How agroforestry is taught in Southeast Asia

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a status and needs assessment in
Indonesia, Lao PDR, the Philippines,
Thailand and Vietnam

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Preface

Academic institutions in forestry, agriculture and natural resources management increasingly teach agroforestry. This is a response to the growing need for people trained in sustainable development of the uplands of Southeast Asia. The incorporation of agroforestry into educational programmes started more than 20 years ago, and is still going on. A number of regional meetings and initiatives in Southeast Asia have catalysed this development, among them a *Roundtable discussion on agroforestry education in Southeast Asia,* organized by the International Centre for Research in Agroforestry (ICRAF) and Asia Pacific Agroforestry Network (APAN) in November 1994. At this meeting, six universities in Indonesia, the Philippines and Thailand developed a proposal for regional collaboration on agroforestry education.

An important step towards regional collaboration was taken in 1997–98 through an ICRAF-coordinated assessment of the status and needs of agroforestry education. The study, supported by the Swedish International Development Cooperation Agency (Sida), covered universities and colleges in Indonesia, Lao PDR, the Philippines, Thailand and Vietnam. This report summarizes the results.

The work resulted in a proposal to establish the Southeast Asia Network for Agroforestry Education (SEANAFE), expected to be formed in 1999. We hope and expect that the network will help shape educational programmes in forestry, agriculture and natural resources management in Southeast Asia, to address the challenges of the next millennium.

Dennis Garrity
Regional Coordinator

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Per G Rudebjer and Romulo A del Castillo

Summary

This reports presents the results of a regional study on agroforestry education and training in five Southeast Asian countries: Indonesia, Lao PDR, the Philippines, Thailand and Vietnam. The project was coordinated by ICRAF, in collaboration with the Institute of Agroforestry, University of the Philippines Los Baños, and supported by the Swedish International Development Cooperation Agency (Sida). Data was collected through questionnaires and institutional visits and analysed in five national meetings and two regional workshops, all during 1998. Five country reports were written by ICRAF-appointed Education Fellows in April–July 1998. An overview of regional organizations linked to agroforestry education was done by ICRAF.

The underlying hypothesis was that there is a great demand for high-quality agroforestry education, and that a regional mechanism would be helpful in advancing tertiary agroforestry education in Southeast Asia.

At the regional level, the study showed that there are many common areas of needs and experiences among educational institutions in Southeast Asia, but very limited mechanisms for collaboration, nationally as well as regionally. Agroforestry education is hampered by inadequate or outdated curricula, lack of minimum standards, and obstacles to agroforestry curriculum development. Lecturers require further training for effective teaching, and continuous updating to benefit from developments in agroforestry research.

There is a general shortage of relevant and high-quality training materials, including textbooks, manuals and case studies. Existing teaching materials require updating and translation. Often, universities and colleges have inadequate human and material resources to develop research capacity in agroforestry, particularly at graduate level. There has not been a systematic survey of education and training needs in agroforestry.

Agroforestry is yet to be recognized as a field of specialization in many schools, and there are no specific government jobs in agroforestry.

Other issues apply at both national and regional level, notably that:

- agroforestry education is not adequately linked to the field, or properly linked to research and extension
- available country and regional resources are not adequately tapped.

Certain issues refer to the national or institutional level:

- inadequate or uncoordinated institutional and policy arrangements
- unclear or varied perceptions of agroforestry
- inadequate numbers of agroforestry lecturers, limited teaching materials for distance learning, and
- general lack of, or access to, field practical facilities in agroforestry.

At the same time as these needs are clearly expressed, there is a considerable, and growing, interest in agroforestry development in the five countries in this study. Educational institutions are responding to this growing interest in several ways: They increasingly include agroforestry in their educational programmes, as a topic, as a course or as a full programme. Many institutions have plans to further increase or develop their agroforestry education. Several institutions offer graduate research opportunities in agroforestry. Short-term training courses are also offered for a wide clientele in many institutions. At the national level institutions join forces in agroforestry education: the Philippines established a national network for

agroforestry education in 1998. Vietnam has a network on social forestry education that also addresses agroforestry aspects. In other countries there is informal collaboration among institutions and teaching staff involved in agroforestry.

The participants in this initiative has agreed to tackle these needs also at a regional level, through the formation of a Southeast Asian Network for Agroforestry Education (SEANAFE).

Chapter 1

Status and needs assessment 1998—a regional overview of agroforestry education

Background and methods

Land use changes in Southeast Asia

Southeast Asia is facing rapid changes in land use. There are many reasons for this: increasing population and spontaneous or government-supported transmigration; years of economic growth that increase consumption and thereby the pressure on natural resources; and lack of areas for new settlement, which demand intensification of land use, to mention a few.

The result in many areas has been declining quality of the natural resources. Concerns about food security, increasing awareness of the needs to protect biodiversity, and worries about global warming are reasons why governments in Southeast Asia are looking for sustainable alternatives in the use of natural resources. This may involve dramatic policy changes. For instance, both Laos and Vietnam are currently allocating land to farmers, thereby changing the traditional land-use patterns.

Often, the changes mean that intensification of agriculture is needed, for instance, when shifting cultivation is no longer sustainable. Agroforestry alternatives are increasingly in demand. In addition, traditional disciplines—forestry and agriculture—change. In forestry, social forestry, community forestry, and joint forest management have become / are becoming important areas. In agriculture a more holistic view of land management is gaining ground, e.g. through conservation farming, and SALT (Sloping Agriculture Land-use Technologies).

This needs to be reflected in tertiary education, in old and new educational programmes. Traditional disciplinary boundaries need to be replaced by interdisciplinary approaches to education.

Earlier initiatives for agroforestry education

During the past decade, several initiatives have been taken to develop agroforestry education in Southeast Asia. These are:

- A national workshop on developing agroforestry curricula, organized by the University of the Philippines Los Baños (UPLB) Agroforestry Program in Los Baños, Philippines, November 1992.
- A regional expert consultation on developing curricula for agroforestry and community forestry in Asia, organized by the Asia Pacific Agroforestry Network (APAN) and Chiang Mai University in Chiang Mai, Thailand, June 1993.
- A roundtable discussion on agroforestry education in Southeast Asia, organized by the International Centre for Research in Agroforestry (ICRAF) and APAN in Bogor, Indonesia, November 1994.
- Philippine Agroforestry Education Needs Assessment (PHILAFENA)—a project initiated to identify and profile agroforestry schools, and appraise the status of agroforestry education, 1995–1996.

- Philippine Agroforestry Education Research Network (PAFERN)—launched to serve as a mechanism for facilitating communication exchange and to enhance agroforestry education development, 1996.

The Bogor roundtable meeting involved deans or their designates from six leading universities in Indonesia, Thailand and the Philippines. It led to the formulation of an inter-university programme proposal to strengthen agroforestry education in Southeast Asia. Although not funded in its original form, the proposal laid the ground for the study presented in this report.

The Southeast Asia Initiative for Agroforestry Education

This status and needs assessment was carried out during October 1997–December 1998, coordinated by ICRAF SE Asia. It was supported by Sida and covered five countries. The initiative drew upon the experiences and lessons emerging from the African Network for Agroforestry Education (ANAFE), coordinated by ICRAF since 1993.

The initiative involved some 20 leading universities and technical colleges in agriculture, forestry and natural resources management, in Indonesia, Lao PDR, the Philippines, Thailand and Vietnam. During this modest initial phase, two regional workshops and five country studies were organized to assess the status, needs and issues, and to prepare a long-term strategy to strengthen agroforestry education in the region.

Objectives and activities

The overall objectives of the Southeast Asia Initiative for Agroforestry Education were to:

- explore the needs for regional efforts to strengthen tertiary agroforestry education in Indonesia, Lao PDR, the Philippines, Thailand and Vietnam
- develop a strategy for this regional collaboration
- define the mission and direction of a possible future regional network, the Southeast Asia Network for Agroforestry Education (SEANAFE)
- identify key institutions, resource persons and regional partners and secure institutional commitments and consensus among those.

The project followed a stepwise strategy—developed during ICRAF's regional planning workshop in August 1998—with the following main activities (Figure 1.1):

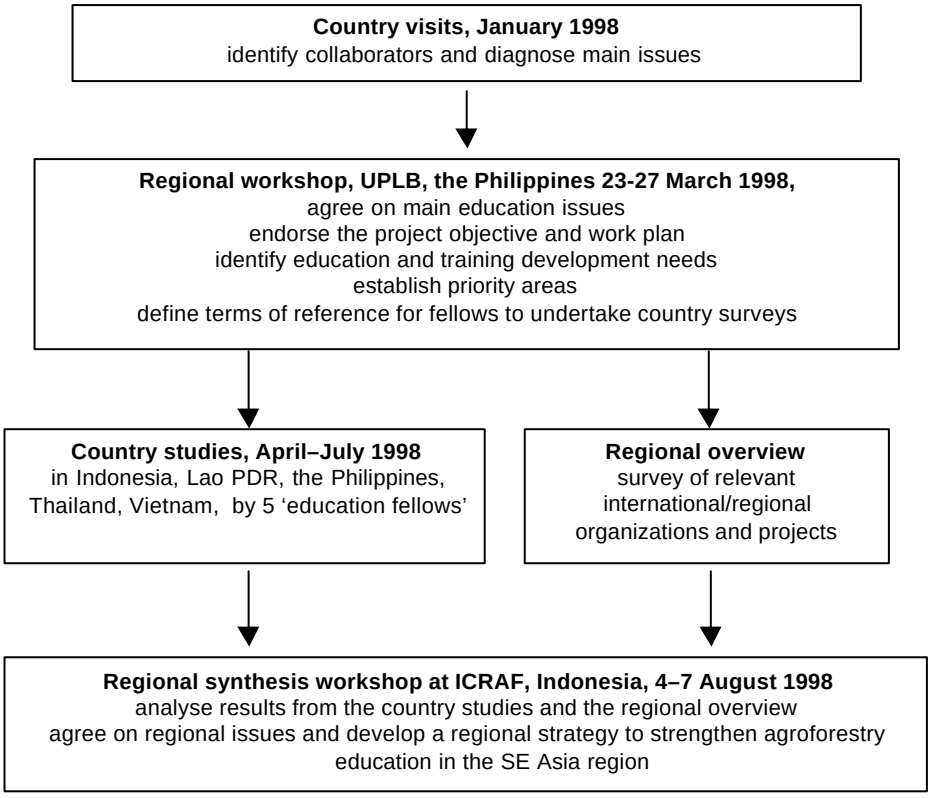

Figure 1.1. Activities during 1998 under the Southeast Asian Initiative for Agroforestry Education.

Areas of concern

The needs assessment focused on a broad spectrum of aspects on agroforestry education: the historical background of agroforestry education; agroforestry curricula offered at different levels of education; students' recruitment, admission and enrolment, and graduates profile and employment prospects. Other aspects studied were existing facilities such as library resources, teaching materials, laboratory facilities; research and extension activities; institutional links; and institutional development needs and plans (Annex 1.1).

These areas were the backbone of the study, while the method of collecting the data varied. Institutional presentations, questionnaires and institutional visits were the main sources. In the following, each step in the data collection is described in greater detail.

Participating institutions

Five countries were included in this study. The choice reflected the countries of ICRAF's regional programme (Indonesia, the Philippines, Thailand) and countries with which the donor, Sida, has had long cooperation (Lao PDR, Vietnam).

An ICRAF team, consisting of Romulo A del Castillo, Senior Agroforestry Education Fellow and Director, UPLB Institute of Agroforestry, the Philippines; Bruno Verbist, Associate Training Officer and Chun K Lai, Senior Capacity Building Specialist, visited Vietnam and Laos in January 1997 to select potential partners for the Initiative. In Indonesia, the Philippines and

Thailand, the choice of institutions was made in consultation with the ICRAF offices in the respective country. The following institutions were selected:

Country	Institution
Indonesia	• Institute Pertanian Bogor (IPB), Bogor • Universitas Gadjah Mada (UGM), Faculty of Forestry, Yogyakarta • Universitas Lambung Mangkurat (UNLAM) Faculty of Forestry, Banjarbaru • Universitas Mulawarman (UNMUL), Samarinda, East Kalimantan • Universitas Brawijaya (UNIBRAW), Malang
Lao PDR	• National University of Lao, Faculty of Agriculture and Forestry, Vientiane • Northern Agriculture and Forestry Extension and Training Centre, Luang Prabang • Southern Agriculture and Forestry Extension and Training Centre, Savannakhet
The Philippines	• Benguet State University (BSU), College of Forestry, BSU, La Trinidad Benguet • Dingle Agricultural and Technological College (DATEC), Dingle, Iloilo • Misamis Oriental State College of Agriculture and Technology (MOSCAT), Claveria, Misamis Oriental • University of the Philippines Los Baños (UPLB), Laguna
Thailand	• Chiang Mai University, Faculty of Agriculture, Chiang Mai • Kasetsart University, Faculty of Forestry, Bangkok • Khon Kaen University, Faculty of Agriculture, Khon Kaen, Thailand • Prince of Songkhla University, Faculty of Natural Resources, Hat Yai, Songkla
Vietnam	• Vietnam National University of HCM City, College of Agriculture and Forestry, Thu Duc District • Forestry College at Xuan Mai, Forestry College, Xuan Mai, Ha Tay • Thai Nguyen University, College of Agriculture and Forestry, Thai Nguyen Province • Vietnam Agricultural Science Institute (VASI), Thanh Tri, Hanoi
Other partners	• Universiti Putra Malaysia (UPM), Faculty of Forestry, Serdang, Selangor, Malaysia • FAO Regional Office, Bangkok • Regional Community Forestry Training Centre (RECOFTC), Bangkok, Thailand • HELVETAS (the Swiss Development Cooperation)—Social Forestry Support Project, Hanoi, Vietnam • ICRAF

Regional workshop on agroforestry education, Los Baños, the Philippines, 23–27 March 1998

This section summarizes the Regional Workshop on Agroforestry Education in Southeast Asia, held at the University of the Philippines, Los Baños (UPLB) on 23–27 March 1998. The workshop was organized jointly by ICRAF and UPLB Agroforestry Programme, as part of the Southeast Asia Initiative for Agroforestry Education. A list of participants is attached in Annex 1.2.

The regional workshop enabled representatives of some 20 key educational institutions in the region to jointly:

- present and assess the status of agroforestry education in selected institutions
- identify needs and issues related to the teaching of agroforestry in the five countries
- make preliminary recommendations for regional collaboration, in order to enhance tertiary agroforestry education in the region
- plan for a more detailed collection of baseline data on agroforestry education and training through studies in each of the five countries.

The institutional presentations and the discussions during the workshop showed that the status of agroforestry education differs considerably among the five countries, the Philippines having the most developed agroforestry programmes. Very briefly, the national situations were described as follows:

Indonesia

- At BSc level, agroforestry is not a recognized study programme; it appears only as elective courses—there is a need for curriculum development and policy change
- Teaching staff is of adequate quality, but unevenly distributed among institutions
- Availability and maintenance of physical facilities is an issue
- 'Agroforester' is a new job, not widely known to the public
- There is a need for structured research in agroforestry
- There are opportunities to strengthen existing collaboration among institutions.

Lao PDR

- Currently, there is no MSc education in agroforestry in Lao PDR, but the subject is taught in BSc and higher diploma programmes, and in non-formal training
- There is a great need for more and better trained agroforestry teachers
- English language skills are weak, which limits the access to foreign literature and information
- Physical facilities need attention, particularly libraries
- Students are weak in basic sciences
- There is a lack of developed research programmes.

The Philippines

- Twenty-four universities and colleges in the Philippines teach degree programmes in agroforestry at different levels. The programmes offered include five different BS programmes in agroforestry, a postsecondary diploma, a postbaccalaureate diploma and MS agroforestry programmes.
- Curricula need modernizing
- There is an inadequate number of agroforestry teachers
- Access to demonstration areas and sites for practical studies is not satisfactory
- Students have a tendency to be attracted to new education programmes
- Self-employment for agroforesters is important, while the career paths in government agencies are still a constraint
- Funding for research is limited
- The existing informal national network of agroforestry education institutions in the Philippines could be formalized.

Thailand

- Agroforestry is offered in various programmes, such as social forestry, forest resource management, soil science and earth science. But bureaucracy is a constraint to curriculum development.
- There is inadequate coordination among teaching staff of agroforestry courses
- There is a need for demonstration plots, and for improved libraries

- Graduates may not find jobs in the field of agroforestry
- There is a need for a participatory approach in training
- Most research is component-oriented. Only some is interdisciplinary
- The Council of Deans in Agriculture and Environmental Sciences is a good channel for curriculum development.

Vietnam

- There is an urgent need for agroforestry and community forestry, and a corresponding need for improving agroforestry curricula
- Teachers lack a background in social sciences including tools for rural development
- Facilities for teaching and research are in short supply
- The quality of students is decreasing; other areas of study are more attractive. There is a need to encourage young rural people to study agroforestry, with priority given to ethnic minorities.
- Refresher courses for ex-students are needed
- More job opportunities for agroforestry graduates are desired
- Many interesting topics need to be researched, for instance land-use systems for allocated lands, or community-based development in the uplands
- The interest in institutional links is great, but possibilities are limited by distance, and by lack of infrastructure or funds.

Regional issues and opportunities

The workshop participants analysed the national situations described above, and agreed on a number of regional issues and opportunities for collaboration on agroforestry education. This discussion revealed the following picture (Table 1.1):

Table 1.1. Regional issues, identified by workshop participants

Area	Regional issues
Agroforestry curricula	There is a concern about minimum standards (quality) of agroforestry curricula, and a curriculum guide is desired. Guidelines for integrating agroforestry in forestry and agriculture courses would also be useful.
Teaching staff	Training of agroforestry teachers is an important opportunity for regional collaboration, for instance through staff exchange programmes, or joint staff training. However, language skills among teachers may be an obstacle to collaboration.
Teaching facilities	There is a great demand for teaching materials on agroforestry—materials that need to be purchased, developed, exchanged or translated. The Internet is now also a channel for information exchange. Further, there is a demand for sharing or developing case studies, and for demonstration sites.
Students & graduates	This is an area where regional collaboration could make a difference, for example through student exchange, thesis research grants in agroforestry, sharing of information on job opportunities regionally, and marketing of agroforestry graduates.
Research	Collaboration would strengthen agroforestry research, e.g. sharing research capacity across universities, sharing information on agroforestry research methods, and joint identification of funding sources for research.
Extension	Since many universities also have an extension mandate, extension can help provide agroforestry specialists in training programmes. A regional mechanism could also help exchange of extension materials, assisting in publication of case studies, manuals etc.

Table 1.1. Regional issues, identified by workshop participants, continued

Area	Regional issues
Policy	There is a need to promote agroforestry as a profession, and to influence policy makers involved in curriculum development. One way of doing so is to arrange meetings and workshops with policy makers.
Institutional links	A regional agroforestry education network in Southeast Asia would be useful in optimizing available resources. It would link existing local, national and regional networks.

Finally, the participants agreed to endorse the continued work towards the establishment of a Southeast Asia Network for Agroforestry Education (SEANAFE).

Second regional workshop, Bogor, Indonesia, 4–7 August 1998

In a second regional meeting, representatives of 10 universities in Indonesia, Laos, Philippines, Thailand, and Vietnam, and ICRAF staff, attended the 'Fellows Workshop' in Bogor 4–7 August 1998 (list of participants in Annex 1.3). The aim of the workshop was to analyse the results from the five country studies, to identify the main issues, and to developed a strategy for addressing these issues regionally.

The following regional issues related to agroforestry education were identified:

- There are many common areas of needs and experiences among countries in Southeast Asia, but very limited mechanisms for collaboration, nationally as well as regionally.
- Agroforestry education is hampered by inadequate or outdated curricula, lack of minimum standards, and obstacles to agroforestry curriculum development
- Lecturers require further training for effective teaching, and continuous updating to benefit from recent developments in agroforestry research
- There is a general shortage of relevant and high-quality training materials, including textbooks, manuals and case studies. Existing teaching materials require updating and translation.
- Universities have inadequate human and material resources to develop research capacity in agroforestry, particularly at graduate level
- There has not been a systematic survey of education and training needs in agroforestry
- Agroforestry is yet to be recognized as a field of specialization in many schools; and there are no specific government job areas in agroforestry.

Other issues apply at both national and regional level, notably: agroforestry education is not adequately linked to the field, nor properly linked to research and extension; and available country and regional resources are not adequately tapped.

Certain issues apply at the national or institutional level: inadequate or uncoordinated institutional and policy arrangements; unclear or varied perceptions of agroforestry; too few agroforestry lecturers, limited teaching materials for distance learning; and general lack of, or access to, field practical facilities in agroforestry.

The participants in the Fellows Workshop agreed that a Southeast Asian Network for Agroforestry Education (SEANAFE), would be an appropriate strategy to address these regional issues.

Five country studies in brief

Studies on agroforestry education in five countries—Indonesia, Lao PDR, Philippines, Thailand and Vietnam—were conducted during April–July 1998. Each study resulted in a report, summarized here (see Chapter 2–6 for the full reports).

Indonesia

Indonesia has a large number of state and private universities in agriculture, forestry and animal husbandry (207 were listed in this study). Sixty-one questionnaires were sent to selected institutions, out of which 36 replied. Universities in Indonesia have a wide range of educational programmes, including diploma and professional (non-degree) programmes.

Agroforestry research, extension, training and education are offered by a number of institutions in Indonesia, and the demand seems to be increasing. Agroforestry in the broad sense is becoming one of the most common choices in ways to overcome problems related to sustainability of agriculture, ecology and environment.

In Indonesia, agroforestry is not yet approved as a full 'study programme' in universities. The national curriculum in agriculture, signed by the Minister of Education and Culture in 1994, does not contain agroforestry. This is currently a policy constraint on introducing comprehensive educational programmes in agroforestry.

Agroforestry was introduced in tertiary education institutions in the 1980s. It is offered at all levels, S1, S2 and S3 (i.e. BSc to PhD), and in diploma programmes in faculties of forestry, agriculture and animal husbandry. Non-degree programmes and short courses in agroforestry are frequently offered. Research on agroforestry by individuals or by teams has served as a driving force to develop agroforestry education in the universities concerned.

At BSc level, there are two approaches to agroforestry teaching:

- As a compulsory subject of 2–3 credit points in the study programmes of silviculture and forest management, as an elective subject in other study programmes (e.g. agronomy, soil science, animal feed and nutrition), or as a topic in other subjects.
- As a theme for final assignments or a thesis.

There is a great diversity in agroforestry course contents and education models among universities. Agroforestry, being interdisciplinary, is differently interpreted depending on the discipline in the leading institution.

There is insufficient supply of literature related to agroforestry, while physical facilities and equipment to support agroforestry education are appropriate in most institutions.

The country study for Indonesia made the following recommendations and observations:

- Establish a forum for communication on agroforestry, such as regular seminars or even setting up a national network to exchange information
- The present diversity in the content of agroforestry courses calls for standardizing the minimum contents of these courses
- There are unclear market demands and insufficient recognition for agroforestry specialists at diploma or undergraduate levels. A study of this aspect is certainly needed to identify job opportunities for agroforestry graduates.

- Agroforestry teaching staff need further education in all aspects of agroforestry, through degree education and / or non-degree programmes such as upgrading courses, seminars and workshops, in-country or abroad.
- An inter-university staff or student exchange programme would be helpful in accelerating agroforestry education development
- Most universities are not properly supplied with books, journals and other publications on agroforestry, both in terms of numbers of publications, and in variety of topics
- Agroforestry extension needs a supply of manuals or guidebooks compiled from research, to be used as a practical package in agroforestry training
- There is a need for demonstration plots in agroforestry education and extension, specially designed to meet local conditions.

Lao PDR

The National University of Laos was established as recently as 1995, by combining many technical colleges and universities. The Faculty of Agriculture and Forestry is one of eight faculties. There are also four technical schools in agriculture and forestry in various parts of the country. The Ministry of Agriculture and Forestry also has five research and training institutions of relevance for agroforestry education and training

In the **university**, agroforestry was introduced in 1989 as a course in the diploma curriculum. In 1999, this course will be extended to the new BSc programme. Two of the **technical schools** offer an agroforestry subject, while one teaches agroforestry as a topic in other courses. Of the five **research and training institutions**, two offer short courses (1–2 weeks) in agroforestry, while two others have included some aspects of agroforestry in courses in sustainable agriculture or watershed management.

General problems in the teaching of agroforestry are the lack of agroforestry experience among teachers, and lack of agroforestry books.

The country study and the national workshop held in Vientiane on 25–27 May 1998, prioritized the needs for the development of agroforestry education and training in Lao PDR as follows:

First priorities

- Develop the agroforestry course curriculum in the Faculty of Agriculture and Forestry, National University of Laos
- For formal education: develop a logically linked sequence of agroforestry curricula from the technical schools to the BSc level
- Develop the training centres' curricula (short courses) on agroforestry for different levels (e.g. village levels, technician levels)
- Coordinate curriculum development work through the curriculum committees.

Second priorities

- Upgrade the staff and the teachers through short- and long-term training
- Agroforestry teachers to focus more on field practices and learn from the field experiences
- Have sufficient agroforestry teachers at the different levels of education.

Third priorities

- The Faculty of Agriculture and Forestry should take the lead in agroforestry research and experiment stations, nationally respond for agroforestry experiments, and link with concerned institutions.

- The distribution of experiments should be concentrated in the three regions of Lao PDR (North, Middle and South).

Fourth priority

- The Faculty of Agriculture and Forestry should become a national centre for information on agroforestry.

Fifth priority

- Apply the results from agroforestry experiments to the villagers and farmers, specifically in the remote areas, through extension activities or sharing the demonstration plots with the farmers.

The Philippines

Among the countries covered in this proposal, the Philippines stand out as having much more developed agroforestry education than the four others. In fact, a BS curriculum in agroforestry was instituted as early as 1976, in the Don Mariano Marcos Memorial State University. The most recent development is that the University of the Philippines Los Baños established an Institute of Agroforestry in 1998—the only one in the region.

The country study for the Philippines showed that at least 26 colleges of agriculture and forestry offer formal degree courses in agroforestry at different levels. In addition, 20 more schools are in various stages of preparations of agroforestry curricula. Of the 15 political regions, 11 currently have an agroforestry school.

Today, formal degree courses in agroforestry are offered at all levels: the two–year technical courses are available in seven schools, while the five different BSc curricula are offered in all 26 schools. At the graduate level, the post-baccalaureate Diploma in Agroforestry program is offered in one school, and an MS in Agroforestry in two. In addition, students may select agroforestry-related topics for their thesis or PhD studies.

Short-term training is available in some school, in NGOs, and in regional training centres of the Department of Environment and Natural Resources. Most of these courses target field technicians and upland farmers.

The following development needs were identified in the country study:

- Most of the schools surveyed ranked the expansion and development of staff first in their list of perceived needs
- Most of the schools expressed the need for a curriculum guide for agroforestry. The ‘minimum standards’ for the major in agroforestry in the BSA and BSF curricula formulated in 1981 are outdated. For this reason, the participants in the recently concluded National Workshop on Agroforestry Education recommended—in a resolution directed at the Commission for Higher Education (CHED)—that the Commission ‘develop and enforce minimum standards to ensure the quality of agroforestry education’.
- Most institutions want to strengthen their research and extension capacities. However, many of them, particularly the smaller schools, are much constrained by lack of staff capacity and research funds.
- The lack of adequate indoor and outdoor facilities for lecture and laboratory classes are major constraints in the teaching / learning process
- A number of schools do not have basic references for the fundamental and major courses, making both the teachers and students totally dependent on old lecture notes.

In the light of these considerations, the National Workshop recommended that CHED should develop a national agroforestry education development plan that should provide for the following, among others:

- Immediate identification of the state colleges and universities that should serve as national centres of excellence in the sustained development of agroforestry education and research in the country.
- A thorough review of the existing *guiding principles and minimum standards* for the major in agroforestry in the BS Agriculture and BS Forestry curricula
- The availability of adequate funds for hiring full-time instructors and staff development; construction of needed classrooms and laboratory facilities; expansion of library acquisitions including subscription to relevant technical journal; and development of field laboratories and demonstration areas.
- Creation of a participatory mechanism within CHED, specifically for agroforestry education development, that can more effectively serve to catalyse, facilitate, coordinate and monitor efforts to strengthen and maintain the quality of agroforestry education in the country.

