Professional forestry education and forestry development in Central America

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A link is seen between the development of forestry education and the level of forest development in Central American countries, but opportunities for forestry education have been growing while opportunities for forestry employment have not.

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Opportunities for academic training in forestry are proliferating in Central America, but the demand for professional foresters is not – indicating a need for adjustments in education, including changes in curricula

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Forestry schools in Central America have proliferated over the past 30 years, and a number of new public and private universities are planning to consolidate programmes for training human resources in the forestry sector. However, the proliferation of schools is not evidence of any clear strategy; indeed it is paralleled by a drop in the job market for foresters.

This article briefly reviews the current professional training situation in Central American forestry schools and explores possible ties between the state of forest resources and the training of professional foresters. Asserting the strategic value of economic investment in forestry and in forestry education, it presents several recommendations for enhancing professional training in the subregion.

CENTRAL AMERICA: THE CURRENT SUBREGIONAL CONTEXT

Central America is still a poor subregion, where it is hard to find sustainable options for supplying food, housing, work, education, clean drinking-water and health care to a population of nearly 30 million. With the exception of Belize, the countries of the subregion (particularly El Salvador and Guatemala) have relatively high population density, on average almost 89 inhabitants per square kilometre (surpassed only by Asia) (FAO, 2001).

Overpopulation, poverty and illiteracy provide the basic explanation for pressures on economic and environmental resources. Where there are many mouths to feed, little money and a low level of education, development options are few; finding enough money to feed the family is the primary concern. Slash-and-burn agriculture, subsistence farming and overexploitation of forest resources will not recede if basic needs cannot be met. Thus the countries of the subregion have high rates of deforestation resulting from clearing of forests for permanent and shifting agriculture and grazing, and severe forest degradation caused by overharvesting of wood and non-wood forest products.

Forest management has not been an economically advantageous activity in any of the countries of the subregion. External economic interests have tended to concentrate on only one of forests' economically valuable assets: wood. Yet the Central American forestry sector is now emerging as an attractive field for economic investment in local and international terms. The subregion has a number of advantages: a strategic location close to markets, access to two oceans, growing signs of political stability, basic infrastructure, and the availability of natural and human resources at relatively low cost.

Guatemala, Honduras, Nicaragua, Belize and Panama are attractive for investment in forest management, possessing natural forest in amounts and concentrations to justify the investment. In El Salvador and Costa Rica, on the other hand, the population density, fragmentation of landholdings and forests, pressure to meet agro-alimentary needs and the scarce attention given to forest utilization in national policies complicate forest management. Costa Rica, however, has been able to stimulate forest development through successful conservation policies launched in the 1970s. Innovative strategies and mechanisms for financing the protection and management of forest resources have already led to significant recuperation of the country's forest cover. Costa Rica also has a strong institutional system with sufficient professional foresters to achieve sustainable forest development, and is now a reference for many other countries.

Reforestation can be an attractive investment possibility in countries with extensive land, experience in silviculture,

relevant legislation and relatively well developed socio-economic conditions. There may be abundant opportunities for development based on goods and services from tropical forests, such as bioprospecting, ecotourism and CO_2 fixation; yet growing trees is a long-term economic investment, financially unrealistic for property owners struggling to survive with short-term subsistence measures.

DEVELOPMENT OF HIGHER FORESTRY EDUCATION IN THE SUBREGION

Technical forestry education in Central America began in Guatemala with the Escuela Forestal Centroamericana, founded in 1960. Initially supported by the government, it trained 125 professional foresters but was later closed permanently.

The post-graduate school of the Inter-American Institute for Cooperation on Agriculture (IICA) in Costa Rica, now called the Tropical Agricultural Research and Higher Education Center (CATIE), has been in continuous operation since 1942. Apart from that institution, however, university-level education in forestry in the subregion originated with the foundation of several schools in the late 1960s and 1970s. Nicaragua began to train its own technical staff domestically in the 1980s. Most educational centres for forestry in the subregion have no more than 20 years of experience. Three schools have been established recently and have not yet turned out a graduating class (see Table).

