge, we know that such abstract action is far from reality. All human groupings respond to patterns and processes in their ecosystem. They engage in political adjustment to present, past and anticipated futures and to the unequal distribution of scarce resources. A seriously rational approach to curriculum development will accept this reality and use it for making the best adjustments. Analysis of the relevant variables that drive the curriculum process seems as worthy as an analysis of the structure and functioning of the ecosystems we hope our students will manage.

Our analysis is not intended to encourage massive data collection and detailed reports. Rather, it is to remind us that how we organize our educational system is as crucial as what we put into a curriculum. Secondly, we must remind ourselves that there are social forces that can inhibit or redirect our curricula innovations. We should be aware of both processes if we are to have more rational control over the outcome of our well intended actions.

It is hoped that we have suggested some ways to identify opportunities and constraints upon certain desired organizational or course changes. For example, there are systematic differences in time scales, personal goals, incentives and participation between students and faculty. Students have 2 to 6 year time scales, while faculty have a potential of life tenure, hence students are impatient for change, whilst faculty (no matter whether their national politics are left or right) tend to be conservative regarding innovation, because they must remain present and accountable.

In terms of curricula the faculty have responsibility for the academic standards observed by the students, yet students are more concerned about their employment opportunities after graduation. Faculty have the power, but students may seek to leverage their power, and thus innovation in curricula, by developing coalitions with powerful alumni in major employing agencies to pressure the faculty to adopt changes. Similar opportunities

and constraints can be identified for the cumulative consequences of actions--independently and jointly by the player groups. In short, good intentions alone are no guarantee that good will result.

Table 1 sums our discussion. It lists those variables and processes which we should consider as we attempt to combine continuity with adaptability in our professional programs.

TABLE 1

ANALYTICAL APPROACH FOR CURRICULUM DEVELOPMENT AND CHANGE

Elements

- o Students
- o Faculty
- o Administration
- o Employing Agencies
- o External System--clients, etc.

Factors Affecting Changes

- o Political, Social, and Economic Structures
- o Institutional Patterns
- o Levels of Information/Knowledge

Interventions to Alter System

- o Organizational
- o Incentives
- o Requirements
 - courses
 - objectives
 - faculty
 - discipline mix
 - student recruitment
- o Information Systems

Constraints on Adopting Innovations

- o Timing
 - o Career Cycles
 - o Decision-making Structures
 - o Power Distribution
 - o Incentives
 - o Organizational Structure
-

The scheme I have outlined permits us to consider the complex set of overlapping and interdependent elements that affect curriculum development. Both the internal and external systems and the subsystem elements that drive them have certain basic, predictable processes that can give us greater understanding as to why and what the consequences are likely to be when we intervene or choose not to intervene in our professional education program.

The choice should be as rational as possible. If we wish a larger or smaller response lag, the gap between what we are expected to deliver and what we choose to deliver, then we should understand and analyze the forces that are creating these gaps.

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CHAPTER II

STRATEGIC CONSIDERATIONS FOR FORESTRY CURRICULUM REVISION AND DEVELOPMENT

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Abstract. This chapter discusses five strategic themes for forestry curriculum development. These themes focus on: 1) the need for a vision about the nature of the forestry profession and the education required by its practitioners; 2) systems approaches for curriculum development; 3) consideration of the internal and external linkages of a forestry education program with other parts of a university, with action and research agencies, and other individuals and institutions affecting professional practice; 4) educating professionals in problem-solving techniques so that they may cope with changing realities; and 5) utilizing pragmatic opportunism to take advantage of existing opportunities in forestry education programs.

Introduction

The following five strategic considerations for enhancing forestry curricula reflect the thoughts of participants at the Workshop on "Integrating the Social Sciences in Asian Forestry Curricula", the follow-up Workshop on "Curriculum Development", held at the Institute of Forestry in Pokhara, Nepal, and other references about contemporary curriculum revision in agriculture and natural resources management (See "Tools and Approaches for Curriculum Development"). The major strategic themes are:

- 1) A vision of the existing and emerging challenges to the forestry profession should guide the process of designing and implementing educational programs to prepare forestry practitioners and researchers.
- 2) Systems approaches to curriculum development should serve as a major guide to the process of designing the content of the curricula.
- 3) Integration and linkages (between and among institutions that directly and indirectly effect educational programs) should be acknowledged and reflected in curricula design and implementation of their development and change.
- 4) Dynamic and changing realities dictate that problem-solving and situation improving objectives should guide preparation of forestry researchers and field practitioners.