Thailand

The survey for Thailand covered seven universities in central Thailand, three in northern, two in southern, and four in northeastern Thailand. Eleven colleges of agriculture and technology were also included. Short courses in agroforestry are offered by the Centre for Agricultural Extension and the Royal Forest Department. Some educational institutions—both universities and colleges of agriculture and technology—also provide short term training for farmers and the public.

The study showed that:

- Agroforestry education at university level in Thailand is offered as undergraduate and postgraduate courses, or part of some courses, in faculties of agriculture, forestry, technology, and natural resources and environment. There is no full agroforestry programme.
- In vocational schools, agroforestry is offered mainly by colleges of agriculture and technology, in their basic and advanced certificate programmes. Normally, agroforestry is part of courses such as 'Integrated Agriculture' or 'Natural Resources and Environment'. A new agroforestry-related course is entitled 'Agriculture according to the New Theory'. (The 'New theory' is invented by the King of Thailand to promote integrated agriculture for self reliance of small farmers and rural people).
- Research and training in agroforestry is carried out under the Ministry of Agriculture and Cooperatives, particularly the departments of Agriculture, Agricultural Extension, and Land Development; and Royal Forest Department.
- Many NGOs all over the country are involved in agroforestry training and promotion.
- The Department of Agricultural Extension is responsible for extending knowledge and technology in agriculture to farmers. This involves agroforestry-related training such as 'transformation of agricultural production structure' to agricultural officers.

Curricula: There is no formal full agroforestry programme at undergraduate or graduate levels in universities and equivalent institutions in Thailand. At both levels, agroforestry is taught as individual courses or constitutes parts of other courses, in programmes of agriculture, forestry, natural resources, environment, and developmental sociology.

Agroforestry tends to be offered in agricultural faculties rather than in forestry faculties at university level. Therefore it is likely that agroforestry curricula at this present stage are more

influenced by agriculture than forestry. Agricultural faculties in various universities are tending to expand their scope to integrate natural resources and environment and forestry into agriculture.

Teaching staff are well-qualified in their respective fields, but should be given opportunities for further training in agroforestry—an interdisciplinary field. In addition they should be aware of team teaching, which characterizes agroforestry.

Teaching materials are in short supply in universities, technical colleges and vocational schools. This deficit includes, for instance, textbooks, self-learning teaching materials such as videos, CD-ROMs, and slide sets.

Graduates: In Thailand, local people and administrative bodies are mobilized to protect and make judicious use of their own resources. Graduates with knowledge in agroforestry and related fields can fit in with this on-going movement.

Research: There are many research programmes related to agroforestry in universities, while there are very few in technical colleges and vocational schools.

The national policy of Thailand supports the concept of agroforestry and agroforestry education (the 8th National Social and Economic Plan). In addition to this, the concepts of conservation of natural resources and environment; and agriculture as livelihood with emphasis on self-sufficiency and self-reliance of the farmers, are supported by the King of Thailand.

The economic slump in Thailand has highlighted the importance of the agricultural sector. This can be seen as a good opportunity to promote agroforestry practices and education.

The government's policy to give autonomy to state universities by the year 2002 is a good opportunity to develop agroforestry education towards a high-quality interdisciplinary programme without constraints from departmental confinement.

The following emerging needs were pointed out:

- Training of teaching staff, with special emphasis on team teaching and interdisciplinary skills
- Textbooks, especially in Thai language
- Self-learning teaching materials
- Increased awareness among administrators of the significance of agroforestry and agroforestry education
- Curriculum development: there is a need for a full programme in agroforestry, and for compulsory agroforestry courses for all agriculture, forestry, and natural resources and environment students. Minimum standards for agroforestry courses / curricula need to be developed.
- A national network is desired—which can develop further into a centre for agroforestry education
- Research on various aspects of existing agroforestry systems and practices should be expanded
- More effective links between research and extension, especially universities and research / extension institutions, ought to be developed.

Vietnam

In Vietnam, 23 institutions were included in the study, covering the whole range from technical and vocational schools to universities. Also a few research and extension organizations were covered.

At graduate level, there is no separate educational programme in agroforestry. But in most graduate programmes, agroforestry is a subject. Interestingly, two research institutions in Vietnam offer graduate education, and there have been many dissertations and theses in agroforestry.

Among the 10 colleges and universities offering BSc degrees in agronomy and forestry, the content of agroforestry varies (Table 1.2) but most do have a separate agroforestry subject.

Table 1.2. Agroforestry content in BSc curricula in universities in Vietnam

Faculty, College/University,	Separate subject	Part of a subject	None	Location
Faculty of Forestry, College of Agriculture and Forestry (CAF)	x			Hochiminh City, south Vietnam
Faculty of Agronomy, CAF	x			Hochiminh City, south Vietnam
Faculty of Agriculture and Forest Economics, CAF		x		Hochiminh City, south Vietnam
Agronomy faculty, Cantho University			x	Cantho province, Mekong delta
Faculty of Forestry, Central Highland University	x			Banmethuot, Darlac province
Faculty of Forestry, Hue University		x		Thua Thien, Hue, central VN
Faculty of Animal Science, Hue University		x		Thua Thien, Hue, central VN
Faculty of Agronomy, Agriculture University no 1	x			Hanoi, north Vietnam
Faculty of Faculty, Xuanmai Forestry College	x			Xuan Mai, Ha Tay province
Faculty of Forestry, CAF Thai Nguyen	x			Thai Nguyen province

Of the seven schools at certificate and diploma levels, five teach agroforestry as part of subjects such as land-use management, while two offer a separate agroforestry subject.

As Vietnam's rural development increasingly relies on agroforestry techniques, almost all agricultural and forestry educational institutions confirmed the urgent need of agroforestry education to meet the present demand for both formal and non-formal training. The following was particularly recommended:

Formal education

- Since agroforestry is not yet an approved discipline in Vietnam, agronomists and foresters of all academic levels need multidisciplinary skills to be able to work effectively in rural areas.
- It is possible to consider offering full agroforestry programmes, e.g. BSc in agronomy, forestry, and animal science with specification in agroforestry
- All agricultural and forestry educating institutions in the country need to strengthen links with one another and with other neighbouring countries, to exchange experiences and staff in agroforestry education.

- Facilities and human resources for agroforestry education in the country must be improved, for quality education
- Research and extension activities are necessary elements of the agroforestry education system
- Case studies and short training courses for farmers must consider the national trend in rural development, for instance forest-land allocation, land use, credit and market systems
- It is important to develop agroforestry knowledge in Vietnam by encouraging graduate and post-graduate students to choose agroforestry topics for their thesis and dissertation.

Non-formal training

- Farmers and officials need short training courses, such as re-orientation workshops or training, and farmer-to-farmer visits, farmers' training, and extension
- Cross-field visits and study tours would not only develop knowledge but also strengthen links among different groups working in the area of agroforestry.

External factors

- Favourable policy aspects and conducive education, research and extension links are necessary conditions for developing agroforestry education in the country. These four components are the backbone of a future national network for strengthening agroforestry education.
- It is recommended that existing technical, financial and human resources: projects, other related networks; national expertise; etc., be explored to back up the process of strengthening Vietnam's agroforestry education.

Specifically, the country workshop on 20 May 1998 recommended the following actions:

- establish a national informative network on agroforestry education activities
- exchange experiences and information within the country
- develop human resource to teach in agroforestry
- develop curricula, and textbooks and other facilities needed for agroforestry education
- develop case studies and on-farm research to improve agroforestry education.

Overview of regional organizations and projects

Twenty-one organizations and projects, directly or indirectly connected to agroforestry education and training in the region, were visited or their staff members interviewed.

In summary, this regional overview showed that development programmes in the region increasingly consider and apply agroforestry solutions to problems related to sustainable land use and environmental protection, particularly in the uplands of Southeast Asia. There is a great demand for agroforestry knowledge at the field level, a demand that has still to be met. There is great interest in, for instance, agroforestry alternatives to slash-and–burn, and reclamation of degraded *imperata* grasslands. But there is lack of hands-on information. There is a recognition that action research is needed to capture and develop indigenous knowledge.

Southeast Asia has a rich diversity of organizations, networks and projects in forestry, agriculture, agroforestry and related fields. Most of the organizations and projects in this review are forestry-based, reflecting that agroforestry in Southeast Asia seems to have entered via the forestry 'window'. However, there is no organization or project that deals explicitly with agroforestry education.

The overview showed that there is great demand for practical agroforestry knowledge at the field level, including indigenous knowledge. Implications for the educational system are to satisfy this demand. There is a need for universities and colleges to work more closely at the field level (although some institutions are doing commendable field-related work).

Ample opportunities for collaboration exist with several other organizations and projects. Some of these are shown in the following table:

Table 1.3. Opportunities for regional collaboration

Area	Organization
Training	• Regional Community Forestry Training Centre (RECOFTC) • The Lao-Swedish Forestry Programme • Asia-Pacific Agroforestry Network (APAN) • United Nations Food and Agriculture Organization (FAO)
Curriculum development	• Social Forestry Support Programme (SFSP), Vietnam • Promotion of Forestry Education Project, Lao PDR (GTZ—the Technical Cooperation of Germany), • CCL—*Projet de transformation de l'ESAN en Faculté d'agriculture et des forêts*, Lao PDR
Training materials	• United Nations Food and Agriculture Organization (FAO) • Asia-Pacific Agroforestry Network (APAN) • Regional Community Forestry Training Centre (RECOFTC) • Forest Trees and Peoples Programme (FTPP)
Educational policy	• Southeast Asia Ministers of Education Organization—SEAMEO—Regional Centre for Graduate Study and Research in Agriculture (SEARCA) • Regional education networks • World Resources Institute, Resource Policy Support Initiative (WRI/REPSI)
Students' (thesis) research	• International Rice Research Institute (IRRI) • Forage for Smallholders Project (FSP)

Regional overview of organizations and projects in agroforestry education and development

Per G Rudebjer[1]

Introduction

The objective this regional overview is to map regional ongoing activities related to agroforestry education in Southeast Asian, in order to identify opportunities for future collaboration in capacity and institutional strengthening, and to avoid duplication of efforts. The report describes organizations and projects in the region with a bearing on agroforestry education. The aims are to contribute to the analysis of regional needs related to developing agroforestry education and training, and to identify the gaps that a possible Southeast Asian Agroforestry Education Network could fill.

The selection of organizations and projects is slightly biased towards Sida-supported ones, particularly in Laos and Vietnam. This is to show the synergy among projects supported by the donor. There is also a bias towards forestry projects / organizations, because of the closeness between agroforestry and social / community forestry. It seems that, in Southeast Asia,

[1] Consultant, ICRAF, Indonesia

agroforestry is more a 'forestry-' rather than 'agro-' domain. The list of organizations and projects in this report does not claim to be complete, but hopes to be comprehensive enough to provide a fair picture of ongoing activities of importance to agroforestry education.

Twenty-one organizations and projects are included in this overview (table 1.4). The following sections present these organizations and projects, and in particular, their interest and involvement in agroforestry education.

Main sources of information for this review are papers presented at the Regional Agroforestry Education Workshop in the Philippines, 23–27 March 1998, and interviews with staff of the organizations during a trip 18 May–13 June 1998.

Table 1.4. Organizations and projects linked to agroforestry education and training

Type	Organization/Project
Bilateral projects in natural resources management	• Lao-Swedish Forestry Programme • Mountain Rural Development Programme, Vietnam
Bilateral education projects	• Social Forestry Support Programme, Vietnam • GTZ—Promotion of Forestry Education Project, Laos • CCL—*Projet de transformation de l'ESAN en Faculté d'agriculture et des forêts*, Laos
International research organizations	• International Centre for Research in Agroforestry • International Rice Research Institute • Forages for Smallholders Project • World Resources Institute—Resource Policy Support Initiative
Regional training and extension organizations	• Regional Community Forestry Training Centre • Forest, Trees and Peoples Programme • Southeast Asia Ministers of Education Organization—SEAMEO—Regional Centre for Graduate Study and Research in Agriculture
Regional networks	• Asia-Pacific Agroforestry Network • Four Forestry Faculty Network • Southeast Asian University Consortium • Asia Pacific Association of Forestry Research Institutions
Multilateral organizations	• Food and Agriculture Organization (FAO) • Asia Development Bank • European Union
NGOs	• International Institute for Rural Reconstruction • ASPECTS, Philippines

Bilateral projects in natural resources management

Ultimately, agroforestry research and development aims at having an impact on farmers' fields, thereby contributing to sustainable land use and increased farm incomes. This is why links to the field level are so important when designing agroforestry educational programmes.

Sida supports field projects in both Laos and Vietnam: the Lao-Swedish Forestry Programme in Laos, and the Mountain Rural Development Programme (MRDP) in Vietnam. Both these programmes operate in the uplands, where shifting cultivation is no longer sustainable. Both have expressed interest in agroforestry. An underlying reason is current policy changes—land allocation is ongoing in both countries—and, in Laos, 'shifting cultivation stabilization'. As a consequence, farmers need to intensify land use. This increases the demand for agroforestry competence at the field level, reflected in short-term and long-term training and education needs.

The Lao-Swedish Forestry Programme, within the Department of Forestry, has several elements relevant to agroforestry: sub-programmes on shifting cultivation, and on research; and a strong capacity building component. As an example, a recent training needs assessment in the programme featured agroforestry among the top-three needs.

Also the MRDP in Vietnam has an agroforestry link. Its objective is mountain area development in five provinces in Northern Vietnam. In extension, the project experiences needs for technology development (including agroforestry) and stronger links with applied research. For capacity building of staff and farmers, MRDP collaborates with several schools, including the Rural Development Training Centre, which offers agroforestry training.

Bilateral education projects

Several universities in the region are partners in bilateral education projects.

In Vietnam, the Helvetas-supported Social Forestry Support Programme (SFSP) aims at developing forestry education. For this purpose, SFSP works via a national forestry education network that links five universities. This network is a natural starting point for developing agroforestry education in Vietnam—social forestry education that responds to upland farmers' needs, is indeed very close to our interest.

Further, four of the five institutions in the SFSP network are combined agriculture and forestry institutions, and therefore a stepping stone for cross-discipline collaboration. Helvetas supports the idea of a regional network on agroforestry education, and emphasises that focus should remain on education, not on techniques. To develop teaching materials and case studies, for instance, could be of great help.

In Lao PDR, the only agricultural university of the country, the National University of Laos, receives both German and French support. The newly established Faculty of Agriculture and Forestry is hosting the projects.

In the department of forestry, GTZ supports the Promotion of Forestry Education Project. Juergen Hess, Technical Advisor for Academic Affairs confirmed my impression that the interest in agroforestry in Laos is evident, but that current efforts are rather opportunistic, and ad hoc. He said that he welcomes a regional project on agroforestry education. It would complement GTZ's more general work to up-grade forestry education at the National University in Laos. Training of trainers, and improvement of teaching materials are two opportunities for collaboration.

The department of agriculture implements the French project CCL (Comite de Cooperation avec Le Laos)—*Projet de transformation de l'ESAN en Faculté d'agriculture et des forêts.* There are three technical advisors: a team leader, one agronomist and a animal scientist. The CCL is interested in agroforestry, and took an active part in the recent national workshop for Laos (organized by the Faculty of Agriculture of Forestry).

There are also other bilateral projects that have not been included in this review, among them GTZ- and CIDA-supported projects at universities in Indonesia.

International research organizations

International Centre for Research in Agroforestry (ICRAF)

Capacity and Institutional Strengthening is one of five programmes in ICRAF. The recent establishment of a Development Division at ICRAF gives dissemination a greater weight, and emphasizes the need for close links with the users of research results. In addition to the project described in this report, two ICRAF projects in Southeast Asia should be mentioned:

- The Dutch-funded DSO / ICRAF project Strengthening Training and Education in Agroforestry (1997–2002). The aim is to transfer introductory agroforestry training to national and regional institutions, and to support these institutions to do so. This is done through training of trainers, and agroforestry teaching materials development and production, and through a small grants scheme.
- The Sida-funded Vietnam Agroforestry Capacity Building project. This project, running during 1998–99, links Vietnamese scientists and practitioners with the global Alternatives to Slash-and Burn (ASB) programme, and other ICRAF activities in agroforestry research and development. This is to strengthen emerging agroforestry research in Vietnam and to complement the MRDP programme.

International Rice Research Institute (IRRI)

The International Rice Research Institute (IRRI) has started to take interest in agroforestry as part of its upland rice programme. Keith Farney, Upland Agronomist at IRRI, Laos, says that this is to address the needs of the shifting cultivation farmers. Some agroforestry experiments have already been laid out:

- improved fallows with leucaena (to reduce *imperata* and provide much-needed fodder)
- paper mulberry plantations
- live fences—testing of varieties of *Erythrina* sp (the presence of free grazing cattle is a big obstacle)
- teak spacing trials, interplanted with upland rice.

Keith Fahrney says that there is a need for more agroforestry expertise in Laos, and to train trainers to quicken dissemination of research results. He likes the idea of networking in agroforestry research and development, since many lessons can be learned from earlier work in Thailand and Vietnam.

Currently, IRRI has very little training that relates to agroforestry. However, there are plans to develop a broad upland training course.

Forages for Smallholders Project

The Forages for Smallholders Project (FSP) is a regional project under International Centre for Tropical Agriculture (CIAT). One of the two project coordinators, Peter Horne, Laos, explains that FSP deals with forage plant species, at the same time taking erosion control and soil fertility aspects into account. The approach is farmer-oriented. The project conducts on-farm evaluation of leucaena, gliricidia and calliandra. He points out that farmers in Laos are not used to planting trees, and that a common problem in the uplands is conflicts between livestock and cropping.

There is a great need to train staff at district level, since extension is very weak. FSP provides the course 'Developing Forage Technologies with Farmers', targeting district livestock and agriculture officers. FSP looks forward to informal contacts with ICRAF, particularly regarding seeds and new planting materials and agroforestry alternatives on *imperata* grasslands.

World Resources Institute—Resource Policy Support Initiative (WRI/REPSI)

The Resources Policy Support Initiative (REPSI) is a five-year project aimed at improving the management of natural resources in the uplands of mainland Southeast Asia. The World Resources Institute (WRI) is collaborating with institutions in the region to strengthen the supply, quality and demand for independent policy research and information in support of this goal. Sida is one of the donors.

A WRI scientist based at the ICRAF office in Chiang Mai coordinates the initiative. One study object is an environmental assessment of the Ca river basin (on the Vietnam-Lao border), where infrastructure development is taking place. Another activity has been a regional workshop on transboundary trade in non-wood forest products.

The International Union for Forestry Research Organizations (IUFRO)

The International Union for Forestry Research Organizations (IUFRO) promotes international cooperation in forestry research and related sciences. IUFRO has a wide range of scientific activities in eight thematic divisions. Important objectives are to promote dissemination of research results, address issues of global or regional significance, and publish the outcomes of the activities.

Agroforestry is included in various ways in the work of IUFRO, through links with ICRAF, and in activities within the Special Programme for Developing Countries. For instance, there are plans to develop a manual on agroforestry technology and methods.

Southeast Asia will be in focus at IUFRO during the coming years, since Malaysia will host the 21st IUFRO World Congress, 7–12 August 2000.

Regional training and extension organizations

Regional Community Forestry Training Centre (RECOFTC)

Established in 1987, the Regional Community Forestry Training Centre (RECOFTC) aims to achieve participation of local communities in the development and management of forest resources. The office is located at Kasetsart University campus in Bangkok. Currently, Sida supports RECOFTC's work to develop outreach and training activities in Laos and Cambodia.

Dr Pearmsak Makarabhirom is the Coordinator of the Outreach Programme: he says that there is need for teachers to 'learn with the farmer' and he suggests more involvement of educational institutions in action research. He also sees a need to put efforts into in-service training, to educate the 'real actors'. He thinks that an agroforestry education network could be beneficial for the flow of materials, ideas and resource persons.

The Director, Somsak Sukwong expressed similar views: that agroforestry is spread by the people, but that education is very slow to change. Universities show signs of isolation. They need to change the way they work with the teaching-learning process: less emphasis should be put on textbooks and more on participatory approaches.

RECOFTC is an important partner in agroforestry training, course design and curriculum development; and a source of information about the field level through its Thailand and Regional Outreach Programmes.

Forest, Trees and Peoples Programme (FTPP)

The Forest Trees and Peoples Programme (FTPP) is an international strategy- and method development programme, supported by five donors, in collaboration with FAO. It is built on a global and five regional programmes. Sweden has had the coordinating role for the global programme, including the publishing of the FTPP newsletter.

Emphasis is put on peoples' participation, local planning and networking. Some of the programme's themes are conflict management, tenure issues, participation methods, gender aspects, and farmer initiated research and extension. Publishing is a central activity of FTPP.

In Southeast Asia, the Regional Community Forestry Training Centre (RECOFTC) serves as a focal point for FTPP, and a distribution centre for the publications.

Southeast Asia Ministers of Education Organization—SEAMEO—Regional Centre for Graduate Study and Research in Agriculture (SEARCA)

The headquarters of SEARCA, the SEAMEO Regional Centre for Graduate Study and Research in Agriculture, is located in Los Baños, the Philippines. A centre for sustainable agriculture and rural development, SAERCA has four main activities: education, research and development, information dissemination, and consulting.

In education, several SEARCA activities are relevant to agroforestry:

- graduate scholarships (100 scholarships are administered every year)
- a university consortium (for details, see below)
- short-term training: a course on sustainable agriculture for the uplands
- curriculum development assistance for higher education.

The Director, Percy E Sajise, says that agroforestry is an expressed need in the region. Discussing the possible set-up of an agroforestry education network, he encourages the use of existing networks: such as Association of Colleges in Agriculture of the Philippines (ACAP); and Asian Association of Agriculture Colleges and Universities—currently with 45 member institutions (the secretariat is located at SAERCA), in addition to the earlier mentioned university consortium.

Regional networks

Asia-Pacific Agroforestry Network (APAN)

The Asia-Pacific Agroforestry Network (APAN) has 11 member countries, with national networks connected by a regional secretariat. Members are mainly national research, extension and training institutions. This network supports agroforestry development through training-of trainers. establishment of demonstration plots, organizing farmer exchange visits, and publishing and distributing agroforestry information. APAN was supported via a FAO project for six years, until 31 March 1997.

In spite of the present lack of project funding, APAN continues on a reduced activity level. APAN's national secretariats are still in place, with limited funding. Some regional functions, such as distribution of materials, are maintained by the APAN National Secretariat in Bogor, Indonesia. The regional newsletter for APAN is currently edited by FAO Regional Office.

APAN has taken part in education-related activities:

- A regional expert consultation on developing curricula for agroforestry and community forestry in Asia—organized by APAN / Chiang Mai University (CMU) in Chiang Mai, Thailand, June 1993.
- A roundtable discussion on agroforestry education in Southeast Asia—organized by ICRAF / APAN in Bogor, Indonesia, November 1994.

Educational institutions in the region are to lesser extent APAN members, but good opportunities for collaboration with APAN exist, nationally as well as regionally, in training of trainers, and teaching materials production and distribution.

Four Forestry Faculty Network

The Four Forestry Faculty Network was initiated in 1988 to promote cooperation in forestry education. Members are: Faculty of Forestry, Kasetsart University; Faculty of Forestry,

Universiti Putra Malaysia; College of Forestry, University of the Philippines Los Baños; and Faculty of Forestry, Universitas Gadjah Mada.

Activities consist of meetings of Deans, joint organization of conferences, student field visits into different countries, proposed ASEAN forestry textbooks, exchange of publications, and staff exchange.

Southeast Asian University Consortium

The Southeast Asian University Consortium for graduate education on agricultural and natural resources was launched 19 September 1989. Its secretariat is housed at SEARCA, Philippines.

Objectives of the University Consortium are to:

- provide highly trained manpower in agriculture and natural resources in Southeast Asia
- enhance cooperation among agricultural universities in the region
- utilize more fully and efficiently the scarce academic facilities and expertise available in each member country
- hasten institutional development through freer exchange of information, facilities, and the expertise among agricultural universities in the region.

There are five regular and two associate member universities. Regular members are: Universitas Gadjah Mada; Institut Pertanian Bogor; Universiti Putra Malaysia; Kasetsart University; and University of the Philippines Los Baños. The associate members are University of British Columbia, Canada, and University of Queensland, Australia.

The programme covers graduate student exchanges, faculty exchanges, research fellowships, a professorial chair, thesis grants, best thesis awards, consortium journals, and consortium textbooks.

Its management structure consist of the Secretariat at SEARCA, a consortium coordinator at each university, annual meeting / conference of consortium coordinators, and annual meeting of executive officers (deans of graduate schools). The consortium is financed by membership fees (US$5000 / year for regular members, US$10,000 / year for associate members) and other sources.

Asia Pacific Association of Forestry Research Institutions (APAFRI)

The Asia Pacific Association of Forestry Research Institutions (APAFRI) is an independent non-profit body, with a mission to enhance research and technology development capabilities in support of conservation and management of forest resources in the region. It was launched in Bogor in February 1995. The secretariat is located at the Faculty of Forestry, UPM, Malaysia, and is linked to IUFRO Asia-Pacific.

Membership is open to research institutes, universities, NGOs, international organizations and the private sector. The current membership is 37 institutions in 18 countries. The fees vary from US$50 to US$1000.

The vision of APAFRI is to be recognized as a dynamic, strong and self-reliant forestry research association in the Asia Pacific Region, promoting innovative research and development for national, regional and community development.

APAFRI aims to foster research for sustainable forest management in the Asia Pacific region by facilitating exchange of scientific and technical know-how and information, promoting cooperative research and training programs, and strengthening links between national, regional and international centres and organizations. APAFRI is managed by a general assembly, an executive committee, and a secretariat headed by an executive secretary.

Multilateral organizations

Food and Agriculture Organization (FAO)

The FAO Regional Office in Bangkok has participated in, or supported, several education activities / projects during the last decade:

- Social forestry curriculum development at Kasetsart University
- Forestry education development, Bangladesh
- Forest products marketing curriculum at UPLB
- Forestry extension curricula (Forestry Paper 85, 1988)
- Two curriculum development consultations
- Establishing RECOFTC.

FAO also provides a range of information and forestry education tools:

- A list of forest education and training institutions
- The design and implementation of technical forestry education
- A directory of selected tropical forestry journals and newsletters
- Short-term training courses in forestry
- An Asia-Pacific forestry sector outlook study
- Other FAO publications.

Patrick Durst, Regional Forestry Officer, explains that FAO is involved in educational networking activities, such as the Asian Network on Forestry Education. Training of trainers is an important activity, supported through several projects including APAN (see further details above). FAO is formulating an Asia-Pacific Regional Forestry Education Support Project, and plans to expand its educational activities with two new positions—a forestry education officer, and an agroforestry / land-use officer.

Asia Development Bank (ADB)

The Asian Development Bank (ADB) is interested in agroforestry to help achieve its objectives of poverty alleviation, economic growth and protection. ADB-financed projects in social forestry and natural resources management in Laos and Vietnam are good examples of agroforestry-related activities.

Discussing educational aspects with Dr Sivaguru Sahajananthan, he says that there is a need for agroforestry education 'for the masses'. Agroforestry needs to be incorporated in primary education. In his view, there are opportunities for ICRAF to collaborate with ADB on agroforestry education, but it has to get down to the lower educational levels, not only universities.

European Union

In the mandate area of the Initiative, The European Union has delegations in Bangkok, Hanoi and Manila, and a representation in Jakarta. I visited the delegations in Hanoi and Bangkok.

The EU delegation in Vietnam supports two large forestry projects related to agroforestry, one social forestry and nature conservation project in Nghe An Province (operational for one year), and a proposed rural development project in four provinces in northern Vietnam. I was told that, particularly for the latter, agroforestry is very important. EU's impression is that there is a lack of knowledge on exactly what to do to intensify agriculture in the uplands.

EU in Thailand does not have any pure agroforestry projects, but the Union is interested in, for example, fruit trees in northern Thailand and in Laos (where a new large project in northern Laos is in the pipeline). Impact at grassroots level is a concern. There is no regional EU strategy for these areas, and projects are funded on an ad hoc basis. Discussing agroforestry education, representatives emphasised the need for a strong field level component.

NGOs

International Institute for Rural Reconstruction (IIRR)

The International Institute for Rural Reconstruction (IIRR) is dedicated to improving the quality of lives of the rural poor in developing nations. The programme areas are environment, natural resources and agriculture; community health, reproductive health and nutrition; institutional capacity building; and gender and indigenous knowledge.