In Central America the historical picture seems to indicate a direct and positive link between the presence of forestry schools and forest development. Costa Rica, Guatemala, Honduras and Nicaragua are considered the most highly developed countries in forestry in the subregion and have one or more forestry schools. El Salvador, Panama and Belize are less developed in this field and offer few academic opportunities in forestry. Panama has only recently set up a forestry school with a professional course of studies for forestry engineering. El Salvador and Belize have no forestry school. Belize is scantily populated and has abundant forest resources, so deforestation is not yet a prominent issue there. El Salvador, where most of the forest has been cleared and demographic pressure is strong, would require an approach different from the traditional one in the subregion, to focus more on ecosystem restoration.

TRAINED PROFESSIONALS IN THE FORESTRY SECTOR IN CENTRAL AMERICA

Some 2 785 professional foresters and technicians have been trained in the subregion (see Table). Of this number half are technicians and the remainder professionals, of whom some 13 percent hold degrees equivalent to or higher than the M.Sc. Most have been trained in forest management and plantation silviculture. The number of professionals is less important than the fact that these people have been trained in the actual socio-economic and environmental context in which they are expected to work.

This group of foresters is augmented by a number of professionals trained outside the subregion, bringing the total number to perhaps 3 000 (excluding professionals from related areas such as agronomy and biology), which would mean one forester for every 10 000 inhabitants or for every 17 000 ha (a very high ratio). However, the distribution of professional foresters around the subregion is uneven.

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Today's foresters must consider the forest ecosystem (natural or planted) in a holistic manner – and wood is only one of its components

Supply of professionally trained foresters and forestry technicians in Central America

Country	Professionals educated	Founded	Total professionals reported
Belize	No forestry school		9
Guatemala	Escuela Nacional Central de Agricultura (ENCA): 167 foresters	1987	544
	Centro Universitario del Petén (CUDEP): 27 forest technicians	1987	
	Centro Universitario del Nor-Occidente (CUNOROC): 112 forest technicians, 38 forestry engineers	1977	
	Facultad de Agronomía de la Universidad de San Carlos (FAUSAC): 200 forestry engineers	1982	
Honduras	Escuela Nacional de Ciencias Forestales (ESNACIFOR): 800 foresters, forest experts and forestry engineers	1969	931
	Centro Universitario Regional de Litoral Atlántico (CURLA): 256 forestry engineers	1967	
	Universidad del Valle: no graduates as yet	1999	
Nicaragua	Universidad Nacional Agraria (UNAA): 195 agronomists/foresters	1980	325
	Instituto Técnico Forestal (INTECFOR): 130 forest technicians	1985	
	Universidad de las Regiones Autónomas de la Costa Caribe Nicaragüense (URACCAN): no forestry graduates as yet	1995	
El Salvador	No forestry school		15
Costa Rica	Instituto Tecnológico de Costa Rica (ITCR): 276 forestry engineers (B.Sc.), 75 wood engineers (B.Sc.), 11 forestry engineers (M.Sc.); 1 accredited master's degree	1976	811
	Universidad Nacional (UNA): 277 forestry engineers (B.Sc.), 44 forestry engineers (M.Sc.)	1976	
	Fundacion Escuela de Reforestación de Costa Rica (FERCO): 150 forest technicians	1995	
	Instituto Nacional de Aprendizaje (INA): 30 forest workers	1990	
Panama	University of Panama, Faculty of Agricultural Sciences: no graduates as yet	2000	150
Total[a]			**2 785**

[a] Not counted here are the 350 M.Sc. graduates and international experts reported for the subregion by CATIE.

Yet despite the magnitude of the challenges to Central American forestry – in forest management, reforestation, rehabilitation of degraded land and ecosystem restoration, forest extension and research – Costa Rica, Guatemala and Nicaragua are already showing signs of saturation in the market for professional foresters.

This is not a sign that there is no need for educated foresters. The simple explanation is that the owners of forests and woodlands cannot afford to take on the cost of professional advice. In addition, in some countries (e.g. Costa Rica) there is a disproportionate number of professionals with higher degrees who are costly to hire and reluctant to work in rural areas, and fewer technicians prepared to work in the forest. In other countries (e.g. Honduras) the proportions are more balanced. However, in most cases the fundamental problem is that the work of the professional forester is characterized by unattractive working conditions and very low salaries.