- 5) Pragmatic opportunism should be a fundamental strategy for taking advantage of existing opportunities in forestry education programs.

Vision

As a starting point, each institution should establish its own goals and objectives which will ensure more efficient and effective curriculum development. These goals and objectives become the fundamental guides for curriculum planning and reform. Whether they refer to the relevance between the course of studies and national priorities, to the quality of education, or to the need to meet future challenges of the forestry profession, these goals and objectives must clearly articulate a tone and direction for the educational program to follow. Vision statements might include an institutional mission statement that guides forestry undergraduate studies; a faculty mission statement that articulates the roles and responsibilities of an institution's faculty; a statement of a philosophical position for instance, "Knowledge without wisdom is dangerous" (Bahuguna, 1989:6) that guides the student's learning process.

Systems Approaches

Curriculum revision and development occurs within universities, colleges, and departments which are complex systems. The structures and functions of these systems must be understood. For instance, most forestry education programs have prepared professionals to do research or to work principally on the protection of government forests or the production of timber for commercial purposes. However, in recent years, social forestry, farm forestry, and recreation forestry have received more emphasis in professional forestry education.

Curriculum revision should attempt to understand specific aspects of the existing systems. For instance, some elements of a curriculum dealing with traditional approaches to forestry practice may be relevant and viable. Some may merely need improvement as the transition to new a curriculum evolves. The forestry curriculum revision and development process itself, therefore, must be guided by systems approaches which identify mechanisms to mold, manipulate and work within the systems so that curriculum development activities can be more efficient and effective.

Systems approaches also guide curriculum developers in understanding and addressing problems that are evident when the whole system's considered but might not be recognized on an element by element basis. Resolving one problem in a complex system may lead to problems elsewhere. For example, changing course content in a program of studies may not have a positive impact, no matter how appropriate the change. If at the end of the study program students are tested on traditional rather than new knowledge and skills, they may fail the standardized exams. In this case, curriculum revision alone cannot solve problems of an outmoded system; other parts of the total system must be changed as well.

Integration and Linkages

Traditionally, the forestry profession has been responsive to what had been defined as its clients--national governments and/or commercial lumber companies. Today, however, the profession is increasingly made aware that its clientele has been redefined. Clients now include: farmers wanting to include trees in their agricultural systems; villagers wanting woodlots for fuel and other goods; recreationists wanting places to relax and play; tribal peoples who traditionally have had access to and control over local forest resources until population pressures began to cause competition for those resources; landless people wanting food, fuel, fiber and other goods that are available to them only on public lands.

The educational preparation of many professionals has continued to reflect the old mandates for protection of government forests and production for commercial exploitation. Now that the mandate has been broadened to include new priorities due to linkages with other groups, institutions, and resource needs, the preparation of forestry practitioners should reflect this trend.

Systems approaches to curriculum development emphasize principally the internal parts, relationships and the structure and functions of a system in which curriculum is developed. It is equally important to emphasize integration with the linkages external to the system in which curriculum development takes place. Integration, for example, can occur when forestry faculty and specialists from other relevant disciplines (e.g., the social sciences) work together to plan and implement courses that serve the needs of field practitioners. Linkages can be made between academic institutions with local, district, national, and international institutions to enhance opportunities for meeting the research, education, and extension mandates of universities.

Integration and linkages are not necessarily natural occurrences. They must be identified, then cultivated and improved. They work best if they are mutually beneficial. They should be constantly evaluated for their appropriateness over time.

Facing Changing Realities

Reality changes for any number of reasons. Natural disturbances as well as legal, social, political, and technological developments can affect forest systems. Reality may also change because our perceptions of it change. For example, in recent years, we have suddenly "seen" that women are major food producers throughout most of the world when all along we assumed that men were doing all the work. In order to prepare professionals, curricula must provide them with the ability to address current and constantly changing realities. Universities, however, tend to isolate intellectual activities from the real world. A gap often exists between the real world and academic responses.