At the IIRR HQ outside Manila I met Marissa Espineli, director of the education and training division. The international training courses are central to IIRR's mission. Several of their courses relate to sustainable agriculture, but no specific agroforestry course is offered. Interestingly, IIRR has a five-year Dutch grant for training of trainers for sustainable agriculture—obviously in line with the DSO / ICRAF project described above. This is a regional project, involving fellowships and support for capacity building, among others.

Marissa Espineli also acts as a consultant for an NGO in Laos, to develop curricula for sustainable agriculture in Luang Prabang and Savannaket agricultural schools.

In conclusion, IIRR work less with formal education, and more with NGOs and development organizations. Therefore, no immediate overlap with the prospective SEANAFE exists. For short-term training in agroforestry, there might be opportunities for collaboration in the future, for instance through the IRRI Alumni and Friends Association in Thailand.

ASPECTS, Philippines

ASPECTS (Agroforestry Support Program for Empowering Communities Toward Self-reliance), is a community-oriented project for the sustainable development of the uplands of Luzon, Visayas and Mindanao, Philippines.

As part of its extension mandate, the University of the Philippines Los Baños (UPLB) Agroforestry Programme—now the Institute of Agroforestry (IAP)—initiated the ASPECTS project in 1997, in partnership with selected schools and target communities.

ASPECTS has two aims: empowerment of target communities through agroforestry activities, and strengthening of participating schools' research, extension and education programmes.

Observations

A few things are clear from this review:

- The interest in agroforestry is apparent. Development programmes in the region now consider that agroforestry is part of the solution to problems related to sustainable land use and environmental protection, particularly in the uplands of Southeast Asia. One such programme is the Lao-Swedish Forestry Programme.
- There is a great demand for agroforestry knowledge at the field level, and this demand has yet to be met. There is great interest in, for instance, agroforestry alternatives to slash-and–burn, and reclamation of degraded *imperata* grasslands, but lack of hands-on information. I often heard people mention 'action research', as a way to capture and develop indigenous knowledge.

- Most of the organizations and projects in this review are forestry-based. Does that mean that agriculture has yet to fully recognize the potential of agroforestry? Agroforestry in Southeast Asia seems to have entered through the forestry window.
- Southeast Asia has a rich diversity of organizations, networks and projects in forestry, agriculture, agroforestry and related fields. However, no organization or project deals explicitly with agroforestry education. Many organizations in this review welcome a possible agroforestry education project, while I heard very few, if any, negative comments. The precaution that needs to be taken is not to work in isolation from other networks.
- Educational institutions in the region participate in several national and regional networks in support of various aspects of education in forestry and agriculture (Table 1.5). But no current initiatives focus particularly on agroforestry education.

Table 1.5. Education networks in forestry and agriculture in Southeast Asia

Network	Geographical coverage	Members	Mandate
Southeast Asia University Consortium	Universities in Thailand, Indonesia, Philippines, Malaysia, Canada, Australia	7	Agriculture and natural resources education; Institutional development
Association of colleges of agriculture in the Philippines	Philippines	?	
APAN	11 countries of Asia-Pacific (including Indonesia, Laos, Thailand, Vietnam and the Philippines)	Research, extension and training organizations	Agroforestry development through training, demonstrations and information
Four Forest Faculty Network	Thailand, Malaysia, Philippines, Indonesia	4	Forestry education
Asian Association of Agriculture Colleges and Universities	Asia	45	Agriculture
The Asia Pacific Association of Forestry Research Institutions (APAFRI)	Asia-Pacific		Forestry research and development

Conclusions

A regional network on agroforestry education would not duplicate what others are doing. There is a need for universities to work more closely at the field level (although some institutions are doing commendable field-related work). There is a great demand for practical agroforestry knowledge at the field level, including indigenous knowledge. The education system has an important role to play in meeting this demand.

Ample opportunities for collaboration exist with several other organizations and projects, such as:

- Training (RECOFTC, Lao-Swedish Forestry Programme, APAN, FAO)
- Curriculum development (SFSP, GTZ, CLL)
- Training materials (FAO, APAN, RECOFTC, FTPP)
- Educational policy (SEARCA, regional networks, WRI/REPSI)
- Students' (thesis) research (IRRI, FSP)
- A project proposal on agroforestry education may qualify for EU or ADB funding, but requires a wider approach than tertiary education only.

Annex 1.1. Checklist of concerns

ICRAF/Sida/UPLB Regional Workshop on Agroforestry Education

March 23-27, 1998, U.P. Los Baños, College, Laguna, Philippines

CHECK LIST OF CONCERNS FOR AGROFORESTRY EDUCATION INSTITUTIONAL REPORT[2]

Historical Background (when and how did agroforestry curriculum development start at your institution?)

Agroforestry Curricula

- Type of agroforestry curricula currently offered (please provide a copy of each):
  - ***selected agriculture*** *(including livestock/animal husbandry)* ***and/or forestry subjects*** (to which agroforestry concepts have been integrated) - please specify and give description of each;
  - ***special integrative agroforestry courses*** - offered as required or elective subjects in existing Bachelor of Science in Agriculture or Bachelor of Science in Forestry degree programs (please give title and description of each);
  - ***technical level course*** (2 years beyond secondary education) – please provide the - complete title of the certificate or diploma awarded by your institution;
  - ***professional degree course(s)*** - please specify degree title and duration;
  - ***graduate degree course(s)*** - please specify degree title and duration; and
  - ***short-term training course(s)*** - please give course title(s) in full and duration of each course
- Name of administering unit for each degree or non-degree course(s) offered.
- Description of how curricula are developed and / or revised.

Faculty

- List of teaching staff in agroforestry classified by gender and further classified into full-time agroforestry staff; part-time agroforestry staff; and affiliate agroforestry staff
- Level of education and field of specialization of each teaching staff
- Description of how team teaching is practised and in what subjects
- Current staff development program (expansion as well as upgrading plans, if available).

Students

- Student recruitment program - How are students recruited? What strategies are used to increase enrolment?
- Requirements for admission

[2] The checklist was developed to guide institutional presentations in the regional worksop on agroforestry education, held in Los Baños 23–27 March 1998.

- Number of students (desegregated by gender and grade level) enrolled in each agroforestry course offered during the last 3 years
- Proportion of student recipients of full and partial scholarship support, and from what sources?

Graduates

- Profile of graduates during the last 3 years classified by course and gender
- List major sources of employment for graduates arranged by absorptive capacity and attractiveness.

Existing Facilities

- Library resources in agroforestry and related subjects
- Agroforestry laboratory facilities used in teaching and research
- Production of teaching and extension materials.

Research and Extension Programs

- Title and description of on-going research and extension projects
- Title and description of regular and occasional publications.

Institutional Linkages

- List of collaborating institutions, classified into the nature of relationship whether as fund provider, service employer, networking, etc.

Institutional Development Needs

- Enumerate perceived development needs to strengthen curricular programs in your institution, arranged from major to minor.

Plans for the next 5 years

- Please give specific plans for the next 5 years for further development of agroforestry curricula.

Annex 1.2. List of participants, regional workshop, 23–27 March 1998, UPLB, the Philippines

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Country reports

To collect more thorough data on agroforestry education, detailed country studies were undertaken in Indonesia, Laos, the Philippines, Thailand and Vietnam. The studies were conducted by five education fellows appointed by ICRAF[3], during April–July 1998 (database form is attached in Annex 6. The results were compiled in country reports, presented here.

Chapter 2

Agroforestry education in Indonesia

Widianto[4]

Acknowledgements

I am very grateful to my colleagues Dr Cecep Kusmana (IPB), Ir Mahrus Aryadi, MSc (UNLAM), Dr Eko Handayanto, and Ir Sunaryo, MSc, (both from UNIBRAW) for the time they spent to make institutional visits, collecting data and writing their contributions for this study; and to Prof. Dr Riyanto (UNMUL) and Dr Sambas Sabarnuddin (UGM) for their interest and support since the beginning.

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Finally, I am indebted to the colleagues and staff of the Soil Department of UNIBRAW for their support and for providing facilities.

History of agroforestry curriculum development

Although the term agroforestry is recent, various types of integrated land use have been practised by people in various islands of Indonesia for generations. Examples are *pekarangan* (home garden), *tumpangsari* (taungya or multiple cropping), shifting cultivation, and alley cropping. Agroforestry in Indonesia has basically developed from two viewpoints: the forester's and the farmer's. Sabarnurdin (1998) described agroforestry from the point of view of the forester, while Palte (1989) wrote the history of agroforestry in uplands of Java.

The *tumpangsari* or taungya system was introduced around 1875, and became a standard practice in establishing forests plantations. The driving force of this practice was to cut the cost of reforestation. However, taungya would at the same time take advantage of people's hunger, population pressure and unemployment. This exploitation of people's poverty had gradually changed. Increasingly, taungya had fairer farmer-forester cooperation and paid better attention to farmers' rights and living conditions.

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An intensive opening of the uplands in central and east Java occurred in early 19th century. The migration to the uplands resulted in the clearing and settlement of extensive wastelands. As long as land was plentiful, the upland farmers practised a three to four-year fallow system. When possibilities to clear new land had come to an end, and population growth in the uplands caused pressure on the local agricultural resource base, a number of adaptive processes took place. These included the change to permanent dry-field cultivation. Technical solutions were adapted to local needs. Some of these were widespread, whereas other responses were adopted only locally. The result was that great variations of farming systems evolved, e.g., various types of agroforestry. Similar changes took place outside Java, where shifting cultivation, a common practice in the past, was replaced by permanent agriculture.

Later, it was discovered that most uplands were not properly managed, causing land degradation and low productivity and poverty. Before the 1980s, the government had focused its attention on lowland rice. Environmental challenges in the uplands demanded the study and application of various kinds of technology in many development projects. Only recently, the social problems were taken into account. The government now promoted a more comprehensive approach to the problem, with agroforestry as one possible solution.

The increasing interest in agroforestry in the 1980s influenced educational institutions, both in research and in education. Staff and students of agriculture universities were encouraged to conduct and contribute to interdisciplinary research—such as agroforestry—in land conservation and farming systems.

The increasing demand for interdisciplinary approaches triggered the introduction of agroforestry into curricula of tertiary education.

In 1981, Universitas Gadjah Mada (UGM) ran a short course and a workshop on agroforestry, followed by another short course on social forestry in 1984 and a workshop on implementation of social forestry in 1987. Agroforestry was incorporated into the existing undergraduate curriculum at the Faculty of Forestry already in 1982. In 1986, the University of Lampung Mangkurat (UNLAM) in Banjarmasin introduced a study programme in agroforestry. Regrettably, this programme had to be closed down in 1994, because the agroforestry study programme was not listed in the national curricula that was effective nation-wide in this year. In both universities agroforestry education was conducted by the Faculty of Forestry.

Meanwhile, in UNIBRAW (Universitas Brawijaya) and UNUD (Universitas Udayana), two universities that do not have a faculty of forestry, agroforestry education was developed in the Faculty of Agriculture and the Faculty of Animal Husbandry, respectively. The local needs and experiences of the teachers strongly influenced agroforestry curriculum development in each university.

Although many people agree that agroforestry skills are needed to overcome various problems related to low productivity, land degradation, low income and poverty, it does not mean that agroforestry education can be established as a study programme or a faculty in the near future. The national curricula of agriculture in broad sense (including forestry, fishery, animal husbandry and agriculture) declared by the Minister of Education and Culture in 1994, did not contain a study programme of agroforestry. Agroforestry was only considered as a multidisciplinary approach. Many respondents of this study believed that agroforestry will become an important subject in the future.

Agroforestry is offered in a number of universities according to their needs and conditions. The variation in agroforestry concepts and experiences among university staff and scientists weakens the development of agroforestry education at the national level. Most respondents stated that they have never attended a national meeting in agroforestry education, and there is a strong need for that.

The national curriculum, stipulated by the Decree of Ministry of Education and Culture in 1994, limits the number of study programmes a university may have. This curriculum might be reviewed in the year 2000, and hopes for the possibility of an agroforestry study programme should be maintained until then. However, strong arguments and support from the education institutions and markets are needed to achieve this. So far, 'agroforestry positions' requested in the government and most of the private sector are filled either by a forester or by an agriculture specialist and not by an agroforester. Neither government nor private sector recognizes the agroforester as a specialist.

Agroforestry education in Indonesia has been carried out at both undergraduate level (S1) and at master or doctoral level (S2 and S3). Since there is no national curriculum for the S2 and S3 levels, it is more feasible to offer agroforestry education at these levels than at undergraduate level. Agroforestry education at the technical level has been carried out by a number of universities in non-regular programmes. Short courses or diploma programmes have been offered in collaboration with other institutions, for example the Department of Agriculture and Forestry. These sorts of programmes have been designed in various ways in terms of curriculum and duration of study, to meet the specific needs of collaborating institutions.

Method of data collection

Target group

The target group of this study was educational institutions that offer agroforestry studies in Indonesia. They were vocational schools, universities, research institutes, education and training institutes, and non-government organizations (NGOs). Since numerous institutions were assumed to offer agroforestry education and training, we had to sample them in order to obtain a reasonable result.

Secondary education in agroforestry is mainly done by vocational schools in agriculture and forestry.

Research and training institutes come under government departments related to agroforestry—the Department of Agriculture, Department of Forestry and Estate Crops, (and probably the Department of Transmigration). Research and training, are handled by different institutions, namely Research and Development Institutes (*Puslitbang*) and Education and Training Institutes (*Pusdiklat*), respectively. In the latter category, two institutions are relevant to agroforestry, namely *Pusdiklat Kehutanan* in Bogor and *Pusdiklat Perhutani* in Madiun.

Many NGOs in Indonesia focus their attention on environmental conservation and community empowerment. Normally, education and training in various subjects are among their activities. However, agroforestry education and training is not a major programme for many of them.

Regarding higher education institutions, agroforestry is offered mainly in agriculture, forestry, and animal husbandry faculties. There are more than 300 universities in Indonesia, of which 207 offer education programmes in agriculture, forestry and / or animal husbandry.

The primary target of this study was undergraduate higher education. Information from other educational bodies serves as additional or supporting data.

Selection of institutions

In Indonesia, universities are either state (*PTN = Perguruan Tinggi Negeri*) or private (*PTS = Perguruan Tinggi Swasta*). State universities develop study programmes and curricula, and to some extent, private universities depend on state universities for curriculum development, library facilities, and faculty staff.

Of the 207 universities in Indonesia offering agricultural studies (including forestry and animal husbandry), 28 are state universities and 179 are private. These universities would be those most likely offer courses in agroforestry.

Since this number was too large for a complete survey, a selection of sample institutions was made, based on

- representation of both state and private universities: more state than private universities were selected
- representation of study programmes under faculties of agriculture, forestry and animal husbandry
- representation of as many provinces as possible in Indonesia
- the coverage by universities of agroforestry education, research and extension in terms of number of study programmes, lecturers, students, and graduates associated with agroforestry
- existence of agroforestry, as indicated by publications and participation in scientific events by the institutions or staff.

Data collection and analysis

Data was collected through questionnaires, interviews, direct observations, and secondary information. The data collection took about two and half months during April–June 1998—longer than estimated, partly due to the situation in Indonesia in May, where university staff and students were involved in demonstrations and other political activities.

Preparation

A questionnaire was compiled, based on the needs identified at the workshop in the Philippines in March 1998, and adapted to meet educational conditions in Indonesia.

Phase one survey

The first questionnaires were distributed to 61 institutions, asking:

- whether or not the institution provided agroforestry education, and if so, in what way
- if they were willing to participate actively in this research and, further, in a possible initiative for an agroforestry network
- to appoint a contact–person, if this was the case.

Thirty-eight faculties / study programmes in 34 institutions returned the questionnaires to the research team (Annex 2.1). Among these, the 27 institutions teaching agroforestry, plus a few additional ones, were selected for a more detailed study 2. The sampling process is illustrated in Figure 2.1.

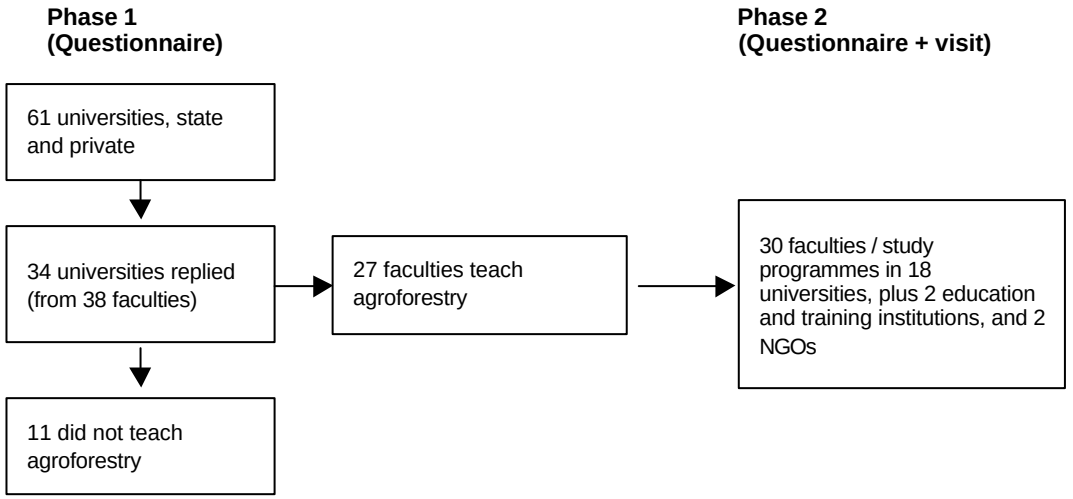

Figure 2.1. Selection of institutions for the country study on agroforestry education.

Phase two survey

Visits, observations and interviews were conducted at 22 institutions, by five member of the research team. The institutions visited were 16 state universities, two private universities, two training centres and two NGOs (Annex 2.2). A set of unstructured questionnaires and check-lists was used.

Analysis and reporting

Results from questionnaires, interviews and observations were analysed and reported by each study team member. Data and reports were discussed and analysed further during a meeting on 18–19 June, 1998 and presented in a seminar at Universitas Brawidjaya (UNIBRAW), Malang.

Current state of agroforestry education in Indonesia

The educational system in Indonesia

The national education system is shown in Figure 2.2.

There are three levels of education: primary, secondary, and tertiary or higher education. The duration of primary education is six years, followed by three years of the first secondary level (junior high school). The Indonesian government has declared that nine years of education is the minimum education. Students who continue after that time attend:

- senior high school, which prepares graduates to continue to tertiary level (university)
- vocational school with various specializations, including agriculture and forestry.

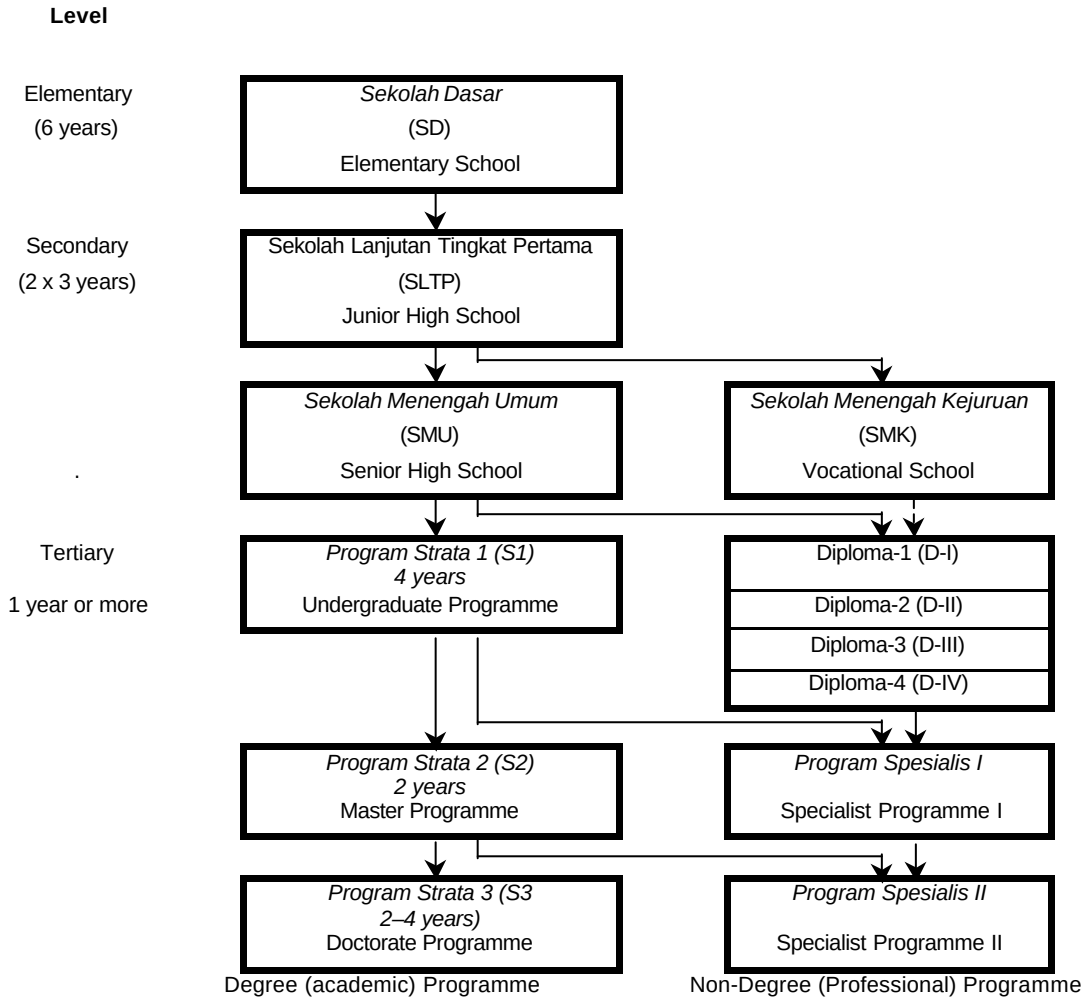

Figure 2.2. A simplified chart of national education system in Indonesia

The tertiary level at the university consists of two paths: non-degree or professional education programmes (D) and degree or academic programmes (S). The non-degree programme consists of several levels: D-I (a 1-year programme), D-II (two years), D-III (three years) and D-IV (4 years) and Specialist Programme (Specialist I and Specialist II). The degree programme or S (stratum) consists of three levels: S1 (undergraduate), S2 (master) and S3 (PhD). The 'load' of all programmes is determined, not by the length of study, but by the number of study unit or credits, as indicated in Table 2.1.

Table 2.1. Types of programmes and levels of higher education in Indonesia

Programme	Level	Study units (credits)	Length of study
Diploma or Professional	Diploma I (D-I)	40-50	2-4 semesters
(non-degree)	Diploma-II (D-II)	80-90	4-6 semesters
	Diploma-III (D-III)	110-120	6-10 semesters
	Diploma-IV (D-IV)	144-160	8-14 semesters
Academic or degree	Undergraduate (*Sarjana*) - S1	144-160	8-14 semesters
	Master - S2	36-50	4-10 semesters
	Doctor - S3	>40	4-10 semesters

Agroforestry education—an overview

Universities

Agroforestry education at universities is offered as a lecture subject and / or a research topic for thesis in degree programmes at S1, S2 and S3 level, and in non-degree programmes at D1, D2 or D3 levels. Some universities also offer short courses of relevance to agroforestry. In addition, some universities in Indonesia offer regular diploma programmes in agriculture and forestry, related to agroforestry. One example is Agriculture Polytechnics (D3) in Jember, that offers programmes on Agronomy for Food and Horticulture Crops, Agronomy for Estate Crops, Agriculture Technology and Animal Husbandry. No full programme in agroforestry has been established in Indonesia.

Vocational schools

Secondary education in agroforestry is mainly offered in vocational schools for agriculture, forestry and animal husbandry, *Sekolah Menengah Kejuruan (SMK): SMK Pertanian* (agriculture), *SMK Kehutanan* (forestry), *and SMK Peternakan* (animal husbandry). A number of schools were established during the colonial time and run by the Department of Agriculture. During the period when the government gave the highest priority to agriculture development programme in the 1970s, many agricultural schools as well as higher education institutions in agriculture were founded in various places. However, in the mid 1980s these vocational schools were reorganised and some were closed. For example, the courses offered by the very old agriculture and animal husbandry school in Malang (*SPMA* and *SNAKMA*) were converted into Diploma Programme (D3) for Agriculture Extension Specialists.

Today, universities are more popular than vocational schools for agricultural studies. There are more than 200 universities with about 500 study programmes in Indonesia offering agriculture.

Education and training institutes

Research and training institutes related to agroforestry are under the control of various government technical departments: the Department of Agriculture, Department of Forestry and Estate Crops, (and Department of Transmigration). In most cases research and training are split into research (Research and Development Institutes, *Puslitbang*) and training (Education and Training Institutes, *Pusdiklat*). Two institutes, *Pusdiklat Kehutanan* in Bogor and *Pusdiklat Perhutani* in Madiun, offer agroforestry training for upgrading their own officers. Mostly, the training focuses on policy rather than technical aspects of agroforestry.

Non-government organizations (NGOs)

There are many NGOs registered in Indonesia, but few are specifically concerned with agroforestry. Some are concerned with ecology and nature preservation, or with the empowerment and with agroforestry being only a minor part of their activities. Two NGOs were selected for this survey: the Centre for Environmental Education, and the Indonesia Institute for Forest and Environment. They do offer training programmes in popular topics such as the environment, but not specifically in agroforestry topic. Therefore the report does not discuss the activities of those two institutions.

Agroforestry curricula

The National Curricula for higher education

In Indonesia, agroforestry is not an established study programme, and neither does an agroforestry department exist in any university. This is because the term agroforestry is not found in the national curriculum for agricultural sciences (Decree of the Minister of Education and Culture of the Republic of Indonesia no. 0311 / 1994 and 0411 / 1994, November 1994).

The national curriculum for agricultural sciences (in broad sense) for the undergraduate (S1) level consists of several groups of subjects, equivalent to about 150 credit points. About 40 to 50 subjects are offered in 8 semester. There are five groups of subject in the national curriculum (Table 2.2). Only the core curriculum is set at the national level (the structure of the national curriculum is illustrated in Annex 2.6).

Table 2.2. Groups of subject in the national curriculum for higher education in agriculture

No.	Group of subjects	Load (credit points)		
		Core	Local	Total
1	General University Course (MKU)	10	2-8	12-18
2	Basic Agriculture Course (MKDK)	29	0-3	30-32
3	Faculty Course (MKKU)	46-50	0-14	50-60
4	Study Programme Course (MKCK)	20-25	11-24	36-44
5	Concentration Field or Elective (MKKL)	0	10-20	10-20
	TOTAL	95-115	23-70	144-160

In practice, there are two models of agroforestry education at undergraduate level:

- *Agroforestry as a subject or part of a subject*: a compulsory subject (two to three credit points) in the study programme of silviculture and forest management. Other study programmes (e.g. agronomy, soil science, animal feed and nutrition, etc.) may include agroforestry as an elective course in 'local content'. In other cases, agroforestry is presented as topics in other courses in the study programme. Because of this, the course content of agroforestry offered by a Forestry Faculty may differ from what is offered by an Agriculture or Animal Husbandry Faculty.
- *Agroforestry as final assignment or thesis*: Agroforestry can be selected by students as the topic for a final assignment or thesis. The agroforestry component is interdisciplinary treated.

Agroforestry in the national curriculum

This study showed that the subject of agroforestry is offered in various study programmes in faculties of forestry, agriculture and animal husbandry. As a core subject, agroforestry has been recognized nationally by the study programme of Forest Management in the Faculty of Forestry, while it is only an elective subject in Faculties of Agriculture and Animal Husbandry. As a compulsory or elective subject, the agroforestry course has not been standardized. (Table 2.3). It varies greatly in terms of course contents, pre-requirement, status, etc. from one university or study programme to another.

Table 2.3. Status and position of agroforestry courses in the national curriculum for forestry, agriculture and animal husbandry

Group of subjects in the national curriculum	Forestry	Agriculture	Animal husbandry
General University Course (MKU)	-	-	-
Basic Agriculture Course (MKDK)	-	-	-
Faculty Course (MKKU)	-	-	-
Study Programme Course (MKCK)	compulsory	-	-
Concentration Field or Local Need (MKKL)	-	compulsory or elective	elective
Credit Points	2 credits	2-3 credits	2-3 credits

In addition to formal courses, many universities carry out multidisciplinary research and extension projects in agroforestry. Student research in agroforestry is considered the best way to handle agroforestry in various study programmes, both at undergraduate and graduate levels.