Governments have other priorities, and the reduction of public expenditure has seen the State go from top employer to a low position in the marketplace for professional foresters. This could also be due to the fact that forestry schools are not offering the type of curriculum that the new generation of forestry students needs. Meanwhile, traditional foresters, i.e. those who have not adapted to the changes of today's world, are taking decisions as they see fit, with too little recourse to technical assistance.

Unfortunately, the presence of professional foresters and technicians is not in itself a sufficient response to the for-

estry challenge in the subregion. The professional forester, in the absence of clear and stable forestry policies, proper funding and forward-looking, investment-minded forest landowners, works in isolation.

QUALITY OF FORESTRY EDUCATION

The relation of forestry education to forestry development has been noted above. Investment and innovation are needed to cement that link and to ensure that forestry education prepares students to address current and anticipated problems in Central American forestry. Most human resource training centres lack the necessary facilities and equipment and properly trained teaching staff for effective forestry education (Reyes, 1991; Musálem and Cozzi, 1993; Rojas and Galloway, 1999; Rojas, 2000). Instructors tend to lack specialization; one professor may teach up to five courses in significantly different forestry subjects.

A trend towards reduced public expenditure is worsening the situation; university professors are paid low salaries, and in some educational centres scant resources are earmarked for upgrading academic and research staff. Most training centres do little or no research or extension work; as a result there is a risk that teachers are only able to inform students, rather than actually training them.

To ensure excellence in professional forestry training in Central America, a number of changes are recommended, shown in the Box.

CONCLUSIONS

Like the supply of professional foresters and technicians, the academic training on offer in Central America is growing by leaps and bounds. The worrying thing is that the demand for professional foresters is not growing, and this indicates a pressing need for market studies and adjustments in training and education, including changes in curricula.

The link between forestry development and an educated forestry workforce underlines the need to provide professional opportunities for educated foresters to enhance the environment and people's livelihoods in Central America.

Clear market signs (changes in the dimensions of wood as a primary material, recognition of the environmental services provided by forests, the development of information and geographic information systems, and commercial relationships such as free trade agreements) demonstrate the urgent need for planning and reform of professional forestry education in the subregion.

Silviculture is and will remain a mainstay of the forestry curriculum; yet new strategic areas of the profession must be swiftly incorporated into the curriculum. The subregion still needs professional foresters with a good grasp of silviculture, but it also needs determined professionals with knowledge of social, economic and environmental issues to help improve the quality of life of their fellow citizens. Central American society requires innovative, enterprising professionals with initiative and a highly pragmatic approach to problem-solving.

An alliance of Central American forestry teaching institutions that would lead to sound, continuous and sustainable exchange of academic experience is an urgent need that cannot be postponed.

Investment in forestry education is crucial to provide access to up-to-date technology and the latest information to produce the kind of professional needed today in Central America. Working professional foresters need to have opportunities for retraining so they can keep up with today's standards of professional excellence. ◆

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Research opportunities are important to train students, rather than merely inform them

Recommendations for obtaining excellence in professional forestry training in Central America

Improvement of courses and curricula

Periodic reviews of course content
In-depth review of teaching and learning methods
Harmonization of curricula with the current context
Establishment of a system of teacher training and refresher courses, including exchanges
Introduction, strengthening and proper use of virtual teaching strategies
Allowing time for elective courses on a routine basis

Standardization of programmes

Development of an effective evaluation process and accreditation
Standardization of the curricula of different training centres
Design of textbooks for distribution throughout the subregion (as initiated by CATIE through its Tranforma Project, which aimed to raise the level of forestry instruction at the university level in the subregion, partly through the distribution of teachers' guides)
Establishment of a clear and coherent subregional system of titles and degrees

Improving links with the professional world

Strengthening of practical training for future professional foresters
Establishment of a permanent system of feedback between graduates and potential employers
Establishment of linkages between the forestry schools and public and private institutions and non-governmental organizations (NGOs)
Development of strategies for reducing professional unemployment, particularly for professional women, who tend to be sidelined at present
Education in ethics to defend the profession from corruption and other pitfalls to professional dignity

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Strategies are needed to improve employment opportunities for professional women in forestry

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