Therefore, university forestry programs, government agencies, forestry associations, and individual practitioners periodically should identify and

review the knowledge, skills, attitudes, and new functions of foresters and related specialists (e.g., social scientists). As the various forms of forest practice (e.g., industrial forestry, recreation, environmental management, public use of forests, rural development activities, subsistence forestry, community and village development, and tribal welfare) change, it is essential to understand how to deal with the current and emerging demands on professionals instead of prescribing traditional remedies that may no longer work. These reality checks help us to learn more quickly from our mistakes.

Pragmatic opportunism

A range of options exists for university forestry programs as they reorganize and innovate. Administrators and faculty must be realistic about every constraint and take advantage of every opportunity. In many cases, the programs should pick from the good "germplasm" of existing curricula and build on it. Thus, a combination of old and new may best serve institutional needs. In other cases, programs might consider "creative destruction", defined as the act of abandoning past, out-moded curricula in order to create different curricula founded on a vision of the future that prepares forestry students in new and better ways to meet the challenges of the profession.

Educational programs constantly must try to improve their quality while making do with existing resources. They can begin by identifying existing opportunities. This might include resources within their own faculties or in other departments or colleges at their institutions. It might include tapping resources and faculty that are accessible at other research institutions and universities when appropriate and feasible. For example, forestry faculties might draw more from the large body of knowledge that has already been developed in the area of agriculture-based rural development. The agriculture community has already learned to change many of its practices as it became increasingly aware that technological development alone would not ensure local adoption of new agricultural practices.

Forestry faculties also might identify new sources of knowledge that have traditionally not been tapped. For example, the indigenous knowledge of local people might serve as a tremendous source of information about the biological diversity, potential uses, growth patterns of various species, and reasons for poor production in some parts of a nearby natural forest. However, the skills (e.g., communications) needed to obtain this kind of knowledge are different than those of traditional forest inventories. Therefore, the education of practitioners may need to be expanded to take advantage of new opportunities. Here social technologies such as social sampling, survey, interviews, systematic observation, and social statistics may be most useful.

Conclusion

A range of strategic considerations for curriculum revision and development has been outlined. A vision of the profession and the educational programs needed to prepare future practitioners should guide

curriculum planners. Systems approaches help us to understand the complex, interrelated elements of the institutional context in which curriculum is planned and implemented. Academic programs must identify and strengthen linkages with other institutions that directly or indirectly affect them. They must strive for the integration of relevant disciplines/knowledge domains in order to enhance the preparation of their students. Problem-solving approaches help students face the changing realities of the forestry profession. And pragmatic opportunism can serve administrators and faculty well in their efforts to provide a quality education with typically limited resources.

The most significant message of this chapter, however, is that curriculum planners and implementors need strategic considerations to help guide the process. They, of course, will need to decide whether the ones outlined above and elaborated on below are appropriate or not for their institution.

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CHAPTER III

ALTERNATIVE APPROACHES TO CURRICULUM INNOVATION

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Abstract. Academic institutions across the Asia and the Pacific region have used a variety of approaches to innovate. This chapter outlines three different institutional approaches, denominated: top-down, front door, and back door. Also outlined are three approaches specifically relevant to the kinds of curriculum that might exist in an institution. These are core, spiral, and core competencies approaches.

Introduction

A variety of approaches to innovate in existing or emerging curricula exist. Each has its benefits and costs; each has its own set of challenges. Alternative approaches are important to investigate. Each alternative or a combination of alternatives must be adapted to the institutional context in which they occur. Essentially, any approach(es) must reflect the needs and "personality" of the institution. An approach must be designed and implemented to contribute to and improve existing curricula not dilute it. The approaches outlined below are not mutually exclusive. It is possible to choose several appropriate approaches at the same time or to follow one approach over time.

The following were identified as potential approaches during the series of curriculum development activities of the Social Sciences in Asian Forestry Curricula sub-project.

- o The Institutional Context
 - 1) Top down approach
 - 2) Front door approach
 - 3) Back door approach
- o The Curriculum Context
 - 1) Core approach
 - 2) Spiral approach
 - 3) Core competencies

Top Down Approach

The "top down approach" is a traditional approach in many forestry schools around the world. It implies that a bureaucratic structure essentially designs the course objectives, content, the course titles, educational materials, and testing instruments, and then imposes them on the institutions under its jurisdiction.