Undergraduate curricula

The detailed survey covered 18 universities with 30 faculties / study programmes. There were distributed as follows (Table 2.4).

Table 2.4. Distribution of faculties and study programmes in the survey

Faculty/study programme	No. of institutions
Agronomy/agriculture	10
Forestry management	8
Socioeconomics	3
Agronomy and soils	3
Animal husbandry	2
Graduate school	2
Soil science	1
Polytechnic/agriculture	1
Total	30

The agroforestry curricula status (at undergraduate level) in the 30 institutions studied is summarized in Table 2.5. The detailed list is found in Annex 2.3. Only in the study programme of Forestry Management is agroforestry a compulsory subject, with two–three credit points.

Table 2.5. Agroforestry education in undergraduate programmes in Indonesia

Faculty	No. of programmes		
	Agroforestry course	Agroforestry lectures	Agroforestry research topics
Agriculture	5	19	19
Forestry	3	5	5
Animal husbandry		2	2
Graduate school		2	2
Polytechnic		1	
Total	8	29 *)	28

*) No information from one institution

Teaching staff/faculty

The backgrounds of academic staff teaching agroforestry vary greatly, and include agronomy, soil science, silviculture, forest management, social economy, animal nutrition, and sociology. Staff often showed interdisciplinary cooperation in their work.

Data indicate that the number of teaching staff is sufficiently large, with the largest number holding S2 (master) degrees (Table 2.6). Each study programme had at least two or three teaching staff, mostly qualified at MSc level. However, there are few academic staff members with a specialist agroforestry background—many universities do not even have one.

Table 2.6. Number, level of education and field of specialization of agroforestry teachers

No	Institution			Number of Staff				Specialization
	University	Faculty	Study program	S1	S2	S3	Sum	(discipline)
1	IPB	Agriculture	Socioeconomy	1	0	1	2	Sociology & Demography
			Agronomy	0	0	3	3	Ecophysiology, Agronomy
		Forestry	Forests management	0	3	0	3	Silviculture & Forest Management
2	UGM	Forestry	Forests management	5	7	3	15	Forest Planning, Silviculture, Social Forestry, Agroforestry
		Agriculture	Agronomy and soils	-	-	-	-	no information
3	UKSW	Agriculture	Agronomy	2	2	0	4	Agronomy, Social Economy, Soil Science
4	UNEJ	Agriculture	Agronomy and soils	1	1	0	2	Soil Science & Agronomy
		Poly-technic	Agriculture	4	0	0	4	Agronomy of Estate Crops
5	UNHALU	Agriculture	Agronomy	-	-	-	-	no information
6	UNHAS	Agriculture	Forest Management	0	5	0	5	Silviculture, Forest Management
			Soil science	0	0	2	2	Soil Fertility
		Graduate school	-	0	2	3	5	Forestry, Agronomy, Soil Science, Animal Nutrition
7	UNIBRAW	Agriculture	Agronomy and soils	0	1	3	4	Agronomy, Soil Science
		Animal husbandry	Animal nutrition	0	1	2	3	Animal Feed & Nutrition
		Graduate school	-	0	0	5	5	Soil Science, Agronomy, Social Economy
8	UNILA	Agriculture	Agronomy	1	3	0	4	Agronomy
			Forest Management	1	2	1	4	Forest Management
9	UNLAM	Agriculture	Agronomy	4	12	3	19	Agronomy, Soil Science (5 subjects)
		Forestry	Forest Management	2	8	0	10	Social Forestry, Soil Science, Sociology
10	UNMUL	Agriculture	Agronomy	0	1	2	3	Biogeochemistry, Social Economy
		Forestry	Forest Management	0	0	3	3	Forest Social Economy
11	UNPAD	Agriculture	Agronomy	0	1	2	3	Forest Hydrology, Silviculture
12	UNPAR	Agriculture	Forest Management	-	-	-	-	no information
16	UNRAM	Agriculture	Socioeconomy	1	3	0	4	Social Economy
13	UNS	Agriculture	Socioeconomy	-	-	-	-	no information
14	UNSOED	Agriculture	Socioeconomy Agronomy	-	-	-	-	no information
15	UNTAD	Agriculture	Agronomy	0	4	0	4	Agronomy
16	UNUD	Agriculture	Agronomy	-	-	-	-	no information
		Animal husbandry	Animal nutrition	0	0	4	4	Animal Feed & Nutrition
17	UNWIM	Forestry	Forest management	4	0	1	5	Social Economy, Soil Science & Forest Management
18	DIKLAT, Bogor			-	-	-	-	
19	DIKLAT, Madiun			-	-	-	-	
	Total			26	56	38	120	

Staff development is a priority in all higher educational institutions, but most staff specialize in fields related to their major in undergraduate studies. A small portion of them specialize in agroforestry. In-country training and upgrading courses for university staff are rarely conducted.

Physical facilities

Classrooms, offices, library and laboratory buildings among state universities are mostly adequate, but this is not always the case in many of the private institutions. We assessed (as poor, sufficient, and excellent) facilities in our survey, using direct observation, interviews and the available qualitative data. The state of general physical facilities in the 30 university programmes and two training institutes is summarized in Table 2.7 (details in Annex 2.4).

Table 2.7. General physical facilities

	No. of institutions		
Facility	Poor	Sufficient	Excellent
Library	-	10	22
Classrooms	-	-	32
Laboratory	-	14	16
Field station	4	5	21

Experimental fields and demonstration plots are available to some institutions, but they vary greatly. They are mostly in a state that is not conducive to agroforestry education. Some universities—such as UGM (Wanagama, Getas and Jambi), IPB (20 ha + 359 ha in Sukabumi), UNHAS (1300 hectares in Bengo-Bengo), and UNLAM (2000 ha in Mandiangin)—have quite large experimental field sites. Some others, such as UNILA, UNUD, UNIBRAW, UNTAD, UNLAM have about 10 to 50 ha of land each, while the remaining have less than 10 ha of experimental fields. However, most institutions stated that their land was not properly designed to serve as demonstration plots for agroforestry education (Annex 2.8).

The laboratories in the institutions were generally equipped with standard equipment, but still falling short in many respects. Many face funding difficulties in replacing obsolete equipment with more modern. Only few respondents stated that some laboratories were very good.

Facilities specifically in support of agroforestry education are less abundant (Table 2.8). The lack of journals and textbooks is particularly severe.

Table 2.8. Physical facilities in support of agroforestry education

	No. of institutions		
Facility	Poor	Sufficient	Excellent
Textbooks	18	14	-
Journals	30	2	-
Laboratory equipment	10	20	-
Audiovisual teaching aids	2	29	

Teaching materials for agroforestry, such as textbooks, journals, and video-audio materials, are lacking in almost all libraries. The availability of agroforestry publications is also very limited in most institutions. Only a few institutions have access to a library network and Internet facilities.

We have no quantitative data on laboratory equipment and the agroforestry literature, but a qualitative interpretation based on available secondary data, interviews, and direct observation is tabulated (Annex 2.5).

Students and graduates

Most universities had no accurate recording of students and graduates who specialized in agroforestry. This is in itself an indication that, in many universities, no special attention is given to agroforestry education. Furthermore, information on students and graduates in agroforestry from the respondents was often inaccurate, because of the way it was recorded by using the study programme as the smallest unit. Many respondents did not provide numbers for students and graduates in agroforestry, even when they stated that they offered agroforestry education.

Table 2.9 indicates the number of students that took agroforestry subjects in 1996/97 and 1997/98 among the 18 universities in the study. Since many institutions do not offer agroforestry as a subject, the table has many gaps. Data on the numbers of students who wrote final reports on agroforestry topics were given by some institutions, but not others.

Very little information could be gathered concerning the number of graduates who took agroforestry as the major topic. The number of graduates, if recorded in the table, is the number of total graduates in a study programme, not agroforestry graduates in particular. Although there are no statistical data, some respondents believe that agroforestry-oriented graduates are in high demand now and will be in the near future. However, this does not mean that such graduates will easily find jobs.

Table 2.9. Number of students taking agroforestry subjects and number of graduates in agroforestry per year

No	INSTITUTION			Agro-forestry	No. of Students		No. of	Remarks
	University	Faculty	Study Program	Subject	1996/97	1997/98	graduates per year	
1	IPB	Agriculture	Socio-economy	-				
			Agronomy	-				
		Forestry	Forest management	yes	25	25	> 5	Thesis in AF
2	UGM	Forestry	Forest management	yes			120	Forestry Faculty
		Agriculture	Agronomy and soils	-				
3	UKSW	Agriculture	Agronomy	-				
4	UNEJ	Agriculture	Agronomy and soils	-				
		Polytechnic	Agriculture	-				
5	UNHALU	Agriculture	Agronomy	-				
6	UNHAS	Agriculture	Forest Management	yes	15	18	15	Thesis in AF
			Soil Science	-				
		Graduate school	-	-				
7	UNIBRAW	Agriculture	Agronomy and soils	yes	84	42	7	Thesis in AF
		Animal husbandry	Animal nutrition	-				
		Graduate school	-	-			3	Thesis in AF
8	UNILA	Agriculture	Agronomy	-				
			Forest Management	-				
9	UNLAM	Agriculture	Agronomy	-				
		Forestry	Forest Management	yes	12	26	17	
10	UNMUL	Agriculture	Agronomy	yes	71	?	34	
		Forestry	Forest Management	yes	70	88	74	
11	UNPAD	Agriculture	Agronomy	-				
12	UNPAR	Agriculture	Forest Management	-				
16	UNRAM	Agriculture	Socio-economy	-	231	203		Agriculture Faculty
13	UNS	Agriculture	Socio-economy	-			150	Agriculture Faculty
14	UNSOED	Agriculture	Socio-economy Agronomy	-				
15	UNTAD	Agriculture	Agronomy	-				
16	UNUD	Agriculture	Agronomy	-				
		Animal husbandry	Animal nutrition	-				
17	UNWIM	Forestry	Forest management	yes	?	170		
18	DIKLAT, Bogor			-				
19	DIKLAT, Madiun			-				

Research

University staff, working individually or in teams, have done research that may cater for local, national, or even international interests in agroforestry. Some have long devoted their time to agroforestry research. Many research projects have been short-term, lasting for one year or less, some others have lasted for three to five years. They have dealt with aspects related either to particular disciplines such as socioeconomics, silviculture, agronomy, soil science, animal feeds, or sometimes to interdisciplinary aspects.

The number of research topics carried out by the institutions varied greatly. Large universities such as IPB and UGM might have more than 20 topics per year, while others conducted research in two to 10 topics in agroforestry annually. Some institutions with long-term research projects in agroforestry are:

UGM	Rehabilitation of tropical forest and management regime of teak forest
IPB	Action research in agroforestry in West Kalimantan
UNIBRAW	Biological management of tropical soil fertility
UNUD	Three-strata systems—a land use system that include three components of crops i.e. tree (stratum 1), food crop (stratum 2) and grass (stratum 3). The arrangement is meant to address the lack of food and animal feed during the dry seasons in the limestone area of South Bali.

Extension

Agroforestry community services and extension programmes, provided by the surveyed institutions were provided through direct counselling, demonstration plots, and distribution of papers or brochures. In addition to education, research and community service are the mandates of universities in Indonesia. Most extension programmes mentioned by the respondents were carried out in cooperation with other institutions at the local level. The target groups for this programme were mostly small farmers and, rarely, big companies such as forest and estate companies.

Institutional links

Almost all higher education institutions have established cooperation with government bodies or private organizations within the country or abroad. This covers a wide spectrum of activities in training and research and also provides scholarships for teaching staff and students. The other party usually acts as fund provider. Some organizations and institutions that cooperate with a number of universities in the field of agroforestry are: the Department of Forestry, Department of Agriculture, Forest State Company (*Perhutani* and *Inhutani*), ICRAF, Ford Foundation, research institutes (for various crops), and private companies. Foreign universities, international cooperation agencies, NGOs, and banks have also established collaboration with some universities (Annex 2.7).

Conclusions and recommendations

Conclusions

Agroforestry was introduced in tertiary education institutions in the 1980s, but until now (1998) it has been offered only as a course subject or a ‘field of concentration’. Agroforestry does not yet constitute a study programme.

Agroforestry education in higher education institutions is offered in all strata: S1, S2 and S3, and in diploma programmes. It is offered in Faculties of Forestry, Agriculture and Animal Husbandry, by relevant study programmes. Diploma or short courses in agroforestry are very often offered as non-regular programmes designed in collaboration with the users.

There is a diversity in agroforestry course contents and education models or curricula among the universities that offer agroforestry.

Research on agroforestry, by individuals or by teams in universities, has served as a driving force in the development of agroforestry education in the university concerned.

Agroforestry is generally regarded as taking an interdisciplinary approach to agricultural issues. Therefore, the development of agroforestry education and research may vary, depending on the leading discipline in each institution.

The supply of literature, journals and other teaching materials related to agroforestry is insufficient. Other physical facilities and equipment among relevant branches of study that support education in agroforestry are mostly adequate.

A number of institutions provide agroforestry research, extension, training and education and the perception is that demand for such education will increase. Agroforestry in the broad sense is becoming one of the most common approaches to various problems related to the sustainability of agriculture, ecology and environment.

Recommendations

There are many interpretations of agroforestry among people who have interest in it. Consequently, there are various ways or models of agroforestry education, and a diversity in the contents of agroforestry courses in the higher education institutions in Indonesia. Institutions need a forum for communication, such as regular seminars or a national network in which they can exchange information.

There is an urgent need to standardize minimum content of agroforestry courses, before efforts are taken to build a national core curriculum or even specialization in agroforestry. The present diversity in the content of agroforestry education has resulted from lack of communication among agroforestry lecturers.

Market demand for, and recognition of, agroforestry specialists from diploma or undergraduate programmes is not yet clear. A study of this is needed, to identify job opportunities for agroforestry graduates.

Agroforestry teaching staff need further education in all aspects of agroforestry through degree education and non-degree programmes, such as upgrading courses, seminars and workshops, either in-country or abroad.

Inter-university staff or student exchange programmes are considered helpful in accelerating agroforestry education development, as expressed in the meeting held in relation to compiling this report.

Most universities are not properly supplied with books, journals and other publications on agroforestry, in term of numbers and in variety of topics covered.

Agroforestry extension needs a supply of manuals or guidebooks, compiled from research, to be used in practical packages in agroforestry training.

There is a need for demonstration plots for agroforestry education and extension, specially designed to meet local conditions.

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Annex 2.1. List of institutions—phase 1

Table 2.10. The status of agroforestry education in institutions that completed the phase 1 questionnaire

No.	Institution, (university)	Faculty	Location	State/ private	Visited	AF course subject	AF research thesis	AF seminar etc.
1	UNSYAH	Agriculture	Banda Aceh	State	no	no	yes	no
2	STP Surya Dharma	Agriculture	Bandar Lampung	Private	no	no	no	no
3	UNILA	Agriculture	Bandar Lampung	State	yes	no	yes	no
4	Univ. Bangkalan	Agriculture	Bangkalan	Private	no	yes	yes	no
5	UNUD	Agriculture	Denpasar	State	yes	no	no	no
6	UNUD	Animal Husb.	Denpasar	State	yes	no	no	no
7	Univ. Jember	Agriculture Polytechnic	Jember	State	yes	no	yes	no
8	Univ. Jember	Agriculture	Jember	State	yes	no	yes	no
9	Univ. Moch Sroedji	Agriculture	Jember	Private	no	no	no	no
10	Univ. Kadiri	Agriculture	Kediri	Private	no	yes	no	no
11	UNDANA	Agriculture	Kupang	State	yes	yes	yes	no
12	UNDANA	Animal Husb.	Kupang	State	yes	no	no	no
13	IPM Malang	Forestry	Malang	Private	no	yes	yes	no
14	UNIBRAW	Animal Husb.	Malang	State	yes	no	yes	no
15	UNSRAT	Animal Husb.	Manado	State	no	no	no	no
16	UNCEN	Agriculture	Manokwari	State	no	yes	yes	no
17	UNRAM	Agriculture	Mataram	State	yes	no	no	no
18	Univ. Dharma Agung	Agriculture	Medan	Private	no	no	no	no
19	Univ. HKBP Nommensen	Agriculture	Medan	Private	no	no	yes	yes
20	UNPAR	Agriculture	Palangka Raya	State	yes	yes	yes	no
21	Univ. Palembang	Agriculture	Palembang	Private	no	no	yes	no
22	UNTAD	Agriculture	Palu	State	yes	no	no	no
23	UNMUH Sumbar	Agriculture	Payakumbuh	Private	no	yes	yes	no
24	UNTAN	Agriculture	Pontianak	State	no	no	no	no
25	UNSOED	Agriculture	Purwokerto	State	yes	no	yes	no
26	STP Wuna Raha	Agriculture	Raha	Private	no	no	yes	no
27	UKSW	Agriculture	Salatiga	Private	yes	no	yes	no
28	UNMUL	Agriculture	Samarinda	State	yes	yes	yes	yes
29	UNTAG Samarinda	Agriculture	Samarinda	Private	no	yes	yes	no
30	Univ. Kapuas Sintang	Agriculture	Sintang	Private	no	yes	yes	yes
31	INSTIPER	Forestry	Sleman, Yogya	Private	no	yes	yes	no
32	UPN Veteran Jawa Timur	Agriculture	Surabaya	Private	no	yes	yes	no
33	Univ. Wijaya Kusuma	Agriculture	Surabaya	Private	no	no	no	no
34	UNS	Agriculture	Surakarta	State	yes	no	yes	no
35	UNHAS	Animal Husb.	Ujung Pandang	State	yes	no	yes	no
36	UGM	Agriculture	Yogyakarta	State	yes	no	yes	no
37	UGM	Animal Husb.	Yogyakarta	State	yes	no	yes	no
38	Univ. Sarjanawiyata Taman Siswa	Agriculture	Yogyakarta	Private	no	no	yes	no

Annex 2.2. Agroforestry education status in 30 institutions

Table 2.11. Agroforestry education status in institutions being studied in the second phase

No	University	Faculty	Study program	AF as a subject (status)	AF given by laboratory	AF as research topic
1	IPB	Agriculture	Social Economy & Agronomy	-	-	yes
2	IPB	Forestry	Forest Management	compulsory	Forest Management	yes
3	UGM	Forestry	Forest Management	compulsory	Forest Management	yes
4	UKSW	Agriculture	Agronomy	-	-	yes
5	UNEJ	Agriculture	Agronomy, Soil Science	-	-	yes
6	UNHALU	Agriculture	Agronomy	-	-	yes
7	UNHAS	Agriculture	Forest Management	compulsory/ elective	Silviculture	yes
8	UNIBRAW	Agriculture	Agronomy & Soil Science	elective	Agronomy	yes
9	UNIBRAW	Animal Husbandry	Animal Nutrition	-	-	yes
10	UNILA	Agriculture	Forest Management	-	-	yes
11	UNILA	Agriculture	Agronomy	-	-	yes
12	UNLAM	Agriculture	Agronomy	-	-	yes
13	UNLAM	Forestry	Forest Management	compulsory	Forest Management	yes
14	UNMUL	Agriculture	Agronomy	-	-	yes
15	UNPAD	Agriculture	Agronomy	-	-	yes
16	UNPAR	Agriculture	Forest Management	compulsory	Forest Management	yes
17	UNRAM	Agriculture	Social Economy	elective	Social Economics	yes
18	UNS	Agriculture	Social Economy	-	-	yes
19	UNSOED	Agriculture	Social Economy & Agronomy	-	-	yes
20	UNTAD	Agriculture	Agronomy	-	-	yes
21	UNUD	Agriculture	Agronomy	-	-	yes
22	UNUD	Animal Husbandry	Animal Nutrition	-	-	yes
23	UNWIM	Forestry	Forest Management	compulsory	Forest Management	yes
24	UNHAS	Graduate school		-	-	yes
25	UNIBRAW	Graduate school	Soil Water Management	-	-	yes
26	UNEJ	Polytechnics	Agriculture	-	-	-
27	PUSDIKLAT	Kehutanan, Bogor				
28	PUSDIKLAT	Perhutani, Madiun				
29	PPLH	Centre for Environmental Education				
30	RMI	Indonesian Institute for Forest and Environment				

Annex 2.3. Agroforestry curricula status

Table 2.12. Agroforestry education in institutions studied in Phase 2.

No	Institution			Type of Agroforestry Curricula				Remarks
	University	Faculty	Study program	AF subject	Series of lectures	Re-search topics	No AF	
1	IPB	Agriculture	Socioeconomy	no	yes	yes	-	
			Agronomy	yes	yes	yes	-	
		Forestry	Forest management	yes	yes	yes	-	
2	UGM	Forestry	Forest management	yes	yes	yes	-	
		Agriculture	Agronomy and soils	no	-	-	-	no information
3	UKSW	Agriculture	Agronomy	no	yes	yes	-	
4	UNEJ	Agriculture	Agronomy and soils	no	yes	yes	-	
		Polytechnic	Agriculture	no	yes	no	-	
5	UNHALU	Agriculture	Agronomy	no	yes	yes	-	
6	UNHAS	Agriculture	Forest management	yes	yes	yes	-	
			Soil science	no	yes	yes	-	
		Graduate school	-	no	yes	yes	-	
7	UNIBRAW	Agriculture	Agronomy and soils	yes	yes	yes	-	
		Animal husbandry	Animal nutrition	no	yes	yes	-	
		Graduate school	-	no	yes	yes	-	
8	UNILA	Agriculture	Agronomy	no	yes	yes	-	
			Forest management	yes	yes	yes	-	
9	UNLAM	Agriculture	Agronomy	no	yes	yes	-	
		Forestry	Forest management	no	yes	yes	-	
10	UNMUL	Agriculture	Agronomy	no	yes	yes	-	
		Forestry	Forest management	no	yes	yes	-	
11	UNPAD	Agriculture	Agronomy	no	yes	yes	-	
12	UNPAR	Agriculture	Forest management	no	yes	yes	-	
16	UNRAM	Agriculture	Socioeconomy	yes	yes	yes	-	
13	UNS	Agriculture	Socioeconomy	no	yes	yes	-	
14	UNSOED	Agriculture	Socioeconomy Agronomy	no	yes	yes	-	
15	UNTAD	Agriculture	Agronomy	no	yes	yes	-	
16	UNUD	Agriculture	Agronomy	no	yes	yes	-	
		Animal husbandry	Animal nutrition	no	yes	yes	-	
17	UNWIM	Forestry	Forest management	yes	yes	yes	-	
18	DIKLAT, Bogor			-	-	-	-	package program
19	DIKLAT, Madiun			-	-	-	-	package program

Annex 2.4. Physical facilities

Table 2.13. Physical facilities in institutions studied in Phase 2.

No	Institution			Physical (Building) Facilities				Remarks
	University	Faculty	Study program	Library	Class-room	Laboratory	Field station	
1	IPB	Agriculture	Socioeconomy	2	2	2	2	
			Agronomy	2	2	2	2	
		Forestry	Forest management	2	2	2	2	
2	UGM	Forestry	Forests management	2	2	2	2	
		Agriculture	Agronomy and soils	2	2	2	2	
3	UKSW	Agriculture	Agronomy	2	2	1	2	
4	UNEJ	Agriculture	Agronomy and soils	2	2	1	2	
		Polytechnic	Agriculture	2	2	2	2	
5	UNHALU	Agriculture	Agronomy	1	2	1	2	
6	UNHAS	Agriculture	Forest Management	2	2	1	2	
			Soil Science	2	2	2	2	
		Graduate school	-	2	2		-	
7	UNIBRAW	Agriculture	Agronomy and soils	2	2	2	2	
		Animal husbandry	Animal nutrition	2	2	2	2	
		Graduate school	-	2	2		-	
8	UNILA	Agriculture	Agronomy	2	2	1	2	
			Forest Management	2	2	1	2	
9	UNLAM	Agriculture	Agronomy	1	2	1	1	
		Forestry	Forest Management	1	2	1	1	
10	UNMUL	Agriculture	Agronomy	2	2	2	2	
		Forestry	Forest Management	2	2	2	2	
11	UNPAD	Agriculture	Agronomy	2	2	2	2	
12	UNPAR	Agriculture	Forest Management	1	2	1	1	
16	UNRAM	Agriculture	Socioeconomy	1	2	1	1	
13	UNS	Agriculture	Socioeconomy	1	2	1	0	
14	UNSOED	Agriculture	Socioeconomy Agronomy	2	2	1	0	
15	UNTAD	Agriculture	Agronomy	1	2	1	0	
16	UNUD	Agriculture	Agronomy	2	2	2	1	
		Animal husbandry	Animal nutrition	2	2	2	2	
17	UNWIM	Forestry	Forest management	1	2	1	0	
18	DIKLAT, Bogor			1	2	2	2	
19	DIKLAT, Madiun			1	2	2	2	

Notes: 0 = poor ; 1 = sufficient ; 2 = excellent

Annex 2.5. Agroforestry materials and facilities

Table 2.14. Physical facilities in terms of library materials and laboratory equipment owned by various institutions potentially available to support agroforestry education

No	Institution			Physical Facilities			
	University	Faculty	Study program	Text-book	Journal	Laboratory equipment	Audiovisual equipment
1	IPB	Agriculture	Socioeconomy	1	0	0	1
			Agronomy	1	0	1	1
		Forestry	Forest management	1	1	1	1
2	UGM	Forestry	Forest management	1	1	1	1
		Agriculture	Agronomy and soils	1	0	1	1
3	UKSW	Agriculture	Agronomy	0	0	1	-
4	UNEJ	Agriculture	Agronomy and soils	0	0	1	1
		Polytechnic	Agriculture	0	0	1	1
5	UNHALU	Agriculture	Agronomy	0	0	0	0
6	UNHAS	Agriculture	Forest Management	0	0	1	1
			Soil Science	0	0	1	1
		Graduate school	-	0	0	-	1
7	UNIBRAW	Agriculture	Agronomy and soils	1	0	1	1
		Animal husbandry	Animal nutrition	0	0	1	1
		Graduate school	-	1	0	-	1
8	UNILA	Agriculture	Agronomy	1	0	1	1
			Forest Management	1	0	1	1
9	UNLAM	Agriculture	Agronomy	0	0	0	1
		Forestry	Forest Management	1	0	0	1
10	UNMUL	Agriculture	Agronomy	1	0	1	1
		Forestry	Forest Management	1	0	1	1
11	UNPAD	Agriculture	Agronomy	1	0	1	1
12	UNPAR	Agriculture	Forest Management	0	0	0	0
16	UNRAM	Agriculture	Socioeconomy	0	0	0	1
13	UNS	Agriculture	Socioeconomy	0	0	0	1
14	UNSOED	Agriculture	Socioeconomy Agronomy	0	0	0	1
15	UNTAD	Agriculture	Agronomy	0	0	0	1
16	UNUD	Agriculture	Agronomy	0	0	1	1
		Animal husbandry	Animal nutrition	1	0	1	1
17	UNWIM	Forestry	Forest management	0	0	0	1
18	DIKLAT, Bogor			0	0	1	1
19	DIKLAT, Madiun			0	0	1	1