The benefits of this approach include:

- o everyone (administrators, faculty, students, future employers) knows exactly what is required and what is expected,
- o it is possible to measure accomplishment of educational objectives by directly testing for specific kinds of knowledge,
- o it is adequately geared to meet the objectives of government protection or large-scale commercial forest production.

The costs of this approach include:

- o it is often too rigid to respond to changing forest situations and demands placed on forestry professionals,
- o its learning objectives rarely include much more than rote memorization (of species, of prescribed solutions to management problems, etc.),
- o it is responsive only to a very difficult and long-term revision process that rarely permits much change.

Innovations typically are difficult to bring into top down forestry curricula, and the process of change is prolonged and often politically heated. While the innovations in a top down approach are possible, they are often limited. For example, when faculty training occurs, the trainee often has to return to a rigidly designed program where faculty receive few incentives to teach new material or introduce new learning opportunities.

The challenges here are to find mechanisms to institute changes within the existing system and making this a top down approach that has humanistic foundations. This implies changes in organizational attitudes about curriculum development and change. It implies viewing faculty and students of universities as valuable resources.

Front Door Approach

The "front door approach" can be applied in a situation where the institution's administrators sanction direct changes of course objectives, title, and content. For many, this represents a more "bottom-up" approach to curriculum development. In essence, it implies that curriculum change

can be made openly in the university system, and that to some degree it is encouraged. Depending on the institutions, this approach may be limited to certain periods of time when curriculum change is part of a process of general change, such as when a donor supports an institutional development project.

The benefits of this approach include:

- o it reflects and encourages more open and constructive dialogue between administrators and faculty,
- o it is officially sanctioned.

The costs of this approach include:

- o change is not easily accepted by everyone,
- o decisions have to be made, resources reallocated, etc., all of which have financial, organizational, and political ramifications in an institution.

The challenges of this approach are to find ways to encourage, sustain, and support positive changes and to minimize destructive conflict.

Back Door Approach

This approach is an adaptive strategy of many faculty members. It implies that changes can occur in course content, but that those changes are not always officially sanctioned. It is an approach that does not permit radical adjustments. The approach succeeds because of administrative acquiescence or lack of awareness rather than official approval in organizations where rigidities are circumvented carefully and with apparent good reason.

The benefits of this approach include:

- o positive changes in course content are possible,
- o it can be more responsive than traditional courses of study in preparing students to face the changing realities of forestry practice,
- o it can provide new information and skills to students who might otherwise not have access to them.

The costs of this approach include:

- o official sanctions against these changes can be difficult to overcome and it is risky for faculty members to undertake unsanctioned action,
- o little encouragement and support exists for the changes,

- o quality control usually lies solely in the hands of the faculty member,
- o students often bear the brunt of the innovations; for example, examinations test for traditional knowledge rather than for new knowledge obtained through "back door" efforts).

A major challenge of this approach lies in finding constructive ways to ensure that needed changes are made without disrupting the education of the students. Another challenge, it seems, would be to find ways for the faculty initiating a "back door" approach working with the existing system to change it, rather than continue to circumvent it.

Core Approach

The "core approach" deals with changes in forestry curricula. A "core" curriculum generally refers to the "core" program of courses that is required for a degree or for a specialization initiated for a specific degree. For example, Kasetsart University has recently added a Social Forestry core as a specialization within the wide range of forestry educational specialties and degree programs. Modifying the core is one approach to changing the kinds of courses, the objectives of those courses, and providing specialized knowledge and skills to foresters being prepared under that core program.

The benefits of this approach include:

- o the core is recognized and institutionally approved,
- o the institution has made a political commitment to developing a core curriculum that addresses specific specializations.

The costs of this approach include:

- o the core may become entrenched and relatively unchangeable through time,
- o a core may require students to limit their studies to courses within the core and limit opportunities to identify and participate in courses in other departments.

The challenges of this approach are to develop and sustain core courses of studies that meet student needs in preparation for their professional careers. Additionally, it is important to provide for flexibility in the design of the core so that it can continue to change within the bounds of the overall objectives in order to provide the best education possible.

Spiral Approach

The "spiral" approach refers to the integration (denominated "horizontal integration" at some institutions) of new knowledge into existing courses. The approach implies that a central curricular node

(e.g., silviculture, nursery management) exists around which new knowledge is intentionally and readily made accessible. The opportunities for instituting a "spiral" approach might include: 1) a core program of forestry management where specific social science courses are taught that enhance student understanding of theories and methods that might provide them with improved tools for work in local communities; or 2) a technical forestry course on nursery management which has a module (i.e., segment, series of lectures, field practicals or related educational activities) that specifically integrates social science theory and methods to ensure that foresters learn how to work with local people in the management of their own nurseries.

The benefits of this approach include:

- o it encourages the use of existing resources at an institution (e.g., someone from rural sociology might teach courses in the forestry school rather than training a forester in social sciences to teach the course),
- o it encourages mutual learning by foresters and their colleagues from other biological, physical, and social sciences,
- o it provides a new orientation to students who might not otherwise have time in their already busy schedules to take courses outside of their core program.

The costs of this approach include:

- o the need to develop incentives for faculty to work together or to modify their courses to include other knowledge domains,
- o loss of time for teaching more traditional information,
- o time, training, materials, and related costs to develop and teach spiral courses.

The challenges of this approach are to find ways to institute and support this approach. It can often achieve significant returns on an investment for an institution as it prepares forestry professionals.

Core Competencies Approach

An alternative approach to agricultural education, research, and extension has been evolving during the past decade at the Hawkesbury Agricultural College, now known as the Faculty of Agriculture and Rural Development in the University of Western Sydney. "The learning strategy for the programmes is now one of developing core competencies rather than specified knowledge. The competencies are autonomy as a learner, effectiveness as a communicator and ability to improve agricultural situations and solve agricultural problems" (Macadam, 1988:5).

The benefits of this approach include:

- o its application of systems approaches to both the design of curriculum and to the design of the content of specific courses,
- o the development of independent learning, problem-solving and other skills for students.

The costs of the program include:

- o obtaining faculty, administrative, and agency support for a program that does not require examinations,
- o providing incentives for radically modifying the structure of an institution's traditional mode of operation,
- o risks for students, faculty, and administrators who undertake a radically different approach.

While the Hawkesbury "core competencies" approach might be inappropriate for many institutions, its experience bears watching. Opportunities may exist for other academic institutions to identify appropriate mechanisms for adapting parts of the core competencies approach in their programs while maintaining their existing or emerging programs.

CHAPTER IV

FACTORS AFFECTING CURRICULUM DEVELOPMENT: SOME BASIC CONSIDERATIONS

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Abstract. This chapter outlines some basic considerations about factors that affect curriculum development. They include the kind, magnitude, level, timing, quality, and accessibility of innovations. These, can serve as a descriptive and analytical tool for curriculum planners; they can also identify, assess and monitor the potential impacts of each or a combination of curriculum development innovations.

Introduction

Curriculum designers and implementors should consider the following factors as part of the curriculum development process.

- 1) Kind of Innovation
- 2) Magnitude of Innovation
- 3) Levels of Innovation
- 4) Timing of Innovation
- 5) Quality of Innovation
- 6) Access to Innovations

The indicators and measures for each of these factors are not necessarily absolutes. The size (e.g., cost in financial and human resource terms) of an innovation for one institution may be large while it is relatively small for another institution. Every case will need a separate set of specific indicators, however, the general categories of factors and discussion of their nature and implications provide some preliminary guidelines to general areas of concern.

While these factors can be identified, described, monitored and analyzed separately, they should also be considered as an interrelated group. For instance, size alone may not be critical, but if the size (e.g., introduction of a large new core curriculum in a specialized area of study) is inappropriate for the timing (e.g., faculty have not been hired or retrained in the specialty yet) of the innovation, then the effort might fail. Thus, consideration of these factors can serve both as a descriptive and as an analytical tool for curriculum designers.

General criteria for analyzing each innovation or group of innovations are:

- 1) Appropriateness--Questions to ask might include:
 - a) Does the innovation reflect the context in which it takes place?

- b) Will the innovation accomplish some or all of the objectives of the curriculum goals?
 - c) What is the anticipated and/or real educational impact of the innovation?
 - d) Is the innovation relevant to professional practice, national development priorities, etc.?
- 2) Implementability--Questions to ask might include:
- a) Can the innovation be accomplished with existing and/or anticipated resources?
 - b) Does the innovation have support and cooperation from the government, the administration, the faculty?
- 3) Sustainability--Questions to ask might include:
- a) Does the innovation reflect a vision of future priorities, resources, and commitments of the institution? Of the profession?
 - b) Does the innovation enhance the quality of education of forestry professionals?
 - c) Does the innovation contribute to the process of achieving the educational goals and objectives of the institution?