Notes: 0 = poor ; 1 = sufficient ; 2 = excellent

Annex 2.6. Agroforestry in the national curricula for agriculture

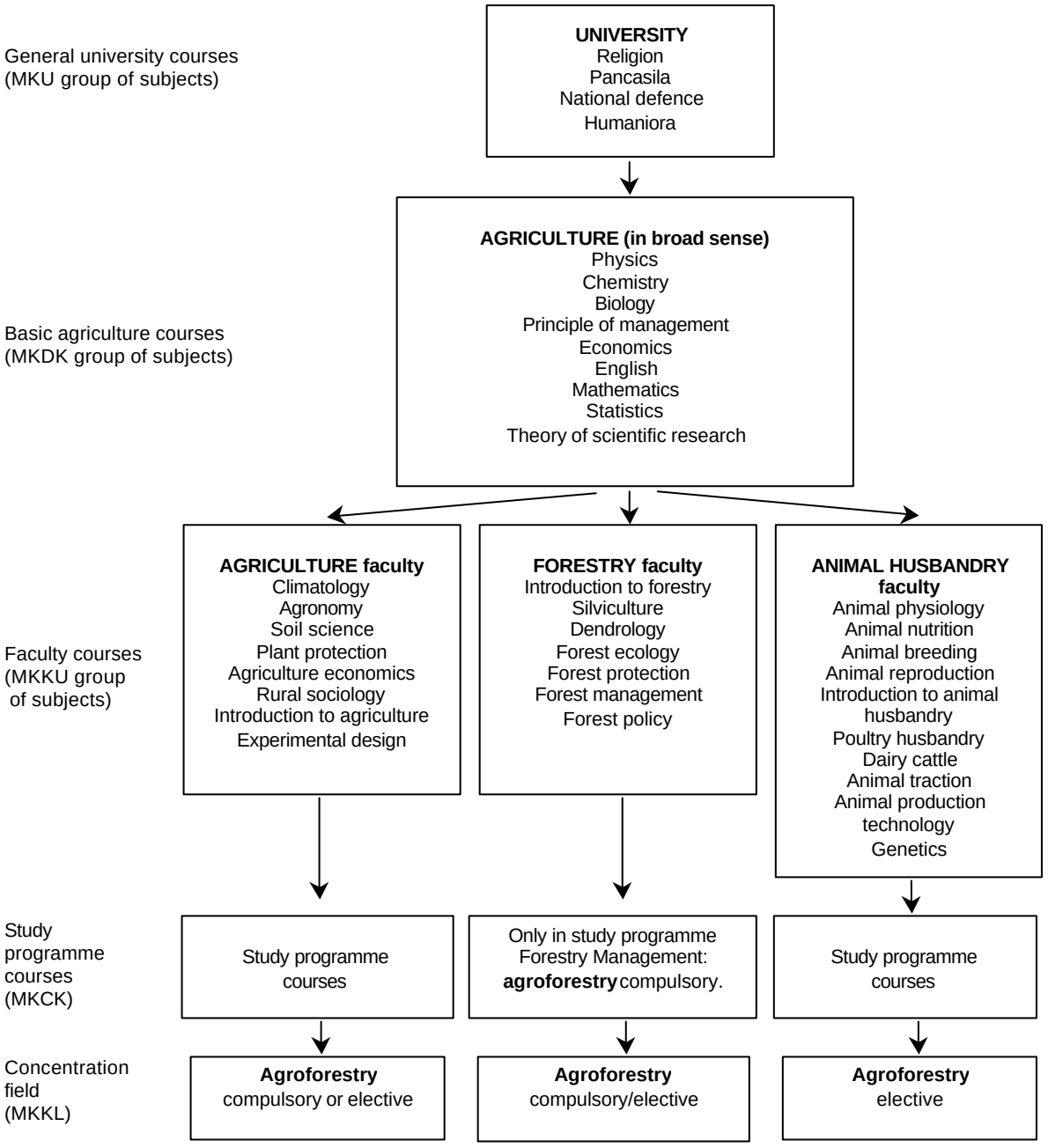

Figure 2.3. The position of agroforestry in the National Curricula for Agriculture in broad sense (agriculture, forestry, and animal husbandry)

Annex 2.7. Institutional collaboration

Table 2.15. Institutions collaborating in agroforestry with various universities that were studied

Name/type of institution	Frequency
Departments:	
Department of Forestry	+++
Department of Agriculture	+++
Department of Public Works	+
Department of Cooperatives	+
Department of Transmigration	++
Department of Environment	+
National state companies:	
Perum Perhutani (forest)	+++
PT Inhutani (forest)	++
PTP Nusantara (estates)	++
National research Institutes:	
National Research Institute for various crops	+++
Research Stations (locally)	++
International research institutes:	
ICRAF	+++
National or local private companies	++
Non-government organizations	++
Foreign universities:	
Kyoto University, Japan	+
Okayoma University, Japan	+
Wageningen Agriculture University, the Netherlands	+
Gottingen University, Germany	+
Wye College, England	+
International cooperation:	
NUFFIC, the Netherlands	+
JICA, Japan	++
GTZ, Germany	++
IDP, Australia	+
International foundations/banks	
Ford Foundation	+++
Asian Development Bank	+
World Bank	+

Explanation for the frequency:
+++ = mentioned by more than 4 university samples
++ = mentioned by 3-4 university samples
+ = mentioned by 1-2 university samples

Annex 2.8. Experimental plots

Table 2.16. Experimental fields and demonstration plots managed by surveyed institutions, and potentially able to support agroforestry education

No	Institution			Experimental Field		Remarks
	University	Faculty	Study program	ha	Location	
1	IPB	Agriculture	Socioeconomy	-		-
			Agronomy	5	Cikabayan	-
		Forestry	Forest management	359	Sukabumi	+ 20 ha arboretum
2	UGM	Forestry	Forest management	?	Wanagama I, Getas & Jambi	+ 2 arboretums
		Agriculture	Agronomy and soils			-
3	UKSW	Agriculture	Agronomy	-		-
4	UNEJ	Agriculture	Agronomy and soils	13	Jubung	-
		Polytechnic	Agriculture	-		-
5	UNHALU	Agriculture	Agronomy	-		-
6	UNHAS	Agriculture	Forest Management	50	Bulukumba	-
			Soil Science	-		-
		Graduate school	-	1300	Bengo-Bengo	-
7	UNIBRAW	Agriculture	Agronomy and soils	35	Cangar (Batu) & Jatikerto	-
		Animal husbandry	Animal nutrition	8	Jatikerto & Dau	-
		Graduate school	-	-		-
8	UNILA	Agriculture	Agronomy	1	Gedong Meneng	-
			Forest Management	50	Tanjungan	-
9	UNLAM	Agriculture	Agronomy	20	Cempaka	-
		Forestry	Forest Management	2000	Mandiangin	-
10	UNMUL	Agriculture	Agronomy			-
		Forestry	Forest Management			-
11	UNPAD	Agriculture	Agronomy	-		-
12	UNPAR	Agriculture	Forest Management	-		-
16	UNRAM	Agriculture	Socioeconomy	200	Kecamatan Bayan, Lombok Timur	-
13	UNS	Agriculture	Socioeconomy			-
14	UNSOED	Agriculture	Socioeconomy Agronomy			-
15	UNTAD	Agriculture	Agronomy	50	Sibalaya	-
16	UNUD	Agriculture	Agronomy			-
		Animal husbandry	Animal nutrition	10	Bukit	-
17	UNWIM	Forestry	Forest management	14	Sumedang	-
18	DIKLAT, Bogor			288 + 597	Majalengka, Sukabumi + Tabo-Tabo	
19	DIKLAT, Madiun					-

Annex 2.9. Acronyms and abbreviations of institutions

Acronym	Institution
INSTIPER	Institut Pertanian
IPB	Institut Pertanian Bogor
IPM Malang	Institut Pertanian Malang
PPLH	Pusat Pendidikan Lingkungan Hidup
PUSDIKLAT Kehutanan	Pusat Pendidikan dan Latihan Kehutanan
PUSDIKLAT Perhutani	Pusat Pendidikan dan Latihan Perhutani
RMI	Rimbawan Muda Indonesia
STP Surya Dharma	Sekolah Tinggi Pertanian “Surya Dharma”
STP Wuna Raha	Sekolah Tinggi Pertanian “Wuna Raha”
UGM	Universitas Gadjah Mada
UKSW	Universitas Kristen Satya Wacana
UNCEN	Universitas Cendrawasih
UNDANA	Universitas Nusa Cendana
UNEJ	Universitas Jember
UNHALU	Universitas Halu Oleo
UNHAS	Universitas Hasanuddin
UNIBRAW	Universitas Brawijaya
UNILA	Universitas Lampung
Univ. Bangkalan	Universitas Bangkalan
Univ. Dharma Agung	Universitas Dharma Agung
Univ. HKBP Nommensen	Universitas Huria Kristen Batak Protestan “ Nommensen”
Univ. Kadiri	Universitas Kadiri
Univ. Kapuas Sintang	Universitas Kapuas Sintang
Univ. Moch Sroedji	Universitas Mochammad Seroedji
Univ. Palembang	Universitas Palembang
Univ. Sarjanawiyata Taman Siswa	Universitas Sarjanawiyata Taman Siswa
Univ. Wijaya Kusuma	Universitas Wijaya Kusuma
UNLAM	Universitas Lambung Mangkurat
UNMUH Sumbar	Universitas Muhammadiyah “Sumatra Barat”
UNMUL	Universitas Mulawarman
UNPAD	Universitas Padjadjaran
UNPAR	Universitas Palangka Raya
UNRAM	Universitas Mataram
UNS	Universitas Sebelas Maret
UNSOED	Universitas Jendral Soedirman
UNSRAT	Universitas Sam Ratulangi
UNSYAH	Universitas Syahkuala
UNTAD	Universitas Tadulako
UNTAG Samarinda	Universitas “Tujuhbelas Agustus” Samarinda
UNTAN	Universitas Tanjungpura
UNUD	Universitas Udayana
UNWIM	Universitas Winaya Mukti
UPN Veteran Jawa Timur	Universitas Pembangunan Nasional “Veteran” Jawa Timur

Chapter 3

Agroforestry education in Lao PDR

Bounthene Phasiboriboun[5] and Somphanh Pasouvang[6]

Lao PDR—general background

Laos is a small landlocked country, with an area of 23.68 million hectares, 80% of which is mountainous and hilly. The total population of 4.47 million (1993) consists largely of farmers. The people belong to 68 groups, of which the main three are Lao Lum (55%), Lao Thung (30%), and Lao Sung (15%). The population density is 18 inhabitants per square kilometre and the population growth rate nearly 2.62% per annum (1993). Of an estimated gross domestic product per capita of $350 (1995), about 54% comes from agriculture and forestry.

The present forested area of Laos is 11.2 million ha, 47.2% of the total area of the country. Before 1950 the forest area was estimated to be 17 million ha or 70% of the total area. The forest area has been considerably reduced, mainly through logging, shifting cultivation and forest fires.

In Lao PDR rice is the main crop and the staple food. Due to limitations of land for permanent agriculture, 90% of farmers in the countryside practise slash and burn agriculture, especially in northern Laos. About 60% of the rice produced is grown in upland areas under shifting cultivation systems. An estimated 277,000 families are engaged in some kind of shifting cultivation with approximately 300,000 ha cleared annually for this purpose (Sindandit 1990). The government is striving to reduce shifting cultivation in pilot areas by, among other things, introducing suitable agroforestry systems to increase farmers' production and income. The programme covers several parts of Laos, but focuses on the north.

The government policy of growth with equity, the National Socio-Economic Development Plan 1996–2000, focuses on eight national priorities: food production, stabilization / reduction of shifting cultivation, commercial production, infrastructure development, improving socioeconomic management and foreign relations, rural development, human resources development, and services development.

The macroeconomic targets set by the government for the year 2000 include national economic growth of 8–8.5% per year. The targets set out in the Plan include stabilization of shifting cultivation. The government suggests to provide sedentary occupation to 80–100,000 families, 25–30,000 families in planting trees, 15–20,000 families in animal husbandry, and 40–50,000 families in rice- and crop cultivation.

Agroforestry curriculum development

In recent years several international projects have assisted the government of Lao PDR in research, information, and development projects to minimise slash-and-burn cultivation in different parts of the country. The Faculty of Agriculture and Forestry at the University of Laos takes part in promoting sustainable development of Lao PDR by providing diploma and BSc graduates in agriculture and forestry.

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Agroforestry was introduced into courses in the higher diploma programmes in 1989, and offered as a separate course from October 1990. It will be offered as a separate subject at the BSc level in 1999, in the Faculty of Agriculture and Forestry.

The Faculty of Agriculture and Forestry collaborates in training, demonstration, and research in agroforestry, with the Technical School of Agriculture and Forestry, the Research Centre of Agriculture and Forestry, and national and international agencies.

Methods of data collection

Questionnaires, verification visits, and a national workshop provided the data for this report.

The main analysis of data was carried out during the national workshop, arranged by the Faculty of Agriculture and Forestry, National University of Laos , 25–27 May 1998. Workshop participants included representatives of institutions and agencies involved in agroforestry training and education in Lao PDR: (Table 3.1).

Table 3.1. Institutions represented at the national agroforestry education workshop

Institution/organization	No. of participants
• Nakae Agricultural Training Centre (Savannakheth province)	1
• Namxuang Forestry Research Centre (Forestry Department, Ministry of Agriculture and Forestry)	1
• National Agricultural Research Centre (Napok)	1
• Forest Conservation and Watershed Protection Centre (Forestry Department, Ministry of Agriculture and Forestry)	1
• Dongkhamxang Technical Agriculture School	1
• Northern Agriculture and Forestry Extension Training Centre	1
• Southern Technical Agriculture School (Champasack province)	1
• Faculty of Agriculture and Forestry (National University of Laos, Ministry of Education)	3
• Northern Technical Agriculture School	1
• Muangmai Forestry School (Forestry Department, Ministry of Agriculture and Forestry)	1
• Extension Project (Forestry Department, Ministry of Agriculture and Forestry)	1
• ICRAF-Indonesia	1

A team of four staff of the Faculty of Agriculture and Forestry coordinated and facilitated the workshop: Mr Bounthene Phasiboriboun, Mr Somphanh Pasouvang, Mr Somsavath Phommachak, and Mr Hounpheth Chanthavong.

The aims of the workshop were:

- to collect information on the status of agroforestry education and training in Lao PDR
- to analyse the needs for capacity building and institutional strengthening as related to agroforestry education and training
- to identify training needs in agroforestry
- to suggest how agroforestry education and training could be enhanced through regional networking.

Current state of agroforestry in the country

Agroforestry curricula

There is no full agroforestry programme in Lao PDR. The subject is included as courses, or parts of courses, in BSc, higher diploma and mid-level certificate programmes (Table 3.2).

Table 3.2. Formal agroforestry education in Lao PDR

Type of institution	No. of insti-tutions	No. of curricula that deal with agroforestry			Number of courses that deal with agroforestry				
					BSc and HD		MLC		
		BSc	HD	MLC	Separate course (core or elective)	Inte-grated into existing courses	Separate course (core or elective)	Integrated into existing courses	Thesis
University	1	2	2		4				
Technical School	4			4			2	1	1
Total	5	2	2	4	4		2	1	1

HD—Higher Diploma; MLC—Mid-Level Certificate

Agroforestry is also the subject of a number of training courses in five different training and research institutions. The following section summarizes current agroforestry education and training in Lao PDR.

Bachelor level

The Faculty of Agriculture and Forestry of the National University of Laos provides a BSc programme in agriculture and forestry. The BSc takes five years: two years in the School of Foundation Studies and three years at the Faculty of Agriculture and Forestry. The third year (first year of FAF) is common for all students, while students in the fourth year specialize in forestry and agriculture.

The agroforestry course in the BSc programmes at FAF is optional for agriculture students in plant sciences and animal sciences, but a core course for forestry students. The course is three credits, which equals four hours per week in an 18-week semester.

Higher diploma level

The Dongdok Forestry School was upgraded from mid-level certificate to higher diploma in 1986, and Nabong Agriculture School was upgraded in 1992. Agroforestry is offered since 1992 to students at the two campuses (that since 1995 is part of National University of Laos). The main agroforestry course is 'Principles of agroforestry systems' which includes agrosilvicultural systems, agrosilvopastoral systems, etc. The course is two credits (three hours a week for one semester).

Mid-level certificate or technical school

Agroforestry curricula for the mid-level certificate are modified from the higher diploma curricula. An agroforestry course is offered at Dongkhamxang Technical Agriculture School (DTAS) and Muangmai Forestry Technical School (MFTS). Agroforestry is not yet offered in Northern Technical Agriculture School (NTAS) and Southern Technical Agriculture School (NTAS), but it is included in the treatment of other subjects such as sustainable agriculture, soil improvement, and cropping systems. National workshop participants from these two institutions proposed that agroforestry should be offered as a separate subject in these technical schools.

Non-formal education

Short-term agroforestry training programmes are offered for both government staff and farmers in the training and extension centres. For example, in 1998, the Northern Agriculture and Forestry Extension Training Centre offered a short training course on agroforestry systems (agrosilvicultural systems, agrosilvopastoral systems), and one on forest communities of 200 hours. They also offered a 200-hour course on sustainable agriculture.

Educational institutions in Lao PDR

Universities

Lao PDR has only one university: the National University of Laos, established in 1995 by combining several technical colleges and universities. The university has eight faculties, including the Faculty of Agriculture and Forestry (FAF), which was created by merging the Nabong Agriculture College and the Vientiane Forestry College, Dongdok. FAF offers higher diploma and BSc degrees.

The higher diploma is a three-year programme: the first and second year are common for all students and the third year consists of specialized studies. The BSc programme consists of five years, the first two years of foundation studies at Dongdok campus, and the latter three of specialized studies.

The former Nabong Agriculture College and Vientiane Forestry College have offered agroforestry education since 1992 in their higher diploma programmes, and is preparing for an agroforestry course in the BSc programme to begin in 1999.

Of the 54 teaching staff in the FAF, five teach agroforestry: two MSc- and three BSc-holders.

Technical schools

Lao PDR has four technical schools relevant to agroforestry:

Northern Technical Agriculture School

The Northern Technical Agriculture School was established in 1989 at Pakxuang village, Luangphrabang province. It trains crop and animal production specialists for the northern provinces. The school offers a three-year mid-level certificate programme. The first two years consist of common studies for all students and the third year is devoted to specialized studies. The curriculum contains 40% theoretical studies and 60% practical work. The sixth term is a 'student's practice' including report writing.

Agroforestry is not a course of its own, but is covered in courses such as sustainable agriculture, environmental protection and soil improvement. The school collaborates with *Coopération internationale pour le développement et la solidarité*, to receive funds for training teaching staff, facilities (animal farm, fish ponds, etc) and students' practice. It is also supported by the organization 'Canadian Funds'.

There are also short term training courses at the school. Last year it offered a training course for farmers on organic fertilisers.

Southern Technical Agriculture School

The Southern Technical Agriculture School was established in 1980–84 in Pakse District, Champasack province. Like the Northern Technical Agriculture School it is overseen by the Ministry of Agriculture and Forestry. They have identical study programmes. The school is receiving funds from *Coopération internationale pour le développement et la solidarité* until the year

1999, and is collaborating with Canadian Funds, arranging training and extension for farmers on biomass production. It plans to train farmers in sustainable agriculture in 1999. The school has 26 teachers and 172 students (43 female).

Dongkhamxang Technical Agriculture School

Dongkhamxang Technical Agriculture School was established in 1987 in Vientiane Municipality, under the Ministry of Education. It offers a three-year mid-level certificate in crop production and forestry. Most of its staff are graduates from Nabong Agriculture College, Muangmai Forestry Technical School, and from Russia. The school has offered an agroforestry subject since the 1996–97 school year. It has 16 teachers and 139 students.

Muangmai Technical Forestry School

Muangmai Technical Forestry School was established in 1983 in Muangmai District, Borikhamxay province. The funds are provided by the Swedish International Development Cooperation Agency (Sida), to train workers for the forestry sector. The school is administered by the Ministry of Agriculture and Forestry. In 1985, the training centre was upgraded to a technical school, with a three-year certificate forestry programme. The first two years of the programme are common studies for all students, and the third year is specialized.

Its agroforestry course includes principles of agroforestry as agrosilvicultural systems, agrosilvopastoral systems, etc.

Research and training institutions

A number of research and training institutions under the Ministry of Agriculture and Forestry are involved in agroforestry-related activities:

Northern Agriculture and Forestry Extension Training Centre

Xieng Ngeune Forestry School, established in 1988, offers a three-year mid-level certificate programme. In 1995 the school became the Northern Agriculture and Forestry Training Centre. It offers short-term training courses for government staff and for farmers. The courses include agroforestry and are funded by the National Forestry Research Centre.

During 1995–98, the institution offered 20 courses in collaboration with international organizations—seven courses for local level, three courses for government staff, two courses for farmers, and two combined courses for government staff with farmers. The centre has done experiments with 12 villages, but progressed only in two villages.

The centre has some orchard plots for demonstration purposes. It has 13 teaching staff: ten with higher diplomas / MScs, one with a mid-level certificate, and two with vocational level certificates. The institution lacks English and plant sciences teachers.

Nakae Agriculture Training Centre

The Nakae Agriculture Training Centre was established in 1995, in Savannakheth province. It offers short-term training courses on agriculture for government officers and farmers in the middle and southern regions, on courses such as plant propagation, mushroom production, soil improvement and vegetables. The centre has four teaching staff, all with higher diplomas.

National Forestry Research Centre

The National Forestry Research Centre, in Naxaythong District, Vientiane Municipality, was established in 1995, supported by Sida. The institution works closely with Sepon Forestry

Training Centre, Savannakheth province, and the Northern Agriculture and Forestry Extension Training Centre.

National Agriculture Research Centre

The National Agriculture Research Centre is the main agriculture research centre in Lao PDR. It is located in Thadockham village, Xaithany District, Vientiane Municipality. Its main purposes are to produce agriculture specialists and agricultural seeds. It offers training courses of 2–3 weeks length, containing 60% theory and 40% practice. The centre has five trainers, three with PhDs, one MSc and one diploma. There are about 35 participants in each training course.

Forestry Conservation and Watershed Protection Centre

The Forestry Conservation and Watershed Protection Centre in Vientiane Municipality was established in 1992 under the Department of Forestry, Ministry of Agriculture and Forestry. Its main purpose is to promote forest protection and watershed management, including soil erosion protection. It plans to train farmers with a GTZ project and trainers from the Faculty of Agriculture and Forestry.

NGOs and international organizations

Several NGOs and international organizations are involved in agroforestry development. They support education and training institutions in different ways:

Coopération internationale pour le développement et la solidarité provides agricultural training and extension service at the provincial level. The project supports agriculture curriculum development in mid-level certificate, and promotes integrated sustainable agriculture and technology development. Among the techniques it promotes are alley cropping, rice banks, natural rice farming, composting, biological pesticides, green manure, irrigation systems and veterinary networks.

The **Canadian University Service Overseas** supports the rural development centre in Luangphrabang province by providing community forestry workshops, a community forestry project and a sustainable upland agriculture project (networking, workshop, extension and on-farm trials).

The Japanese International Cooperation Agency runs an agroforestry project in the Vangvieng District, Vientiane province. The project started in early 1996, and will run for a total of 20 years. The project covers 15 villages, nine in Vangvieng District and six in Hinherb District. In 1997-98 the project started to planted trees mixed with agricultural crops like pineapple and banana, in *Imperata* grasslands.

The aims of the project are to rehabilitate *imperata* grasslands through agroforestry to improve the living standard of the villagers, and to extend agroforestry to the farmers. In 1998, 221 families participates in the project. The project provides a revolving fund for the farmers to buy necessary equipment for fencing, planting, weeding, etc. The project staff consists of four Japanese experts and nine Laotians: one MSc, one BSc, four higher diploma and three certificate holders.

The **Lao-Swedish Forestry Programme**, under the Department of Forestry, is involved in agroforestry research, training and extension, and is supported by the Swedish International Development Cooperation Agency (Sida). One of the programme's activities is work on shifting cultivation stabilization. A recent survey by the programme showed that agroforestry is one of the top three priorities for training within the Forestry Department.

Mennonite Central Committee coordinates an integrated development project, that includes alley cropping, fish ponds, animals, rice banks, home gardens, and veterinary services for

sustainable agriculture. It has been active in alley cropping in Houaphanh and Phongsaly provinces and in the Vientiane municipality since 1992. In total, 25 alley cropping plots in 11 villages, with the total area of 7.2 ha, have been established by the project in lowlands, midlands and highlands, with different Lao ethnic groups.

Government extension organizations

The extension organization system in Lao PDR is the responsibility of the Department of Agriculture and Extension, the Ministry of Agriculture and Forestry at the central level, and the Section of Agriculture and Forestry at district and provincial levels.

Synthesis information on agroforestry education

Teaching staff

National University of Lao PDR, Faculty of Agriculture and Forestry

At the FAF, the faculty members have the qualification shown in Table 3.3:

Table 3.3. Qualifications of teaching staff at FAF

Department	PhD	MSc	BSc	HD	MLC	Total
Animal production		2	1	2	3	8 (2 females)
Crop production	1	6	1	2	2	12 (no females) including the Dean and the Vice Dean
Forestry	1	4	2			6 (1 female)
Total	2	12	4	4		26 (3 females)

HD: Higher Diploma; MLC: Mid Level Certificate

Short- and long-term training of teaching staff is supported by the government and by international organizations. In 1996-97, two faculty members of FAF were trained in agroforestry in Mae Jo University, Thailand, for one year each.

The technical schools, research and extension training institutions involved in agroforestry activities have in total 106 teaching staff members. Their qualifications are presented in table 3.4. The main problems among teaching staff are lack of agroforestry experiences and lack of English skills.

Table 3.4. Qualification of teaching staff in technical schools, research and extension training institutions

Institution	No of teachers	PhD	MSc	BSc	HD	MLD	Vocational
• Northern Agriculture Technical School	17						
• Southern Agriculture Technical School	26						
• Dongkhamxang Agriculture Technical School	20						
• Muangmai Forestry Technical School	16						
• Northern Agriculture and Forestry Extension Training Centre	13				10	1	1
• Nakae Agriculture Training Centre	4				4		
• National Agriculture Research Centre	4	2	1		1		
• National Forestry Research Centre	3		2	1			
• Forest Conservation and Watershed Protection Centre	3			2	1		
Total :	106						

Physical facilities

Education and training institutions in Lao PDR have basic facilities such as laboratories, libraries, books, teaching manuals, computers, photocopying machines, slide projectors and overhead projectors. However, the quantity and quality of these facilities are not enough for effective teaching and learning of agroforestry in Lao PDR. The availability of agroforestry books in the libraries is very limited. There is also a lack of demonstration plots and agroforestry farms for students' practical work.

Students

Since 1996 students were enrolled in a four-year BSc programme (Table 3.5). This is replaced by a five-year BSc programme, introduced in October 1998. Every year, about 90 students will be enrolled in the new programme.

Table 3.5. Anticipated student enrolments in programmes relevant to agroforestry

Level	No. students	Remarks
BSc, 4-year programme	60	
BSc, 5-year programme	0	starting in Oct. 1998
Higher Diploma (HD)	555	40 female students
Mid Level Certificate (MLC)	673	200 female students
Non-Formal Education (NFE)	500/year	

Higher diploma students normally have a mid-level certificate, and have worked for the government for at least two years. Mid-level certificate students enter from high schools, almost all of them selected by quota of the government education plan (Figure 3.1).

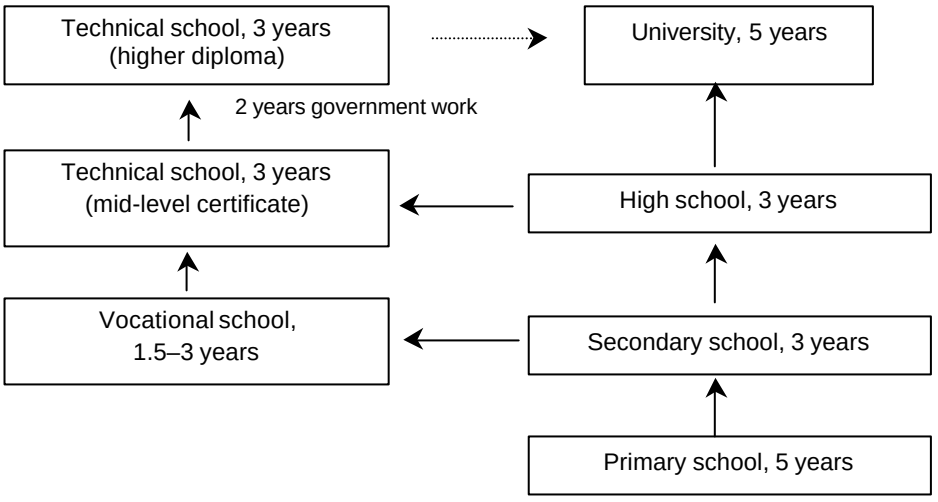

Figure 3.1. The educational system in Lao PDR

Graduates

To varying degrees, graduates from higher diploma and mid-level certificate have studied agroforestry. A fairly large number have also attended non-formal education in agroforestry (Table 3.6).

Table 3.6. Graduates with agroforestry studies in their education and training

Student levels	No. graduates	Remarks
BSc	0	started 1996
Higher diploma	350	
Mid level certificate	100	
Non-formal education	500 a year	

Half of the graduates get job in the government, and the remaining half look for jobs in the private sector, or are self-employed.