Kind of Innovation

Innovations in curriculum to enhance the preparation of forestry professionals can vary. These might include a range of potential innovations, including ways to strengthen existing curriculum, enhance faculty capabilities, and modify government policies and bureaucratic processes that help or hinder curriculum development (See "Tools and Approaches for Curriculum Development").

Magnitude of Innovation

Innovations can be measured in absolute terms or relative terms. Absolute terms for the magnitude of an innovation might include the number of courses that are added to a concentration of study, the financial cost of the innovation, or the number of faculty members who receive graduate training. Relative terms for the magnitude of an innovation might include typologies such as large or small, and/or major or minor. The ambiguity of these relative terms acknowledges, for example, that training two faculty members at a small institution might be proportionally the same as training twenty faculty at a larger institution.

Absolute and relative indicators of size should be developed for each institutional context in which an innovation is proposed. These indicators

might include those noted above but should be designed to describe and analyze the magnitude relative to the needs, capabilities and resources of the institution, and the anticipated impacts of an innovation over the short, medium and long term.

Level of Innovation

The indicators for level of innovation may be the most straight forward factors. These might include:

- 1) Certificate level
- 2) Undergraduate program
- 3) Graduate program
- 4) Continuing Education program
- 5) Policy level
- 6) Administrative level
- 7) Course/individual faculty level

Once again, the set of indicators should be customized to the institution where the innovation in curriculum development is taking place.

Timing of Innovation

Like the magnitude of innovations, the timing of innovations may be described and analyzed in both absolute and relative terms.

Timing of innovations can be important. For example, innovations attempted during a period of general curriculum change might be made more easily than one attempted at another time when a more rigid curriculum process is in place. Or, introduction of a new course when no faculty member is trained to teach it probably will lead to failure.

Absolute measures of time might include the dates on which an innovation is to start, the date on which an innovation is to end, or the history or chronology of important events (e.g., dates new projects began, new core curricula initiated). Relative measures of time might include the sequence of innovation (e.g., should it happen before or after another innovation or activity? If it is too early what are the impacts? If it is too late what are the impacts?), fad time-periods (e.g., based on the experience of others, is this likely to be a fad that will "boom" and "bust" over a short period of time with little long term effect?), and time lags (e.g., What is an acceptable response time between the demonstrated need for an innovation and its introduction and implementation?).

Quality of Innovation

Maintaining and enhancing quality is a firm guideline for the introduction of any innovation. Again, this seems to be relative to the observer, analyst, or critic. For example, many Asian foresters would insist that the integration of the social sciences in forestry curricula would reduce the quality of the more traditional biophysical orientation offered at many forestry schools. Others might insist that an innovation of this sort will enhance the quality of field practitioners and forest researchers and that the quality of the education provided in the social sciences must be high.

Indicators of quality might include:

- 1) The capabilities (e.g., communications, field techniques, participatory skills) of forestry professionals to solve problems in the field have been improved.
- 2) New equipment, methodologies, etc., and training forestry researchers to improve their ability to conduct research have been provided.
- 3) Students test high on new examinations of problem-solving skills for forestry practice.

Access to Innovations

Means of introducing innovations and accessing new learning are addressed in this section. Some of the possibilities include the following.

From internal sources (i.e., use of existing or available resources such as faculty), the introduction of innovations might take place as an individual leader institutes changes or as a faculty or department leads changes in curriculum development. Internal access to innovation might come through team teaching at the department level with existing faculty or through intra-institutional connections (e.g., accessing faculty from other departments, faculties, colleges of a university).

From external sources (i.e., those external to the specific institution), the introduction of innovation might come from a centralized system of change such as a ministry of education or other institutional arrangement, or it might come from outside experts brought in to initiate and/or direct change. Access to innovation from external sources might come through inter-institutional connections (e.g., twinning with other institutions within a country or within a geographical region) or through regional networking (e.g., the FAO Forestry Educators Network).

Conclusion

Using each of the above categories of factors as a starting point, identifying, assessing and monitoring the impacts of individual and combinations of factors is then possible. For example, curriculum planners

would want to ensure that each kind of innovation is introduced at the appropriate time or to anticipate potential reductions in quality if a major innovation is introduced at the wrong time. Application of tools such as these can assist designers, implementors and evaluators in assuring the appropriate, implementable, and sustainable curriculum development in Asian forestry schools.