Research

Agroforestry research is just starting in Laos. As in the JICA agroforestry project in Vangvieng District, the farmers participate in project activities. In 1998, one crop production student conducted research on agroforestry on a rice/leguminous agroforestry system.

Extension

Extension is practised mainly in the agriculture sector. Agroforestry extension is still rare due to lack of specialists in this field.

Administration and policy

Since the revolution of 2 December 1975, government policy has focused on improving social welfare and living standards. Agriculture and forestry have been the primary focus for this change, including the expansion of agricultural production and the development of processing industries. Agriculture and forestry are of major direct and indirect importance in the country's economy.

In the last two decades, natural disasters such as droughts, floods, dried-up streams, and soil erosion have resulted in lower agricultural yields and shortages of food. The government, including the Ministry of Agriculture and Forestry, understands that these problems partly result from the destruction of forests. The preservation of existing forest and the rehabilitation and regeneration of more forest areas by stabilizing slash-and-burn cultivation will prevent further encroaching into the forest. Lao PDR has geared its efforts towards sustainable forest management in order to protect the natural environment, as expressed in the National Socio-Economic Development Plan 1996–2000.

Institutional links

Institutional links play a dominant role in developing agroforestry education in Lao PDR. The university, research institutions, technical schools, training institutions, the Ministry of Agriculture and Forestry, and international organizations all have moderate or strong links with each other. International organizations have a particularly strong link with the university, the research institutes, and the Ministry of Agriculture and Forestry.

Needs for future development

The participants in the national workshop identified the following needs for the development of agroforestry education and training in Lao PDR:

First priorities:

- Develop the curriculum of agroforestry in the Faculty of Agriculture and Forestry, National University of Laos
- Develop specific curricula in agroforestry for each level of education at technical school, training institution or university. (Currently, agroforestry curricula are not adapted to the specific needs of different levels).
- Separate the training centres' agroforestry curricula for different levels (e.g. village levels, technician levels)
- Discuss agroforestry curricula in the curriculum committees for different levels and coordinate these with each other.

Second priorities:

- Upgrade the staff and teachers: in the short term through informal training and in the long term through upgrading academic qualifications
- Give more attention in agroforestry teaching to field practice
- Increase the number of agroforestry teachers

Third priorities:

- Make the Faculty of Agriculture and Forestry responsible for agroforestry experiments, in coordination with other concerned institutions
- Concentrate agroforestry experiments in each of the three regions of Lao PDR (North, Middle and South).

Fourth priority:

- Coordinate agroforestry activities—budgets, technology, and information systems—in Lao PDR through the Faculty of Agriculture and Forestry in national institutions (National University of Laos, Ministry of Education, Ministry of Agriculture and Forestry, etc.) and international institutions (ICRAF, GTZ, CCL, NGOs, etc.) .

Fifth priority:

- Apply the results gained from agroforestry experiments to villagers and farmers, specifically farmers in remote areas, through extension activities or sharing demonstration plots with the farmers.

Annex 3.1 Summary of institutional information

The results of the questionnaire is summarized in Tables 3.7–3.14 below.

Table 3.7. Agroforestry curricula in Lao PDR

Institution	Programme/Course	AF content			
		AF as separate course	AF as topic in other courses	AF thesis	AF seminar
• Northern Agriculture and Forestry Extension Training Centre	Technician Agroforestry Systems, Agro Silvicultural Systems		x		
• Northern Agriculture and Forestry Extension Training Centre	Forest Community/ Agroforestry	x			
• Namxuang Forestry Research Centre	Land Use and Land Improvement		x		
• Namxuang Forestry Research Centre	Agroforestry	x			
• Namxuang Forestry Research Centre	Agroforestry Applied in Household				x
• Forest Conservation and Watershed Protection Centre	Agroforestry Applied in Household				x
• Nakai Agricultural Training Centre	Sustainable Agriculture		x		
• National Agriculture Research Centre					
• Northern Technical Agriculture School	Agriculture and Livestock	x			
• Dongkhamxang Technical Agriculture School	Agroforestry	x			
• Dongkhamxang Technical Agriculture School	Thesis/Technical report			x	
• Southern Technical Agriculture School	Principles of Natural resources Protection		x		
• Faculty of Agriculture and Forestry	Agroforestry	x			
• Faculty of Agriculture and Forestry	Agroforestry and Land Use			x	
• Faculty of Agriculture and Forestry	Agroforestry Applied in Household				x
• Muongmai Technical Forestry School	Principles of agroforestry	x			

Source: Questionnaire on agroforestry education 1998

Table 3.8. Formal degree training in agroforestry

Institution	Agroforestry offered *(1,2,3,4)	Programme or course duration	Year started	Dept./Unit spearheading program
• Northern Agriculture and Forestry Extension Training Centre (NAFETC)	1	200 hours	1988	Forest Department (forestry unit)
• Namxuang Forestry Research Centre (NFRC)				
• Forest Conservation and Watershed Protection Centre (FCWPC)				
• Nakai Agricultural Training Centre (NATC)	1	1–2 weeks	1995	General Agriculture
• National Agriculture Research Centre (NARC)				
• Northern Technical Agriculture School (NTAS)	3	3 years	1989	Agriculture and Livestock
• Dongkhamxang Technical Agriculture School (DTAS)	1	3 years	1987	Agriculture-Livestock-Forestry
• Southern Technical Agriculture School (STAS)	1	20 weeks	1996	Agriculture-Livestock-Veterinary
• Faculty of Agriculture and Forestry (FAF)	2	48 × 2 = 96 hours	1999	Agriculture and Forestry
	4	2*(48 + 6 hrs. practice)	1990	Agriculture and Forestry
• Muongmai Technical Forestry School (MTFS)	1			

Source: Institution information, 1998
1: Technician's level
2: Baccalaureate level
3: Master's level
4: Other degree programme

Table 3.9. Agroforestry training

Institutions	Title of training course	Brief description	Duration	Target audience	No. of trainees	Source of funds
• Northern Agriculture and Forestry Extension Training Centre	Agroforestry	To improve and manage agricultural land by combining agriculture and forestry	2 weeks	Technicians and farmers	10 to 20	Sida Gov.
• Namxuang Forestry Research Centre						
• Forest Conservation and Watershed Protection Centre	Agroforestry	(Watershed management Project) Soil conservation and plantation	3 to 5 days	Villagers	30	Sida
• Nakai Agricultural Training Centre	Crop enhancement	Fruit trees	1 week	Villagers/district staff	100/years	Gov.
	Cultivation of mushrooms			farmers		
	Soil improvement	Soil analysis		farmers		
	Vegetable/décor trees	In the rainy season		farmers		
• National Agriculture Research Centre	Seed technology	Select,ion, storage, germination	6 weeks	Agricultural technician staff	35	Gov.
	Intensive rice growing	Growing technology	6 weeks	-"-	30	Lao-IRRI
	Rice experiments	Demonstration plots	4 weeks	-"-	35	Lao-IRRI
• Northern Technical Agriculture School	Integrated disease control	Insects/diseases survey	3 months (theory + practice)	farmers	20	FAO
• Dongkhamxang Technical Agriculture School						
• Southern Technical Agriculture School	Local medicine and compost	Local medicine and compost technology	10 days	farmers	326	Canadian funds
	Cultivation of mushrooms		5 days	farmers	10	Canadian funds
	Basics of agriculture	Cropping system	10 days	farmers	24	Canadian funds
	Training of trainers	In the field of agriculture	30 days	District staff	48	Farmer Irrigation for Agriculture Training
• Faculty of Agriculture and Forestry						
• Muongmai Technical Forestry School	?					

Source: Institution information, 1998

Table 3.10. Teaching staff involved in agroforestry and training

Institution	No. of staff involved in agroforestry	Educational qualifications of staff	Short term training needs with priority areas
• Northern Agriculture and Forestry Extension Training Centre	3	2 vocational level 1 technician	Community forestry Green manure cover cropping for highlands Highland agroforestry development technology
• Namxuang Forestry Research Centre	4	1 MSc 2 BSc 1 diploma	Seminar on agroforestry and linkage of experiences
• Forest Conservation and Watershed Protection Centre	3	2 BSc 1 diploma	Agroforestry and watershed management
• Nakai Agricultural Training Centre	4	4 technicians	Training of trainers
• National Agriculture Research Centre	4	1 PhD 1 MSc 2 BSc	Agroforestry related sustainable agriculture
• Northern Technical Agriculture School	8	4 BSc 4 technicians	Cattle and pig breeding Equipment applied in soil analysis Agroforestry and extension
• Dongkhamxang Technical Agriculture School	4	4 technicians	Agroforestry development
• Southern Technical Agriculture School	7	4 BSc 3 technicians	Agroforestry and sustainable agriculture
• Faculty of Agriculture and Forestry	5	2 MSc 3 BSc	Agroforestry and sustainable agriculture Agroforestry and watershed management
• Muongmai Technical Forestry School			

Source: Institution information, 1998

Table 3.11. Agroforestry demonstration areas

Institution	On station/ farm	Location	Size	Agroforestry techniques being taught or demonstrated
• Northern Agriculture and Forestry Extension Training Centre	station	NAFETC	63 m x 35 m	Integrated cropping systems
• Namxuang Forestry Research Centre	station	Namxuang		Forest plantation and agroforestry
• Forest Conservation and Watershed Protection Centre	farm	Huaikhong vil. and Dansavanh vil.	Model farmer areas	Upland agroforestry demonstration at village level in the target group of watershed management project
• Nakai Agricultural Training Centre	station	Experiment plot of fruit trees	2.5 ha	Integrated organic farming systems
• National Agriculture Research Centre	station	Thadockham village (each station of each province)	1–30 ha	Organic compost application Seed production Mechanics application
• National Agriculture Research Centre	farm	Village farms (share demonstration plots with the farmers)	1600–3200 square metres	Integrated rice farm Mechanics application Cropping systems (sequential cropping)
• Northern Technical Agriculture School	station	NTAS	3 ha	Fish breeding technology
	farm	NTAS		Cultivation of mushrooms
• Dongkhamxang Technical Agriculture School	station	DTAS	13.6	Integrated rice farm
• Southern Technical Agriculture School	station	STAS	0.8 ha	Seedling production, mushroom making, cropping system, livestock (fish, poultry, cows, etc.)
• Faculty of Agriculture and Forestry	station	Nabong campus	50000 square metres	Cropping systems and livestock (fish, poultry, cows, pigs, etc.)
	farm	Sangthong District	24.8 ha	Integrated cropping systems (trees with crops)
• Muongmai Technical Forestry School				

Source: Institution information, 1998

Table 3.12. Research activities

Institution	Research project	Brief description	Target clientele	Source of funds	Duration
• Northern Agriculture and Forestry Extension Training Centre					
• Namxuang Forestry Research Centre	Forestry research	Collaborative research between members under Asia Pacific Forest Rehabilitation Network	FRC, DoF under FAF (NUOL)	Forestry Research Support Programme for Asia and the Pacific (FAO)/ Forest replanting and management	First phase: 2 years Second phase: 5 years
• Forest Conservation and Watershed Protection Centre					
• Nakai Agricultural Training Centre	Mushroom growing	Mushroom experimental plot	farmers	government	1 week
• National Agriculture Research Centre	Fish breeding	Artificial fish breeding experiment	Staff/farmers	government	2 years
	Rice growing	Intensive rice growing experiment	Staff/farmers	Lao-IRRI	2 years
	Cotton growing	Cotton growing experiment	Staff/farmers	France	3 years
• Northern Technical Agriculture School	Organic soil improvement	Plough after rice harvested and put the manure 10 tons per hectare	Technical staff	*Coopération internationale pour le développement et la solidarité*	4 to 5 years
	Integrated insect control	Survey the good insects for destroying the damage insects	Technical staff	FAO	3 to 4 years
• Dongkhamxang Technical Agriculture School	Rice, fruit trees, crops livestock (fish, pig, cows, buffaloes) seedlings and trees plantations	Data collection and Technical report writing	students	government + international organizations	1 year
• Southern Technical Agriculture School	Compost	Soil improvement by compost used	students	FAO, *Coopération internationale pour le développement et la solidarité*	2 years
• Faculty of Agriculture and Forestry	Agriculture	Cropping system experiments	students	France	3 years
	Livestock	Fish breeding/pig breeding experiments	students	France, Japan	3 years
	Forestry	Study on indigenous/fast growing trees, etc.	students	GTZ	5 years

Source: Institution information, 1998

Table 3.13. Extension activities

Institutions	Research project	Brief description	Target clientele	No. of trainees	Source of funds	Duration
• Northern Agriculture and Forestry Extension Training Centre	Paper mulberry planting	Transfer technology	villagers	18	government + Sida	1 week
	Cash crop planting		villagers	18	government + Sida	1 week
	Fruit trees planting		villagers	18	government + Sida	1 week
• Namxuang Forestry Research Centre						
• Forest Conservation and Watershed Protection Centre	Soil erosion protection project	Sustainable agriculture and forestry	villagers	30	Sida	1 week/1 time
• Nakai Agricultural Training Centre	Cropping system	Crops with fruit trees	villagers	60	government	(1 week/1 time) x 3
• National Agriculture Research Centre	Bean growing	Transfer technology	staff	30	International agencies	1 year
• Northern Technical Agriculture School	Rice growing by putting manure	Transfer technology	students	30	*Coopération internationale pour le développement et la solidarité*	4 months
	Fish raising in the net		students	30	*Coopération internationale pour le développement et la solidarité*	4 months
• Dongkhamxang Technical Agriculture School						
• Southern Technical Agriculture School	Local medicine, compost	Transfer technology	farmers	310	Canada	5 days
• Faculty of Agriculture and Forestry	Cropping system, livestock (fish, pig, poultry), trees plantation	Transfer technology	farmers	400	France, Technical Cooperation of Germany	10 days

Source: Institution information, 1998

Table 3.14. Institutional links

Institutions	Organization/agency	Nature of link
• Northern Agriculture and Forestry Extension Training Centre	District, Lao-IRRI, FAF, NUOL	Technical aspects
• Namxuang Forestry Research Centre	FAF, Department of Forestry ,Ministry of Agriculture and Forestry, FORSPA (in Forest Rehabilitation Network)	Technical aspects
• Forest Conservation and Watershed Protection Centre	Vientiane province Office, Department of Forestry	Demonstration plot of agroforestry at the local level
	Sida, Mekong River Commission	Enhance demonstration plot for villagers
• Nakai Agricultural Training Centre	Ratsamongkoun Institute (Thailand)	Technical and curriculum
	NGOs	Financial support
• National Agriculture Research Centre	Department of Agriculture	Technical assistance
	France project	Technical assistance
	LAO-IRRI	Technical assistance
• Northern Technical Agriculture School	CIDSE	Financial support for experiments, and for sustainable agriculture syllabus
	Food and Agriculture Organization of the United Nations	Financial support to train farmers and improve treatment of insect control
• Dongkhamxang Technical Agriculture School	DED (German Development Service)	Support for teaching manual improvements, teaching equipment, student field work, short term training and seminar, and student field visit
	16 Agriculture Production	
• Southern Technical Agriculture School	Ministry of Agriculture and Forestry, Department of Agriculture	Technical aspects (agriculture curriculum, training, local medicine, compost making, integrated crop protection
	CIDSE, CANADA fund, DED, IDRC, Food and Agriculture Organization of the United Nations	Improvement in student fieldwork, improvement of soil laboratory
• Faculty of Agriculture and Forestry	Ministry of Agriculture and Forestry, Ministry of Education, National University of Laos, Department of Forestry, Namxuang Forestry Research Centre, Upland Project, Watershed Management Project	Technical aspects
	GTZ, KfW (*Kreditbank für Weideraufbau*)	Technical aspects, assets and technical equipment
	France Project	Technical aspects, assets and technical equipment

Source: Institution information, 1998

Chapter 4

Status and needs of agroforestry education and training in Philippines

RA del Castillo[7]

Summary

This country report is based on two recent agroforestry education studies, namely the 1995 Philippine Agroforestry Education Needs Assessment (PHILAFENA), and the 1998 Study of Agroforestry Education and Training (SAFET) sponsored by the International Centre for Research in Agroforestry (ICRAF)/Sida-supported Southeast Asian Initiative on Agroforestry Education. PHILAFENA involved the use of survey questionnaires mailed to 146 state colleges and universities, including some private institutions in agriculture and allied fields. All but one of the 45 responses were from institutions offering formal degree programmes at the tertiary level, or preparing to offer agroforestry curricula. The schools with existing agroforestry curricula were visited by a team of researchers for a more detailed profiling and assessment of needs. SAFET included validation and follow-up activities, profiling of new agroforestry schools and determining development needs of these and other institutions involved in short training courses in agroforestry.

Agroforestry schools and curricula have proliferated during the past two decades. In addition to the school that pioneered in the development and implementation of the BS in Agroforestry curriculum in 1976, 25 other agriculture and forestry schools have instituted four other degree programmes in agroforestry (BS Agriculture major in Agroforestry, BS Forestry major in Agroforestry, BS Agroforestry Entrepreneurship, and Bachelor of Agroforestry Technology).

In an attempt to safeguard the quality of agroforestry education, in 1981 the Ministry of Education, Culture and Sports (now Commission on Higher Education) issued guidelines and minimum standards for agroforestry curricula. However, it considered and recognized agroforestry only as a major field in the BS Agriculture and BS Forestry curricula. Studies of prescribed minimum standards showed that many existing curricula are deficient not only in fundamental agriculture and forestry courses but in major courses as well. Meanwhile, the other existing agroforestry curricula, i.e. BS Agroforestry, BS Agroforestry Entrepreneurship, and Bachelor in Agroforestry Technology, are still not covered by guidelines or minimum standards.

Technical level curricula are available in seven schools, as a stand-alone two-year program, as the first two years of a ladderized[8] baccalaureate curriculum, or as the first three years of a ladderized curriculum leading to the BS in Agroforestry Entrepreneurship. Two postgraduate curricula exist in the Philippines, a one-year Diploma in Agroforestry, or the full two-year MS in Agroforestry. In addition, agroforestry is offered as a major in the MS in Rural Development, and in the PhD in Crop Production and Management.

Short training courses are available in some agroforestry schools, in training institutions run by non-government organizations, and in some national government agency-managed regional

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[8] Students can choose to end after 2 year with at diploma degree, or continue at the baccalaureate curriculum

training centres. Most of these courses cater to field technicians and upland farmers. They range in duration from a day to three weeks. The Institute of Agroforestry at the University of the Philippines, Los Baños, College of Forestry and Natural Resources regularly offers six courses in various aspects of agroforestry. These are Agroforestry Production and Post-Production Systems (3 weeks), Agroforestry Project Planning and Management (1 week), Seed Technology and Nursery Management (2 weeks), Soil and Water Conservation and Management (2 weeks), Integrated Pest Management in Agroforest Farms (1 week) and Technology Verification through On-Farm Trials (1 week). Other courses are offered as requested.

Agroforestry education, research and extension, including short-term training, are expected to develop faster in the years ahead. In 1995 the government adopted 'community-based forest management' as the national strategy to achieve sustainable forestry and social justice, with agroforestry as one part of its implementation. The law, directed at the modernization of agriculture and fisheries, provides support for major development components including education, research and extension. The implementing rules and regulations identified agroforestry as one of the 11 fields[9] that will be the focus of development.

Historical background

The 1970s marked a turning point in the government's policy on forest occupancy, from the traditional regulatory approach that employed punitive measures, to a more development-focused, people-oriented approach in dealing with the age-old problem of *kaingin*-making or slash and burn farming.

In 1971 the Department of Agriculture and Natural Resources issued the *Kaingin* Management and Land Settlement Regulations. It embodied basic policies in *kaingin* management and signalled formal adoption of forest occupancy management as a forest development and conservation strategy. The implementing guidelines issued by the then Bureau of Forest Development emphasized management-in-place of forest occupants in the development of the uplands.

These developments led to the formal adoption of agroforestry as a development strategy as specified in the Forestry Reform Code formulated in 1974. The Revised Forestry Code of the Philippines issued in 1975 prescribed agroforestry development in the management of occupied forestlands. The Philippine government also recognized *kaingin* management and agroforestry development in the management of upland areas.

The formal adoption of agroforestry as a development strategy in the 1970s stimulated education and research in this newly evolving field. The demand for trained human resources in agroforestry increased. The government introduced an increasing number of people-oriented forestry programmes, and the trend was also shown by the research and development projects of big timber companies, notably the Paper Industries Corporation of the Philippines and the Nasipit Lumber Company.

As a result, some enterprising agriculture and forestry colleges started developing agroforestry education and research programmes as early as mid-1970s. The Don Mariano Marcos Memorial State University successfully instituted the BS in Agroforestry curriculum in 1976. The University of the Philippines Los Baños (UPLB) focused on research and development projects aimed at the promotion of sound agroforestry practices. Among these projects were the Ford Foundation-funded Upland Hydroecology Program, a multidisciplinary program that looked into effective ways of working with people to rehabilitate degraded grasslands; the University

[9] including agricultural economics, agribusiness, and marketing; agricultural education and extension; agricultural engineering; animal science; crop and soil science; crop protection; fishery and aquaculture science; food science; marine fisheries; and veterinary medicine

of the Philippines Los Baños / Department of Natural Resources project on the 'Establishment of seed orchards and seed production areas' that established eight 'agroforestation' projects in different parts of the country; and the University of the Philippines Los Baños / Department of Natural Resources 'Integrated project for *Kaingin* control in the Philippines: a new approach to forest conservation'. The University of the Philippines Los Baños also teamed up with the Ministry of Education to promote the teaching of agroforestry in the primary and secondary levels on a pilot scale in the southern Tagalog region.

The landmarks in the development of agroforestry education and training in the Philippines have been:

1971 Forestry Administrative Order No. 62, *Kaingin* Management and Land Settlement Regulations—adopted forest occupancy management as basic policy.

1971 Bureau of Forest Development Circular no. 11–declared management in-place of occupants of public forestlands

1974 Forestry Reform Code—prescribed agroforestry as a major component of the forest occupancy management

1975 Presidential Decree no. 705, known as the Revised Forestry Code—prescribed agroforestry development in the management of occupied public forestlands

1976 First **BS in Agroforestry** curriculum at the Don Mariano Marcos Memorial State University

1977 Presidential Decree no. 1152 (Philippine Environmental Code)—prescribed agroforestry in the management of upland areas

1980 First **BSA major in Agroforestry** curriculum at the Pampanga Agricultural College

1981 First **2-year Technical level Agroforestry** curriculum at the Benguet State University

1981 Ministry of Education and Culture (MEC) Order no. 4, Series of 1981, prescribing the **Minimum Standards for Agricultural Education Allied Programmes (including agroforestry**) Aware of the increasing interest in agroforestry curriculum development among agriculture and forestry schools, the Technical Panel for Agricultural Education, with the assistance of the Policy and Technical Advisory Group (PATAG) of the Education Project Implementing Task Force (EDPITAF), formulated the Guiding Principles and Minimum Standards for Agroforestry Education. In 1981, the minimum standards for BS Agriculture major in Agroforestry and BS Forestry major in Agroforestry were adopted.

1984 First **BSF major in Agroforestry** curriculum at Ifugao State College of Agriculture and Forestry (ISCAF)

1992 Multisectoral workshop on agroforestry curriculum development organized by the University of the Philippines Los Baños Agroforestry Program (UAP) on November 23-26.

1994 First **BS in Agroforestry Entrepreneurship** curriculum at the Northern Mindanao State Institute of Science and Technology (NORMISIST)

1995 Implementation of the Philippine Agroforestry Education Needs Assessment (PHILAFENA) by the UAP in coordination with the Technical Panel for Agricultural Education.

1995 First **Bachelor in Agroforestry Technology Curriculum** at the Misamis Oriental State College of Agriculture and Technology

1995 Institution of the curricula leading to **MS in Agroforestry** and PhD in Crop Production and Management with agroforestry as a cognate at the Mariano Marcos State University (MMSU) and DMMMSU.

1996 An informal coalition of agroforestry schools tentatively called the Philippine Agroforestry Education and Research Network (PAFERN) operational through the initiative of University of the Philippines Los Baños Agroforestry Program.

1997 Institution of one-year **Post-graduate Diploma in Agroforestry** at the University of the Philippines Los Baños

1998 Implementation of the 'Study on Agroforestry Education and Training (SAFET) in the Philippines', part of the ICRAF/Sida-assisted Southeast Asian Initiative for Agroforestry Education.

1998 First National Agroforestry Education Workshop held on June 1–3, 1998 at the University of the Philippines Los Baños College of Forestry, Laguna

Method of data collection

Two major studies were conducted recently to assess the status of agroforestry education and training in the Philippines, the above-mentioned Philippine Agroforestry Education Needs Assessment project and the Study of Agroforestry Education and Training in the Philippines.

Philippine Agroforestry Education Needs Assessment (PHILAFENA)

The University of the Philippines Los Baños Agroforestry Program, now the Institute of Agroforestry, conducted the PHILAFENA project in 1995 under the Ford Foundation-assisted University of the Philippines Los Baños Program for Upland NGOs. The objectives were to determine the number and type of existing agroforestry curricula at undergraduate and graduate levels, profile the schools involved in their implementation, and make a general assessment of the needs to strengthen the academic programmes in these schools. Survey questionnaires were mailed to all of the 146 state and private agriculture and forestry colleges all over the country. Twentyone schools reported agroforestry curricula at the tertiary level. All but 1 of the remaining 24 that responded were preparing to offer agroforestry curricula. Schools that reported that they offer formal agroforestry curricula were subsequently visited and profiled.

Study of Agroforestry Education and Training (SAFET) in the Philippines

The SAFET project was part of the ongoing ICRAF/Sida-funded Southeast Asian Initiative for Agroforestry Education that involves five countries in the region: Indonesia, Thailand, Vietnam, Lao PDR and the Philippines. It enabled the University of the Philippines Los Baños Agroforestry Program to validate and update education data on the 21 agroforestry schools identified under PHILAFENA, to profile additional schools offering agroforestry curricula, and to determine development needs of these and other institutions involved in short training courses in agroforestry.

The project also provided partial support for a national workshop on agroforestry education, held at the University of the Philippines Los Baños College of Forestry (now College of Forestry and Natural Resources) on June 1–3, 1998. The participants were 41 faculty members and school administrators from 22 schools, curriculum specialists, practising professionals and training officers from the Commission on Higher Education, Technical Panel for Agricultural Education, Natural Resources Management Program of the Department of Environment and Natural Resources, and some non-government organizations. Participants shared institutional experiences in the implementation of various undergraduate and graduate curricula in agroforestry, reviewed the implementation of the government's minimum standards, and assessed institutional development needs. A set of recommendations was presented to the Chairperson of the Commission on Higher Education who kindly graced the closing ceremonies.

The education system in the Philippines

College level institutions in agriculture and allied courses, including those serving as homes to agroforestry, are generally classified as:

- chartered colleges and universities
- colleges / schools under the control and supervision of the Commission on Higher Education , and
- private colleges and universities.

The chartered colleges and universities, also known as state colleges and universities, were established by national legislation or by Presidential Decree, which has the force of law. A state college in this category—such as Misamis State College of Agriculture and Technology—may operate by itself, or under the aegis of a state university, as with the Benguet State University College of Agriculture. The highest policy-making body of a state university is its Board of Regents. State colleges, private colleges and universities have a Board of Trustees.

Colleges or schools of agriculture formerly under the supervision of the defunct Bureau of Vocational Education are now under the Commission on Higher Education (CHED). Not having a charter of its own, the college is headed by a Superintendent who is reporting to CHED as in the case of the Dingle Agricultural and Technical College (DATEC).

Graduation from high school is a prerequisite to college admission. By then, the student would have gone through 10–11 years of schooling, i.e. 6–7 years of primary and elementary grades, and 4 years of secondary education.

However, all high school graduates must pass the National College Entrance Examination to qualify for admission to the curricular programme in a college of his / her choice. In the case of agriculture, forestry and agroforestry, the baccalaureate level is 4–5 years depending upon the school and the curriculum being followed. After obtaining their baccalaureate degree, graduates can join a teaching, research or extension organization, practice their profession, or combine these activities. After a few years of service or practice, they can join a continuing education programme through non-formal training, or do graduate courses.

Non-degree technical programmes are available to new high schools graduates who do not attend college, who failed to meet the passing mark in the National College Entrance Examination, and to school leavers from high schools or colleges.

The Philippine tertiary level education system with special focus on agricultural education is shown in Figure 4.1

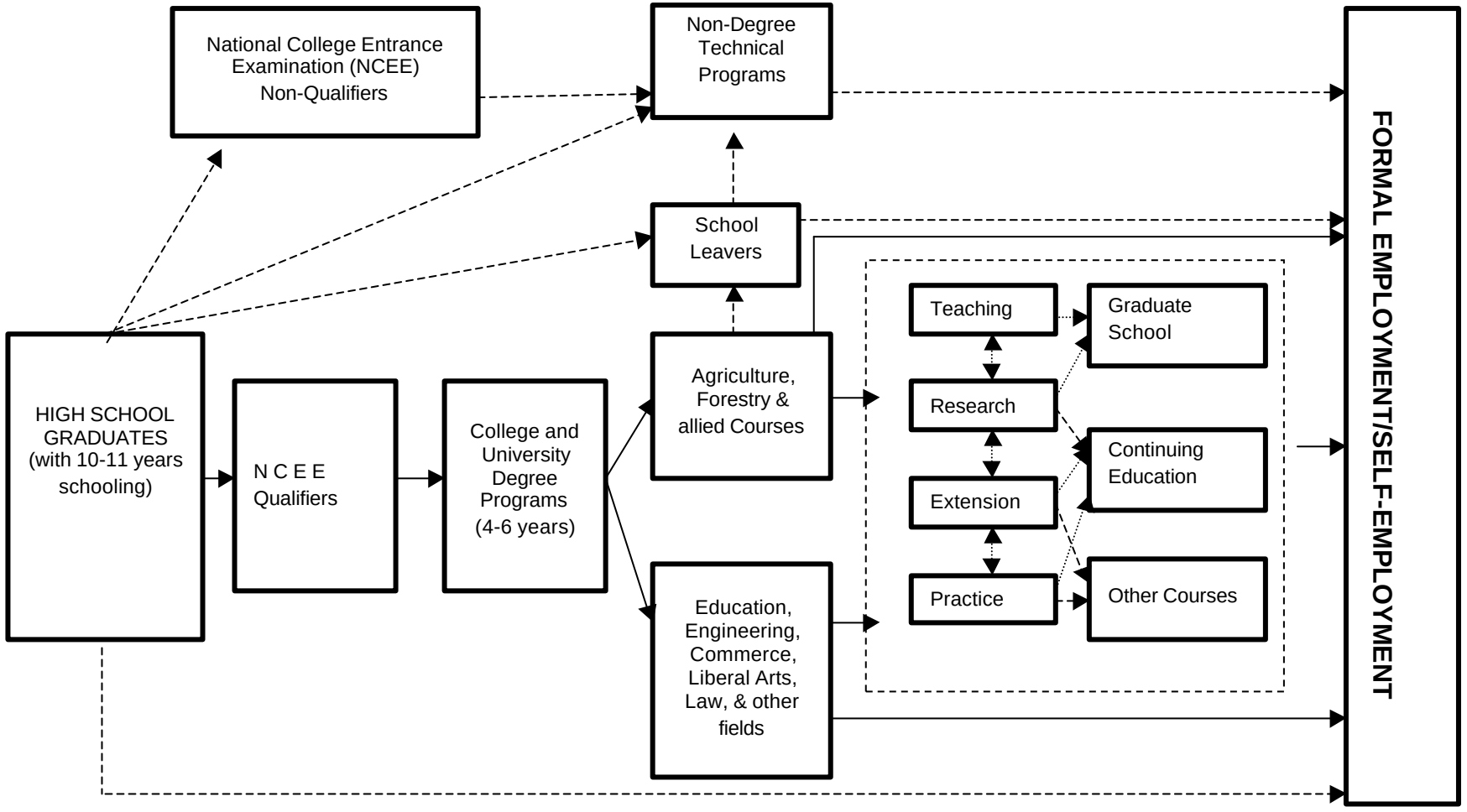

Figure 4.1 The Philippine tertiary education system with special focus on agricultural education.

Current state of agroforestry education and training

Growth in the number of agroforestry schools

The adoption of agroforestry as a development strategy in the 1970s and the subsequent increase in people-oriented and community-based upland projects apparently raised the demand for agroforestry graduates (Table 4.1). The number of schools offering agroforestry has roughly doubled every five years in the past 20 years.

Table 4.1. Number of schools offering degree courses in agroforestry.

Period	Number of new schools offering agroforestry curricula	Cumulative number of schools offering agroforestry curricula
1976–1980	2	2
1981–1985	3	5
1986–1990	4	9
1991–1995	12	21

The agroforestry schools

There are now at least 26 colleges of agriculture and forestry offering formal degree courses in agroforestry at all levels, and at least one of these schools is present in 11 of the 15 political regions of the country (Table 4.2, Figure 4.2).

Table 4.2. Agroforestry schools giving date of establishment and courses offered

Year started	Name of school	Type of agroforestry curricula offered
1976	Don Mariano Marcos Memorial State University	• BS Agroforestry • 1979: two-year technical course • 1995: MS Agroforestry
1980	Pampanga Agricultural College	• BSA major in Agroforestry • 1997: BSF major in Agroforestry
1981	Benguet State University	• two-year technical course • 1993: BSA major in Agroforestry • 1996: BSF major in Agroforestry
1983	Aklan State College of Agriculture	• BSA major in Agroforestry
	Bicol University College of Agriculture and Forestry	• BSA major in Agroforestry • 1991: BSF major in Agroforestry
1984	Ifugao State College of Agriculture and Forestry	• BSF major in Agroforestry
1986	Camarines Sur State Agricultural College	• BSA major in Agroforestry • 1992: BS Agroforestry
1987	Catanduanes State College (CSC)	• BSA major in Agroforestry
	Isabela State University (ISU)	• BSF major in Agroforestry
	Negros Occidental Agricultural College (NOAC)	• BSA major in Agroforestry
	Southern Technological Institute of the Philippines (STIP)	• BS Agroforestry
1989	Zamboanga del Norte Agricultural College	• BSA major in Agroforestry
1990	Quirino State College	• BSA major in Agroforestry • 1994: BS Agroforestry
1993	Leon National College of Agriculture	• BSA major in Agroforestry
	Mindanao State University	• BSF major in Agroforestry

Table 4.2. Agroforestry schools giving date of establishment and courses offered, continued

Year started	Name of school	Type of agroforestry curricula offered
1994	Northern Mindanao State Institute of Science and Technology	• Diploma in Agroforestry Entrepreneurship • Bachelor in Agroforestry Entrepreneurship
	Rizal State College	• BSF major in Agroforestry • 1997: two-year Diploma in Agroforestry
	Mountain Province State Polytechnic College	• Certificate in Agroforestry • BS Agroforestry
	University of the Philippines Los Baños	• BSF major in Silviculture & Agroforestry • 1998: Diploma in Agroforestry
1995	Mariano Marcos State University	• MS Agroforestry • MS Rural Development Cognate in Agroforestry • PhD in Crop Production and Mgt. Cognate in Agroforestry
	Dingle Agricultural and Technical College	• BSA major in Agroforestry
	Misamis Oriental State College of Agriculture and Technology	• Diploma in Agroforestry Technology • Bachelor in Agroforestry Technology
1996	Agusan del Sur State College of Agriculture and Technology	• BS Agroforestry
	Occidental Mindoro National College	• BSA major in Agroforestry
1997	Wesleyan University-Philippines	• BS Agroforestry
1998	Abra State Institute of Science and Technology	• Diploma in Agroforestry Technology • Bachelor in Agroforestry Technology

Geographic distribution of schools and agroforestry curricula offered

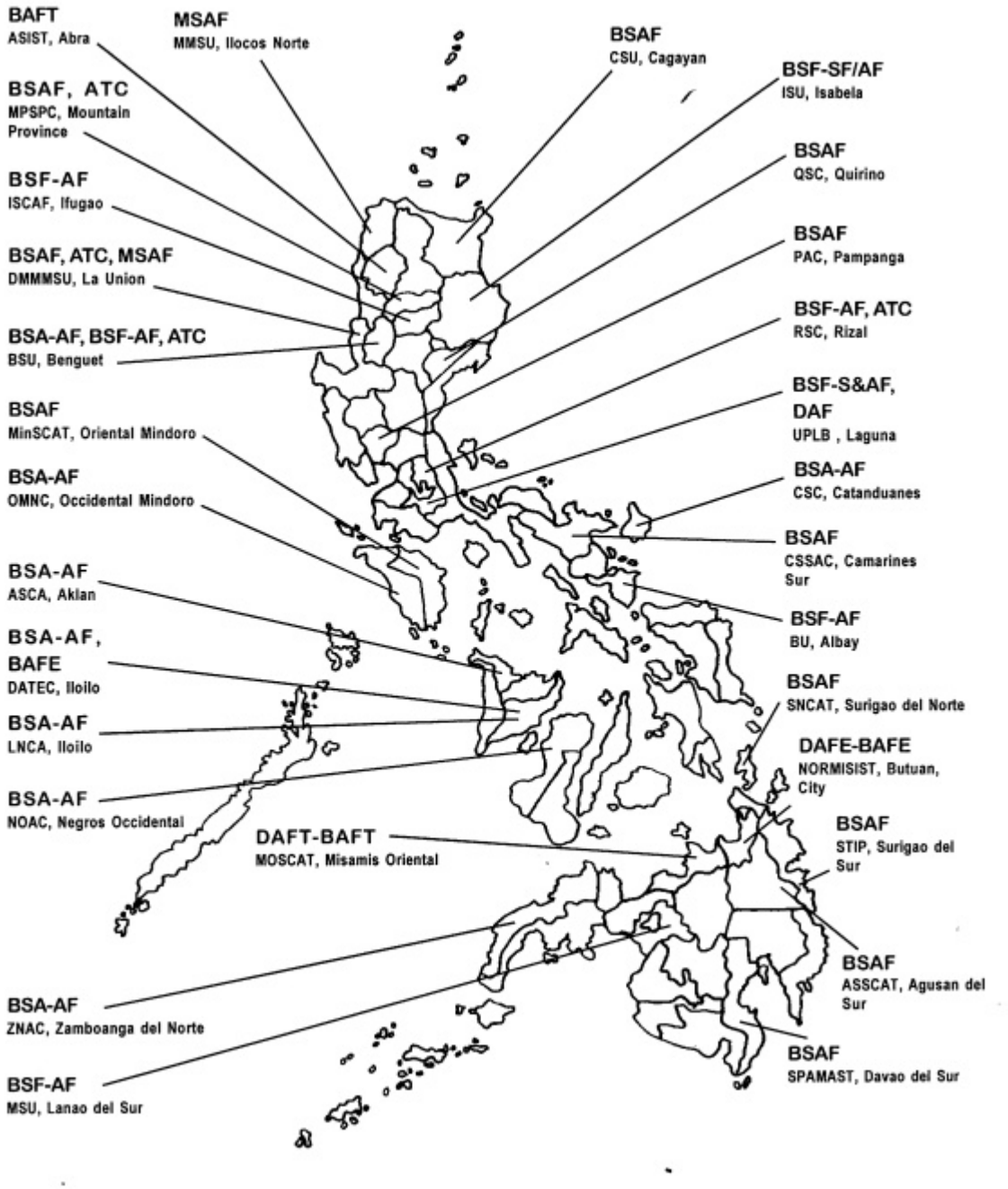

Figure 4.2 Location of schools offering formal degree courses in agroforestry.

Most of these schools (classified by geographic region and type of school in Table 4.3) are found in Luzon where both undergraduate and graduate curricula in agroforestry are offered in 16 schools: 6 state universities, 9 state colleges and 1 private university. In the Visayas, undergraduate curricula are offered in 4 schools: 1 state college and 3 Commission on Higher Education-supervised schools, all in Region 6. Undergraduate degree programmes are offered in 6 schools in Mindanao: 1 state university, 3 state colleges, 1 Commission on Higher Education-supervised school, and 1 private institution.

Table 4.3 also indicates that at least 20 schools are at various stages in preparing to offer agroforestry curricula (4 state universities, 8 state colleges, 6 Commission on Higher Education-supervised schools and 2 private institutions). Eight of these schools are located in Luzon, 7 in the Visayas, and 5 in Mindanao. Six of the 23 schools planning in 1995 to offer agroforestry are now implementing new curricula. Of the 20 schools now planning agroforestry subjects, 3 state colleges and 1 private school funded participants to the recent National Workshop in Agroforestry Education.

Table 4.3. Classification of schools with existing curricular offerings in agroforestry and those that are still in the preparation stage.

Region	No. of schools offering formal degree programmes in agroforestry					No. of schools preparing to offer agroforestry curricula				
	SU	SC	CS	PI	Total	SU	SC	CS	PI	Total
Luzon	6	9	0	1	16	2	4	2	0	8
Visayas	0	1	3	0	4	1	3	3	0	7
Mindanao	1	3	1	1	6	1	1	1	2	5
Total	7	13	4	2	26	4	8	6	2	20

SU—State universities; SC—State colleges; CS—Commission on Higher Education-supervised agricultural schools; PI—Private institutions

Curricular matters

Existing programmes

Today formal degree courses in agroforestry are offered at all levels (Table 4.4). The 2-year technical courses are available in 7 schools while the 5 baccalaureate curricula are offered in all 26 schools (BSAF in 7 schools, BSA-AF in 8 schools, BSF-AF in another 8 schools, BAFT in 2 schools, and BSAFE in 1 school). At the graduate level, the post-baccalaureate Diploma in Agroforestry is offered at the University of the Philippines Los Baños; the MS in Agroforestry is offered at Don Mariano Marcos Memorial State University and Mariano Marcos State University, which also offers agroforestry as a cognate in the MS in Rural Development and the PhD major in Crop Production and Management curricula. In some schools where agroforestry is not offered as a major or a cognate in the graduate curricula—for example, the University of the Philippines Los Baños—graduate programmes allow students to take elective courses in agroforestry and to work on agroforestry-related topics for their theses.

Table 4.4. Schools with agroforestry programmes, giving region and year of establishment

Region	School	Tech	BS AF	BSA-AF	BSF-AF	B AFT	BS AFE	MS	PhD
CAR	• Abra State Institute of Science and Technology	98				98			
	• Benguet State University	81		93	96				
	• Ifugao State College of Agriculture and Forestry				84				
	• Mountain Province State Polytechnic College	94	94						
1	• Don Mariano Marcos Memorial State University	79	76					95	
	• Mariano Marcos State University							95	95
2	• Isabela State University				87				
	• Quirino State College		94	90-93					
3	• Pampanga Agricultural College			80-96	97				
	• Wesleyan University-Philippines		97						
4	• Occidental Mindoro National College			96					
	• Rizal State College	97			94				
	• University of the Philippines Los Baños				94			97	
5	• Bicol University College of Agriculture and Forestry			83-87	88				
	• Catanduanes State College			87					
	• Camarines Sur State Agricultural College		93	86-92					
6	• Aklan State College of Agriculture			83					
	• Dingle Agricultural and Technical College			95					
	• Leon National College of Agriculture			93					
	• Negros Occidental Agricultural College			87					
9	• Zamboanga del Norte Agricultural College			89					
10	• Misamis Oriental State College of Agriculture and Technology	95				95			
13	• Agusan del Sur State College of Agriculture and Technology		96						
	• Northern Mindanao State Institute of Science and Technology	94					94		
	• Southern Technological Institute of the Philippines		87						
ARMM	• Mindanao State University				93				
	TOTAL	7	7	8	8	2	1	3	1

Of a total of 37 curricula, 25 are or were offered in Luzon, 4 in Visayas and 8 in Mindanao. Due to changing needs and priorities, some schools have shifted from one curriculum to another at the baccalaureate level. For example, Camarines Sur State Agricultural College formerly offered a BSA-AF, which became a BSAF in 1993; Quirino State College made a similar shift in 1994. Other schools previously offering BSA-AF have shifted to a BSF-AF (Bicol University College of Agriculture and Forestry in 1988 and Pampanga Agricultural College in 1997).

Comparison of existing baccalaureate curricula

This section compares curricula at baccalaureate level.

BSA Major in Agroforestry

Using the data from 8 schools, the contents of existing curricula leading to the BS Agriculture major in Agroforestry degree were compared with the minimum unit requirements prescribed in MEC Order No. 4, Series of 1981. The result is summarized in Table 4.5 below.

Table 4.5. Comparative study of 8 existing curricula leading to BS Agriculture major in Agroforestry.

Courses	Prescribed minimum standard, units	Mean, units	Range, units	Number of curricula below minimum standard
A. General Education	71	80.9	71-98	0
B. Fundamental Agriculture	33	34.5	33-45	1
C. Fundamental Forestry	9	8.6	3-18	4
D. Major Area	27	19.1	12-27	7
E. Other Subjects	0	9.3	4-13	0
F. Electives	6	3.0	0-9	5
G. Thesis/Practicum	6	6.2	3-11	1
Total	152	161.6	148-185	2

The average credit unit requirement in these schools, 161.6 units, is higher than the prescribed minimum of 152 units. Some curricula (two out of eight) do not meet Commission on Higher Education specifications. Most schools have inadequate coverage in fundamental forestry, major area, and electives.

BSF Major in Agroforestry

Some curricula in BS Forestry major in Agroforestry do not meet the government's minimum requirements (Table 4.6). The total units in 2 out of 7 curricula are lower than the required minimum. A majority of the schools have not met the required minimum in the fundamental agriculture, fundamental forestry, in the major area and electives.

Table 4.6. Comparative study of 7 existing curricula leading to BS Forestry major in Agroforestry

Courses	Prescribed minimum (units)	Mean (units)	Range (units)	Number of curricula below minimum
A. General Education	71	71.3	63-81	4
B. Fundamental Agriculture	9	7.6	0-15	4
C. Fundamental Forestry	35	25.4	24-36	6
D. Major Area	27	21.0	15-30	5
E. Other Subjects	0	24.1	0-37	0
F. Electives	6	4.3	3-12	5
G. Thesis/Practicum	6	6.4	6-9	0
Total	154	164.4	143-192	2

Other baccalaureate programs

As with the BSA and BSF with agroforestry major, there is a great range among the five BS Agroforestry curricula, but required units generally show a more balanced coverage of fundamental agriculture and forestry courses than in either the BSA or BSF with agroforestry major curricula (see Table 4.7).

Table 4.7. Agroforestry curricula at the baccalaureate level

Courses	Prescribed for BSA-AF (units)	Prescribed for BSF-AF (units)	Actual, BSAF (units)	Actual, BSAFE (units)	Actual BAFT (units)
A. General Education	71	71	66-86	53	57
B. Fundamental Agriculture	33	9	15-27	66	27
C. Fundamental Forestry	9	35	12-33	9	15
D. Major Area	27	27	9-30	6	18
E. Other Subjects	0	0	0-32	9	21
F. Electives	6	6	0-15	0	0
G. Thesis/Practicum	6	6	6	42	34
Total	152	154	145-188	185	172

Both the BS Agroforestry Entrepreneurship and the Bachelor in Agroforestry Technology curricula are skills-oriented, and are designed to produce graduates who can work on their own farms. Understandably, both curricula have more agriculture than forestry courses. As much as 34 to 42 units practicum are required in these curricula.

Postgraduate curricula

Graduate degree programmes in agroforestry are available as a full degree programme and as a cognate in existing graduate curricula. Two types of graduate degree curricula (Diploma and MS in Agroforestry) are found in some schools.

A post-graduate Diploma in Agroforestry is offered at the University of the Philippines Los Baños as a joint program of the College of Agriculture and the College of Forestry and Natural Resources, and College of Economics and Management, using the Institute of Agroforestry as a coordinator. The two-semester post-baccalaureate programme is designed to equip development workers with technical skills for sustainable development, and is a good example of a fully integrated multidisciplinary programme. The curriculum and the responsible departments are shown in Table 4.8.

Table 4.8. Curriculum leading to the post-graduate Diploma in Agroforestry at University of the Philippines Los Baños

Course	Title	Credit unit	Lead college/department
Agfor A	Introduction to Agroforestry	3	College of Forestry- Department of Silviculture and Forest Influences
Agfor B	Production and Management in AF Systems	4	College of Agriculture - Department of Horticulture
Agfor C	Supportive Technologies and income generating projects in AF	4	College of Agriculture -Department of Agronomy
Agfor D	Community Organizing and Development for AF	4	College of Forestry - Social Forestry
Agfor E	Agroforestry Systems Design and Development	3	College of Forestry - Department of Silviculture and Forest Influences
Agfor F	Agroforestry Farm Management	4	College of Economics and Management– Department of Agricultural Economics
Agfor G	Agroforestry Project Planning and Management	4	College of Forestry - Department of Forest Resources Management
Agfor H	Special Problem in Agroforestry	3	College of Agriculture/College of Forestry
Agfor I	Seminar in Agroforestry	1	College of Agriculture/College of Forestry
Total		30	

The MS in Agroforestry, available at Don Mariano Marcos Memorial State University and Mariano Marcos State University, have the following as cognate: social forestry, silviculture, plant science, animal science, and soil science (Table 4.9).

Table 4.9. Content of MS in Agroforestry curricula (units)

Don Mariano Marcos Memorial State University	Mariano Marcos State University
A. *Core and major courses (common)*	
Advanced Experimental Design (3) Agroforestry Farm Management (3) Soil and Water Conservation in Agroforestry (3)	
B. Other core and major courses	
Advanced Farming (3) Agroforestry Ecology (3) Agroforestry Project Planning and Management (3) Agroforestry Systems Design and Development (3) Research Methods in Agroforestry (3) Silvics and Silviculture Applied to Agroforestry (3) Uplands Resource Management (3) Special Topics in Agroforestry (3) Graduate Seminar (1)	Cropping Systems (3) Environmental Agronomy (3) Farming Systems Research and Development (3) Forest Influences (3) Micro-Computer Applications in Agroforestry (3) Social Forestry (3) Soil-Plant-Nutrient Relationships (3) Special Problem in Agroforestry (3)
C. Cognate Courses (6)	*C. Cognate Courses (9)*
D. Graduate Thesis (6)	*D. Graduate Thesis (6)*
Total: 46 units	Total 48 units

Mariano Marcos State University reports that it also offers agroforestry as a cognate in their MS in Rural Development and PhD in Crop Production and Management.

Technical level curricula

Technical level courses are available in seven schools:

- As a two-year programme (for example, at the Institute of Highland Farming Systems and Agroforestry, Benguet State University)
- As the first two years of a ladderized baccalaureate curriculum (for example, at Misamis State College of Agriculture and Technology)
- As the first three years of a ladderized baccalaureate curriculum (for example, at Northern Mindanao State Institute of Science and Technology).

The content of these curricula varies greatly between institutions as can be seen in the table below. Numbers of units in the 2-year technical level curricula of Benguet State University, Don Mariano Marcos Memorial State University and Misamis State College of Agriculture and Technology are shown here:

General Education	5–42 units
Fundamental Agriculture	6–21 units
Fundamental Forestry	6–12 units
Major Area	6–12 units
Other Courses	6–30 units
Practicum	6–16 units
Total Requirements	*74–91 units*

Integration of agroforestry

A number of schools offer agroforestry as a topic in agriculture and forestry degree programmes, either as a required subject or as an elective. Examples of courses are fundamentals of agroforestry, soil and water conservation in agroforestry, agroforestry practices, and introduction to agroforestry systems and practices. In other schools, basic

concepts and principles have been integrated in traditional courses in soil and water conservation, rural-based entrepreneurial development, social forestry, farming systems, and others.

In a number of these schools, particularly the bigger state colleges and state universities, thesis and seminar courses are conducted on topics related to the science and practice of agroforestry. These courses involve not only students of agroforestry but in some cases, those enrolled in allied fields.

Agroforestry faculty

In most schools, agroforestry teachers come from the faculties of agriculture and forestry, and teach agroforestry on a part-time basis, except in schools where there are separate departments of agroforestry (such as in Benguet State University College of Agriculture, Mountain Province State Polytechnic College, Don Mariano Marcos Memorial State University, and Agusan del Sur State College of Agriculture and Technology). Many schools without full time staff in agroforestry offer the course by employing part-time staff from other agencies, such as the field offices of ICRAF and Department of Environment and Natural Resources, particularly the Ecosystems Research and Development Service.

Table 4.10 shows qualifications of 165 faculty members from 25 of the 26 identified schools. In terms of educational qualification, 43.0% hold baccalaureate degrees, 42.4 % masters degrees, and 14.6 % doctoral degrees.

Table 4.10. Qualifications of teaching staff in Agroforestry

Field	Qualifications			Total	%
	BS	MS	PhD		
Agriculture	19	24	9	52	31.5
Forestry	27	20	9	56	33.9
Agroforestry	6	2	0	8	4.9
Other fields	19	24	6	49	29.7
Total	71	70	24	165	
%	43.0	42.4	14.6		100

Students and graduates

There is little information on student enrolment and graduation, and response to the survey in this area was poor. Only 2 out of the 7 schools reportedly offering technical level courses, 17 out of 26 schools in the BS curricula, and 1 out of 3 in the MS level, submitted enrolment data, and only 6 out of the 26 schools offering BS level curricula. Nevertheless, profiles of student enrolment at various levels in 1997–98 and the number of graduates at the BS level during the same period are summarized in Table 4.11.

Table 4.11. Student enrolment and graduation numbers

Level	Male	Female	Total	Mean	Range
Enrolment:					
Technical level	47	53	100	50.0	
BS	1,265	922	2,187	128.6	10–370
MS	4	9	13	13.0	
PhD	1	2	3	3.0	
Graduates:					
BS	72	12	84	14	

Don Mariano Marcos Memorial State University and Mountain Province State Polytechnic College have a combined enrolment of 100. The total student enrolment in 17 schools at the

baccalaureate level last year is 2187, an average of 128 students per school. Actual enrolments range from 10 students in one school to 370 students. Reported enrolment figures are fairly high and tend to pull up the overall averages when schools offer ladderized baccalaureate curricula, and where they offer a major in agroforestry with courses given later in the academic program (the third year in most cases). In the former case, the reported number possibly includes students who only go for the technical level program. In the case of the latter, the count possibly includes also those in other major fields.

At graduate level, Don Mariano Marcos Memorial State University reported 13 MS students, and Mariano Marcos State University reported an enrolment of 3 students at the doctoral level (PhD in Crop Production and Management with a cognate in agroforestry). Female students outnumbered male students in all cases, except at the BS level.

Graduation data is currently available only at the BS level. Data from 6 schools gave a total of 84 BS graduates in 1987-88, 72 males and 12 females, an average of 14 graduates per school per year. Information on employment of agroforestry graduates is not available in most schools.

Non-formal training opportunities

Short-term training courses are available in some agroforestry schools, NGO training institutions and in the Department of Environment and Natural Resources' regional training centres. Most of these courses cater to field technicians and upland farmers, and are one day to three weeks long.

The schools offering agroforestry training courses are Mariano Marcos State University, Abra State Institute of Science and Technology, Don Mariano Marcos Memorial State University, Wesleyan University-Philippines, Camarines Sur State Agricultural College, Bicol University College of Agriculture and Forestry, Visayas State College of Agriculture, and University of the Philippines Los Baños. Except perhaps for University of the Philippines Los Baños where 6 courses in various aspects of agroforestry are offered on a regular basis, schools offer their courses on need basis. In addition to the fundamental courses in agroforestry, more specific commodity-focused and technology-oriented courses are developed and offered by some schools as requested. Table 4.12 shows the short course training in agroforestry during the last seven years.

Table 4.12. Attendance and nature of University of the Philippines Los Baños short term agroforestry courses in the past seven years.

Short Term Courses	NGO/people's organizations	Govern-ment agencies	Local govern-ment	Schools	Foreign	Total
Agroforestry Project Planning and Management - 1 week	75	27	3	24	1	130
Agroforestry Production and Post-production Systems - 3 weeks	66	33	3	33	6	141
Integrated Pest Management in Agroforest Farms - 1 week	70	17	3	25	1	116
Seed Technology and Nursery Management - 2 weeks	66	15	2	32	1	116
Soil and Water Conservation and Management - 2 weeks	76	28	2	33	0	139
Technology Verification through On-Farm Trials - 1 week	80	47	5	37	0	169
Courses offered as requested	155	100	51	0	2	308
Total	588	267	69	184	11	1,119
%	52.5	23.9	6.2	16.4	1.0	100.0

Non-government and people's training institutions include:

- Kalahan Educational Foundation in Imugan, Nueva Vizcaya
- Plan International through the Northern Sierra Madre Natural Park Conservation Project, Isabela State University Campus, Cabagan, Isabela
- Mag-uugmad Foundation, Inc. in Guba, Cebu City
- Philippine Business for Social Progress in Lahug, Cebu City
- Agroforestry Resource Center of Kapwa Upliftment Foundation in Bgy. Magtuod, Maa, Davao City
- Livelihood Enhancement through Agroforestry Foundation in Bgy. Tabon, Bislig, Surigao del Sur
- Mindanao Baptist Rural Life Center in Bansalan, Davao del Sur.