CHAPTER V

SUMMARY OF CRITICAL CONCEPTS AND CONSIDERATIONS FOR FORESTRY CURRICULUM DEVELOPMENT AND CHANGE

J. Kathy Parker and William R. Burch, Jr.

This volume has presented some critical concepts and considerations for forestry curriculum planners and implementors. These can serve as tools to analyze the relevant variables that drive the curriculum development process and guidelines to shape the direction of that process in an institution.

An analytical framework helps us think about the patterns and processes and causes and consequences of curriculum development. This system, like an ecosystem, is coherent and predictable, and interventions can be made to modify the system with reasonably predictable results. The overlapping and interdependent elements of a professional educational system that affect curriculum development are students, faculty, administration, and employing agencies. The structure and functions of these elements must be understood in order to make rational choices about the kinds of changes that will improve education of forestry practitioners.

Five themes guide the strategic planning and implementation of forestry curricula. Curriculum planners should articulate a vision of the profession and educational programs to prepare future practitioners. They should follow a systems approach to enhance understanding about the complex and interrelated elements of the institutional system in which curriculum development occurs. Academic institutions must systematically identify and strengthen opportunities to link with other institutions, individuals, and ideas that directly or indirectly affect the production of skilled practitioners. Problem-solving approaches are most appropriate to prepare students to face changing realities in the field. Finally, pragmatic opportunism must guide efforts to mitigate the constraints and take advantage of existing opportunities to provide a quality education.

Alternative approaches exist to innovate in existing and emerging curricula. Top down approaches reflect a traditional approach where a bureaucratic structure essentially imposes its vision upon course objectives, content, educational materials, and standardized examinations of an institution. Front door approaches to innovation occur where administrators sanction direct changes of curriculum. Back door approaches occur in more rigid programs where professors circumvent proscribed rules to innovate in existing courses, for example, by changing content while retaining the traditional course title. Core approaches refer to changes in the "core" curriculum where students complete a program of courses in a specialization initiated for a specific degree. A spiral approach refers to the integration of new knowledge into existing courses. And, finally, the core competencies approach uses new learning strategies to develop student

competence as learners, communicators and problem-solvers.

Some basic considerations of the factors affecting curriculum development provide guidelines to ensure that curriculum revision and development is appropriate, implementable, and sustainable. The kind, magnitude, level, timing, quality, and accessibility of various innovations are outlined and measures for them are presented.

These tools and guidelines, perhaps, can serve as a useful starting point for curriculum planners. However, the set of assumptions that guided the writing of this document should be clarified. First, curriculum revision is a particularly sensitive topic because it plays an essential role in defining the identity and organization of an academic program. Second, rarely is curriculum amenable to predetermined models and external advice. Third, forestry education institutions should constantly monitor, evaluate and modify existing curricula to ensure their continual relevance in meeting the ever-changing challenges of the forestry profession. Fourth, curriculum development and change requires a series of conscious decisions about the direction, the content and the process of curriculum reform that are appropriate to an institution at a specific point in time. Fads, time lags, and other political, social, scientific and natural events affect these decisions. Fifth, each institution should identify and apply appropriate and flexible strategies to design, develop and implement curricula to meet their own needs and goals. Sixth, a quality education must be maintained and/or improved as a result of curriculum revision.

The catalysts and contributors to this volume have been our colleagues in Asia. They have a pragmatic vision, based on their awareness of the realities of the complex problems that Asian forestry professionals must be educated to address. They are aware of the political nature and rigidity of their institutions' curriculum development processes and of the "disciplinary tribalism" of their faculties. They are also aware of their major current limitations--funding, knowledge, and teaching materials. Yet, they are taking the lead in curriculum reform. As one observer put it: "we are riding the wave; they, the Asians, are defining the way the wave is going."

While many of our colleagues may view curriculum change sympathetically, others with more traditional perspectives may not. In fact, many may resist change strongly. However, we must view all of our work as a learning process, a process in which we need to identify and strengthen our curricula to prepare future professionals to assume their roles as educators, field practitioners, researchers, and administrators in a profession that is striving to adjust in order to serve the development priorities of nations around the world.