In addition to short training courses, Kalahan Educational Foundation offers agroforestry to high school students as a vocational elective for one year through its Kalahan Academy.

The regional training centres run by the Department of Environment and Natural Resources also cater to the needs of farmers and technicians for capability building in agroforestry, especially soil and water conservation. These training centres are usually run in partnership with local people's organizations. Examples are:

- Loakan Integrated Social Forestry Farmers Association, Inc. in Bgy. Loakan, Itogon, Benguet
- Nazuni Integrated Social Forestry Farmers Association, Inc. in Bgy. Nazuni, Dingle, Iloilo
- Pulog Kitam-is Integrated Social Forestry Farmers Association, Inc. in Pulog Hills, Manolo Fortich, Bukidnon.

Library and other facilities

Libraries in many schools, particularly in smaller ones, are poorly stocked. Fewer have regular subscriptions to journals or other periodicals—including those distributed free by organizations such as ICRAF, Asia-Pacific Agroforestry Network, United Nations Food and Agriculture Organization, Department of Environment and Natural Resources, Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), and other local and foreign institutions.

To help build library collections, schools were provided with the latest FAO Directory of Selected Tropical Forestry Journals and Newsletters, and other similar materials. These will hopefully make it easier for them to subscribe to relevant publications particularly those given out free.

Many schools, particularly the bigger ones, maintain demonstration areas for teaching and research. They have either on-station or on-farm projects that are used as demonstration areas. At the same time, existing laboratory facilities in agriculture and forestry are used for agroforestry purposes where needed.

Research and extension activities

About 60% of the agroforestry schools (16 out of 26), mainly the state universities and bigger state colleges, conduct some studies related to agroforestry. These include:

- documentation of agroforestry systems and practices
- investigation of decomposition, nutrient cycling, erosion studies, biomass production, tree-crop-animal integration, agroforestry pests and diseases, and plant propagation
- technology development and evaluation including: alley cropping, pruning frequency, soil and water conservation, multistorey systems, technology impact assessments, and technology monitoring tools
- promotion of agroforestry technology: extension methods, action research, agroforestry in community-based resource management.

Many of these schools do not have a budget for research and extension. However, some of them manage to engage in these activities through the use of school farm income. At the same time, some are able to engage in collaborative activities or implement externally funded projects that provide support for travel, supplies and materials, and for hiring of technical support staff.

Institutional links

Most schools are linked with other organizations, usually other agricultural and/or forestry schools, national government agencies, local government units, non-government organizations (including peoples' organizations), business firms, and local and foreign funding organizations. Such links often provide part-time instructors, technical assistance, quality planting materials, books and other library materials, and badly needed funds for research and extension.

Particularly in the case of the state universities and bigger state colleges, established links with government and with NGOs open more opportunities for partnership in research and extension through technical collaborative activities.

Development issues and needs

Faculty and staff development

Most of the 165 faculty members teaching agroforestry in the 26 agroforestry schools are part-time affiliated faculty from traditional academic departments. Very few schools are able to employ full-time agroforestry instructors. But even in these schools, the numbers they employ and their levels of education are lower than they had hoped to have. The insufficient supply of teachers results in overloading of staff and hampers staff development. Most of the schools surveyed ranked the expansion and development of staff as the highest priority in their list of perceived needs.

Curriculum development

Most schools expressed the need for a curriculum guide that they can use in developing their own curricula. The minimum standards for a major in agroforestry in the BSA and BSF curricula, formulated some 17 years ago, are no longer considered realistic. As seen above, for example, seven of the eight BSA-AF curricula are deficient in the major area, and four out of eight require fewer than the minimum standard number of units in fundamental forestry courses. In t the BSF-AF, six out of seven curricula are deficient in fundamental forestry, and four out of seven require fewer than the minimum standard number of units prescribed in fundamental agriculture courses.

No curriculum guide or minimum standards have so far been formulated for the BSAF, BSAFE, and BAFT curricula. These are urgently needed, particularly for the BSAF which has increased from four to seven curricula in the last three years.

Participants in the recent National Workshop on Agroforestry Education therefore recommended that the Commission on Higher Education 'develop and enforce minimum standards to ensure the quality of agroforestry education'. This should include the review and revision of the existing minimum standards for BSA-AF and BSF-AF and the development of minimum standards for BSAF, BSAFE and BAFT. Prescribed minimum standards should be monitored and their effective implementation facilitated.

Research and extension capacities

Both research and extension activities significantly contribute to the professional growth of faculty and staff, and continuously enrich teaching materials and the teaching itself. Most schools are aware of this and it is for this reason that they desire to strengthen their research and extension capacities. However, many of them, particularly the smaller schools, are much constrained by lack of staff capacity and research funds.

Facilities and equipment

The lack of adequate indoor and outdoor facilities for lectures and laboratory classes is major constraint in teaching. For example, the prescribed minimum standards require 'at least 100 hectares of forest reserve and 50 hectares of agricultural land for its own use for instruction and research purposes' but how many of these schools enjoy the benefit of these field facilities? They often have to be content with whatever exists in their collaborating institutions.

Library resources

A number of schools do not have basic references—books and journals—for the fundamental and major courses, making both the teachers and students totally dependent on old lecture notes. Most schools do not subscribe to technical journals even if the prescribed minimum standards require 'two technical journals (current) for each of the fundamental and major subjects'.

Links and opportunities for collaboration

Most schools have established links with concerned government and non-government organizations. But still a good number have expressed the need to expand their institutional links and opportunities for doing collaborative projects to enrich their experience in agroforestry development.

Student recruitment

The enrolment data summarized in Table 4.11 suggests that some schools have more students than they can effectively handle. On the other hand, at least three schools which offered BSA-AF and BSF-AF a few years back have decided to discontinue their programmes due to lack of students. However, two of these have indicated that they plan to resume offering agroforestry in the near future.

At present, the average enrolment per school of 128 students at the BS level is fairly high. But for how long can this level be sustained? What about quality? Concerned about quantity and quality of students, schools collaborating with IAF in the Agroforestry Support Program for

Empowering Communities Toward Self-reliance project have initiated a campaign for the establishment of undergraduate scholarships in their own schools.

Employment opportunities for graduates

The two main aims of existing agroforestry curricula at the baccalaureate level are:

- production of graduates to meet perceived market demands, and
- production of entrepreneurs who would transform their farm lots into productive and sustainable farms.

The first aim assumes that the market demand exists and that graduates possess the skills required by prospective employers. The second aim assumes that: a) both parents and students are fully aware that self-employment, rather than simply employment, of graduates is the primary objective of the curricula, and b) that available farm lots are big enough to make them profitable for the graduates to work on. Schools must ensure that these assumptions are valid.

Concluding remarks

Agroforestry education has gone a long way since its inception in the Philippines. A few schools pioneered the curriculum development that made it possible for the country to offer agroforestry at baccalaureate level earlier than any other institution in the world, and two years before ICRAF was formed. Concerned about safeguarding the quality of education, the government developed and prescribed minimum standards for agroforestry education as early as 1981, a year before the first international workshop on professional education in agroforestry.

Schools have been innovative in their design of agroforestry programmes, giving rise to the variety of curricula now available, at both undergraduate and graduate levels. A lot of interest in agroforestry education has been generated not only among the bigger state colleges and universities but also among the smaller state-run and private institutions. The 21 agroforestry schools that were found through the PHILAFENA project in 1995 have grown to 26 in three years.

The enabling instruments issued by government in the 1970s encouraged the development of agroforestry education and research. They have been reinforced by the more recent administrative issuances.

We recommend that the Commission on Higher Education should produce a national agroforestry education development plan that provides for:

1. immediate identification of state colleges and universities that should serve as national centres of excellence, and of provincial institutes for agriculture and fisheries that should be involved in the sustained development of agroforestry education and research.
2. a thorough review of the existing guiding principles and minimum standards for the major in Agroforestry in the BS Agriculture and BS Forestry curricula, which should lead to a participatory mechanism for the production of more appropriate curriculum guides for all agroforestry curricula formally sanctioned by the Commission on Higher Education.
3. availability of adequate funds in the budgets of the national centres of excellence and provincial institutes for agriculture and fisheries to support the hiring of a full complement of full-time instructors and a staff development programme. This should allow the development of education and research, construction of needed class rooms and laboratory facilities, expansion of library acquisitions including subscriptions to relevant technical journals, and the development of field laboratories and demonstration areas.

4. creation of a participatory mechanism within the Commission on Higher Education specifically for agroforestry education development, to catalyse, facilitate, coordinate and monitor efforts at strengthening and maintaining the quality of agroforestry education in the country.

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Chapter 5

Agroforestry education and training in Thailand

Patma Vityakon[10], Monton Jamroenprucksa[11], Pramoth Khaewvongsri[12] and Teerapong Saowaphak[13]

Summary

Agroforestry education at university level in Thailand is offered as undergraduate and post-graduate courses or part of some courses in Faculties of Agriculture, Forestry, Technology, and Natural Resources and Environment. At least 16 universities teach agroforestry.

At certificate and vocational schools agroforestry is offered mainly by Colleges of Agriculture and Technology, in basic and advance levels of training. The agroforestry-related courses for both levels of certificate—in common for all colleges of this kind—are 'Integrated Agriculture' and 'Natural Resources and Environment'. A new agroforestry-related course is titled 'Agriculture according to the New Theory'. The 'New theory' of the King of Thailand promotes integrated agriculture for self-reliance of small-scale farmers and rural people.

Most institutes conducting research and training in agroforestry and agroforestry-related fields fall under the Ministry of Agriculture and Cooperatives. Agricultural education and training in Thailand is administered by 4 major departments: Department of Agriculture, Department of Agricultural Extension, Land Development Department, and Royal Forest Department (Annex 5.2)

- The **Department of Agriculture** has offices for agricultural research and development (8 offices all over the country), and institutes for crop research (5 institutes all over the country) with many research centres under its umbrella. These institutes provide training, including agroforestry training, aimed mainly at government extension officers.
- The **Department of Agricultural Extensions** administers various regional centres under which provincial and district agricultural offices belong. These offices at district level provide agroforestry training for farmers.
- The **Land Development Department** has offices of land development in 12 zones throughout the country. Training is usually conducted at the station level. The training recipients are farmers, especially community leaders.
- The **Royal Forest Department** administers provincial forest offices in more than 60 provinces; zonal forest offices in 21 zones; and 12 centres for research and development in community forestry, spread throughout the country.

International training institutes in Thailand include the Chiang Mai office of the International Centre for Research in Agroforestry (ICRAF), and the Regional Community Forestry Training Centre, based in Bangkok.

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Some educational institutions, including colleges of agriculture and technology, and some universities, provide some short-term agroforestry training for students, teachers, farmers, Buddhist monks and other members of the community.

Many NGOs all over the country are involved in agroforestry training and promotion. For examples, PLAN International (Thailand), whose main objective is to promote welfare of rural people, works on community forestry in many parts of northeast Thailand, and conducts research to identify appropriate models for community forestry in the northeast. In southern Thailand, the NGOs have formed a network called 'Alternative Agriculture' which operates in almost all provinces in the south.

The government **extension** agency responsible for extending knowledge and techniques in agriculture to farmers is the Department of Agricultural Extension. The Department has agricultural extension offices at provincial and district levels all over the country. The district offices work directly with farmers in transferring knowledge in agriculture. In addition, there is a Centre for Agricultural Extension in each region of the country, responsible for regional training and demonstration. Agroforestry-related training for agricultural officers includes, for instance, 'transformation of agricultural production structure', which aims to spread knowledge on the change of land use from monoculture cassava to fruit trees and multipurpose trees. The officers are also trained in integrated agriculture. The Centre for Agricultural Extension in the southern region promotes integrated agriculture by constructing demonstration plots in all provinces in the region.

There is no formal full agroforestry programme at **undergraduate or graduate levels** in universities and equivalent institutions in Thailand. At both MSc and BSc levels, agroforestry is taught as individual courses, or as parts of related courses in programmes in agriculture, forestry, natural resources, environment, and developmental sociology. Agroforestry is more frequently offered in agricultural faculties in universities than in forestry faculties. It is, therefore, likely that agroforestry curricula at this present stage are more influenced by agriculture than forestry. However, university agricultural faculties are tending to expand their scopes to integrate natural resources and environment and forestry into agriculture.

Teaching staff in agroforestry in universities mainly come from the fields of agriculture and forestry, and hold MSc and PhD degrees in these fields. Some have attended training to increase their knowledge in agroforestry, such as courses organized by ICRAF, Asia-Pacific Agroforestry Network (APAN), and RECOFTC. The teaching staff are well-qualified in their own fields, but they should be given opportunities for further training in agroforestry, which is interdisciplinary. In addition, they should be aware of effective ways of conducting team teaching—which characterizes agroforestry.

The teaching staff at certificate level mostly hold BSc degrees in agriculture. Some have BSc degrees in environmental management. Agroforestry and related subjects are more often taught in agricultural institutions, and is more influenced by agriculture content than by forestry.

Teaching materials are in short supply, both in universities and in technical college and vocational schools. This deficiency includes textbooks, self-learning teaching materials such as audio-video tapes, CD-ROMs, and slide sets.

The **student** numbers are large when agroforestry or agroforestry-related courses are taught at undergraduate level, especially as core or compulsory courses. But when agroforestry is taught in graduate level, the number of students is much lower. Students in agroforestry are mostly from an agriculture background. Those from a forestry background are found in the Faculty of Forestry, Kasetsart University. In general, forestry students take more courses in agriculture, than agricultural students take forestry courses. Some natural resources and environment programmes offer agroforestry and agroforestry-related courses to students from diverse backgrounds.

Graduates who have taken agroforestry or agroforestry-related courses tend to be more aware of the role of trees in ecology and of socioeconomic aspect of natural and agricultural systems, than those who have not taken those courses. The former tend to be advocates of retaining and restoring trees in various systems. The graduates find jobs in both the private and the government sectors. In Thailand at present, local people and administrative bodies are mobilized to protect and make judicial use of their own resources. Graduates in agroforestry and related fields can fit into this movement in various ways, such as by working in administration, managing resources at the subdistrict level.

There are many **research** programmes related to agroforestry in universities, while there are very few in technical colleges and vocational schools. Instead, the latter are actively conducting extension activities with both farmers and the public mainly through short-term training. Universities also provide some training, although to a lesser degree. Some universities organize international training.

The **national policy** of Thailand supports the concept of agroforestry and agroforestry education as seen in the present 8th National Social and Economic Plan. In addition, the concepts of conservation of natural resources and environment and of agriculture as a livelihood with emphasis on self-sufficiency and self-reliance of the farmers, have royal endorsement. This has resulted in the promotion of integrated agriculture—the new and popular term 'agriculture according to the New Theory'—all over the country.

The economic slump happening in Thailand has highlighted the importance of the agricultural sector. This is a good opportunity to promote agroforestry practices and education.

The government's policy is to give autonomy to state universities by moving them out of the government administrative system by the year 2002. This is an opportunity to develop agroforestry education through high-quality interdisciplinary programmes without departmental constraints.

Conclusion and recommendations

Emerging needs and issues

In summary, this study of agroforestry education in Thailand showed the need for:

- training of teaching staff in team teaching and interdisciplinary skills
- textbooks especially in Thai language
- self-learning teaching materials
- increased awareness by administrators of the significance of agroforestry and agroforestry education
- curriculum development in agroforestry, and minimum standards for agroforestry courses and curricula to secure quality
- a full programme in agroforestry; and possibly compulsory courses for all agriculture, forestry, and resource and environment students
- a national network (which can develop further into a Centre for Agroforestry Education)
- research on various aspects of existing agroforestry systems and practices
- more effective links between research and extension, especially universities and research / extension institutions.

For Thailand, one issue for discussion is the benefits from agroforestry. Do we emphasize agroforestry for subsistence or self-reliance, or for market purposes? This issue emerged during a brainstorm session in the national workshop organized for this study.

ICRAF and other international organizations can act as catalysts in the process of institutionalizing agroforestry in Thailand, and in other countries in the region.

History of agroforestry curriculum development

Agroforestry has been practised for generations in various forms in all regions of Thailand. However, formal education in agroforestry started less than two decades ago, in 1981, when it was formally included in the silvicultural course of the Department of Silviculture, Kasetsart University. Some Faculty of Forestry teachers who had attended workshops organized by ICRAF took this initiative. In 1984, the agroforestry course was moved into the Social Forestry programme of the university, since agroforestry is viewed as a people-related discipline. (FAO supported the development of the social forestry curriculum in the two years before the agroforestry course was moved). This curriculum was the result of a consultative process that identified problems in forestry works, assessed community opinions on foresters' roles, and held a public workshop.

In other universities, agroforestry education started later. Generally, it was developed in response to the problems of resource and environmental degradation and the need for sustainable agriculture. For example, in Khon Kaen University, a course in agroforestry started in 1995 as an elective in the MSc programme in agricultural resources and environment; a related course in forest soils had been offered as an elective in the MSc programme in Soil sciences since the mid-1980s. In addition, there have been several masters degree theses related to agroforestry since 1988. In Prince of Songkhla University, agroforestry education was first offered in 1996 as an elective ('Principles of agroforestry') in the MSc Soil resource management programme.

In Chiang Mai University, many theses in agroforestry have been produced under the MSc Agricultural Systems programme, since 1990. In other universities, agroforestry education is taught in faculties of agriculture or natural resources. Kasetsart University is the only Faculty of Forestry in Thailand to offer an agroforestry course.

Methods

Selection of institutions

Data collection was carried out by a study team of four people, each covering one region in Thailand: Central, North, South, and Northeast.

To select institutions to be included in the study five categories were identified:

- universities
- vocational schools and technical colleges
- research and training institutions
- non-government organizations
- government extension agencies

For ***universities***, it was assumed that agroforestry-related education would be offered in agriculture, forestry, and natural resources and environment programmes. Therefore, only universities offering one or more of these fields were included in the mailing list for the questionnaires.

Regarding ***vocational schools and technical colleges***, we concentrated our efforts on state institutions under the Department of Vocational Education, Ministry of Education. This

category included institutes of agriculture and technology; technical colleges (Rachamongkol Institute of Technology); and teachers' training colleges (Rajapat institutes). These are established in major provinces all over the country. Since their curricula are controlled by the Central Department in Bangkok, only some institutions of each type were selected for the study.

Research and training institutes: These are government institutes—all under the Ministry of Agriculture and Cooperatives—mainly in the fields of agriculture, forestry, and soil and land use. They have a similar structure all over the country, although the specific content of the work varies from region to region. A few representatives of these institutions, from different regions, were selected.

Non-government organizations (NGOs): Only a fraction of the NGOs active in agroforestry in Thailand could be covered in this study.

Government extension agencies**:** Agricultural extension work is almost totally under the Department of Agricultural Extension, while forestry extension is under the Royal Forest Department. These agencies have a similar structure all over the country, and therefore only a few representative institutions were included. Annex 5.4 lists the 85 institutions in the study.

Data collection

A questionnaire survey was the major method of data collection, complemented by direct interviews and visits at selected institutions. For each of the four regions, the team member and a research assistant carried out the data collection. They send out and received questionnaires, and made institutional visits to key institutions. Of the 85 institutions, 56 were included in the final analysis: 16 universities,15 vocational schools and technical colleges, 16 research and training institutions, 5 NGOs and 4 government extension agencies.

A one-day workshop aided data collection and verification. The workshop, held at Kasetsart University on 10 June 1998, had 24 participants from all five institutions except extension agencies.

Data analysis

The team members summarized regional data from questionnaires and interviews. They also summarized the status of agroforestry education in their regions. This information was presented during the national workshop in June. The study team then had a post-workshop meeting to compile data to be incorporated in the final report.

In addition, the workshop tried to address two main issues: the needs for education and training in agroforestry in Thailand, and the constraining and facilitating factors.

Current state of agroforestry education in Thailand

Agroforestry education and training are offered as courses or parts of courses at several levels and in different kinds of education, research and extension institutions in Thailand, as discussed below. The education system in Thailand is described in Annex 5.1.

Curricula

Universities—undergraduate and graduate level

There is no formal full agroforestry programme at BSc or MSc level in universities or equivalent institutions in Thailand. At both levels, agroforestry is taught as separate courses or integrated into related courses in educational programmes in the fields of agriculture, forestry, natural resources, environment, and developmental sociology. Mostly these are programmes within faculties of Agriculture, Forestry, Technology, or Natural Resources and Environment. Table 5.1 summarizes the status of agroforestry education among the 16 universities in this survey.

Table 5.1. Agroforestry in university-level education in Thailand

Region	Number of universities	No. of curricula that cover agroforestry		Number of courses that cover agroforestry[3]					
				BSc Level			MSc Level		
		BSc	MSc	Separate course (core or elective)	Integrated into existing courses	Thesis	Separate course (core or elective)	Integrated into existing courses	Thesis
North	3	3[1]	4[1]	2	2	-	1	6	12
North-east	4	4	4[2]	-	4	-	2[2]	2	2
Central	7	10	6	5	13	-	1	4	no info.
South	2	1	1	-	2	-	1	2	-
Total	16	18	15	7	21	1	5	14	14

[1] Includes BSc and MSc curricula at Chiang Mai University that are not approved
[2] Includes MSc Agriculture curriculum under development at Ubol Rachathani University
[3] Of the BSc courses included in the table, 8 are offered at Kasetsart University

The *Northern region:*

- Chiang Mai and Mae Jo Universities offer agroforestry as a separate course in their MSc Agricultural Systems and BSc Agriculture curricula, respectively
- BSc Forest Resources and MSc Agroforestry Systems have been proposed but are not yet approved, at Chiang Mai University. However, many research theses have been produced in agroforestry under the MSc Agricultural Systems programme, an international programme administered by the Multiple Cropping Centre of the Faculty of Agriculture.
- At Naresuan University, agroforestry is taught as part of some courses in the Faculty of Agriculture, Natural Resources and Environment.

In *Northeastern Thailand*, agroforestry education in universities is offered either as specific courses or as parts of related courses:

- In Khon Kaen University, agroforestry is an elective course in the MSc Agricultural Resources and Environment programme of Faculty of Agriculture
- In Mahasarakham and Suranaree universities, agroforestry is part of some undergraduate courses in the agriculture programme and, for Mahasarakham University, in the environmental programme of the Faculty of Technology.

In *Central Thailand*, only three state universities offer agroforestry as a separate course in traditional programmes:

- Kasetsart University (Faculty of Forestry)
- Sukhothai Thammathirat University (STU) (Department of Agricultural Extension and Cooperatives)

- King Mongkut Institute of Technology (KMIT) (Faculty of Agricultural Technology and Faculty of Industrial Education).

Further, agroforestry is taught as an integrated part of some courses in the natural sciences offered at Mahidol, Ramkhamhaeng, Silpakorn, and Thammasat universities.

In *Southern Thailand*, two universities offer agroforestry education:

- The Prince of Songkhla University (Dept Earth Science) offers an elective course 'Principles of agroforestry' in the MSc soil resource management programme
- Songkhla Teacher's Training College offers agroforestry education as integrated into some courses.

In addition to the various university courses, there are also MSc theses in agroforestry, and some undergraduate students choose seminar topics in agroforestry. In Chiang Mai University, for example, a fairly large number of agroforestry-related MSc theses have been written (Annex 5.3).

Agroforestry tends to be offered more in agricultural faculties, than in forestry faculties. It is therefore likely that agroforestry curricula at present are more influenced by agriculture than by forestry.

Agricultural faculties in various universities are expanding their scope to cover natural resources and environment. In some universities, forestry is being integrated into agricultural faculties. For examples, the Department of Soil Science, Faculty of Agriculture, Khon Kaen University has proposed to change its name to the Department of Land Resources and Environment, and has introduced a new MSc programme: Agricultural Resources and Environment. Under this programme, agroforestry is offered as an elective course, and an attempt has been made to recruit a new staff member in the field of forestry. In addition, a new faculty in the relatively newly established Naresuan University is entitled Faculty of Agriculture, Natural Resources and Environment. This shows the trend of integration of these fields. Furthermore, in the Faculty of Agriculture, Chiang Mai University, a new Department of Forest Resources has been proposed and staff members with forestry background have been recruited.

Technical colleges/vocational schools

The institutions in this category include colleges of agriculture and technology (15 of a total of 48 were included in this study) and technical colleges, both under the Department of Vocational Education, Ministry of Education. In addition, there are teachers' training colleges under the Department of Teachers' Training, Ministry of Education. These technical colleges and vocational schools are distributed throughout the country. Their curricula are similar, and content is controlled by the central Ministries.

Colleges of agriculture and technology offer certificates in vocational training at two levels, basic and advanced. The students entering the colleges have finished junior high school or high school (see Figure 5.1). They continue to study at the college for 2–4 years to obtain a certificate at basic or advanced level.

The agroforestry-related courses for both levels of certificate are similar. The courses are 'Integrated agriculture' (elective for all options) 'Natural resources and environment', 'Agriculture according to the New Theory'. The 'New theory', currently popular, is one devised by the king of Thailand who promotes integrated agriculture for self-reliance of small farmers and rural people.

Agroforestry research and training

Agroforestry and agroforestry-related research and training is mainly conducted in institutes under the Ministry of Agriculture and Cooperatives. Four government departments are involved: the Department of Agriculture, Department of Agricultural Extension, Land Development Department, and Royal Forest Department.

Department of Agriculture: There are several research and training institutes under the Department of Agriculture (Figure 5.2). They include Offices for Agricultural Research and Development (8 offices throughout the country) and Institutes for Crop Research (5 institutes throughout the country).

The Offices for Agricultural Research and Development in the Northeast region have held training on subjects such as 'integrated agriculture' and 'intercropping techniques for rubber plantations'.

The Institute for Crop Research—with many research stations under its administration—provides training aimed mainly at government extension officers. Sometimes it also trains farmers directly. The training topics are mainly related to their mandate, for example, horticultural research centres usually hold training on production of horticultural crops.

The *Department of Agricultural Extension*, under the Ministry of Agriculture and Cooperatives, administers various regional centres with provincial and district agricultural offices—all provinces and districts in Thailand have agricultural offices responsible for agricultural extension. Agroforestry is part of the agenda. For example, the Centre for Agricultural Extension in the Northeast region has organized agroforestry-related training on:

- transformation of the agricultural production structure—a course on the change of land use from monoculture cassava to fruit trees and multipurpose trees
- promotion of full-cycle *Acacia mangium* production (a joint venture between government and the private sector)
- development of rubber production in the Northeast—introduction to suitable varieties, cultivation methods, methods to get latex, methods of marking rubber sheets and intercropping rubber with pineapples.
- integrated agriculture—paddy rice, animal raising, fish ponds, fruit trees, fast growing multipurpose trees.

The courses target farmers, provincial and district agricultural officers, and last for one to five days.

The *Land Development Department* has the mandate to conduct soil surveys and mapping and to develop a database on soils and land in Thailand. It conducts land-use planning, and soil analysis and interpretation of fertility status, and recommends measures for improvement. Soil and water conservation is also under its umbrella. The Department conducts research and provides training at various levels in topics related to its mandate. It has Offices of Land Development in 12 zones throughout the country, which run various Stations for Land Development (Figure 5.2). An example of agroforestry research is the use of leguminous trees for soil and water conservation. Various leguminous trees, including *Acacia, Flemingia, Sesbania, Tephrosia, Peltophorum, Cassia, Leucaena* and *Gliricidia,* are tested for growth and adaptability in the Northeast environment, and for their impact on soil chemical and physical properties. Training is usually conducted at the station level. Training topics are indirectly related to agroforestry, such as soil and water conservation and soil improvement through organic matter management. The training recipients are farmers especially farmer leaders.

The *Royal Forest Department* administers Provincial Forest Offices in more than 60 provinces, Zonal Forest Offices in 21 zones, and Centres for Research and Development in Community

Forestry. There are 12 centres country-wide. Some examples of agroforestry training conducted under the Royal Forest Department are:

- Agroforestry and indigenous knowledge (central Royal Forest Department)—lectures and field trips to observe indigenous agroforestry practices in various parts of the country. There have been more than 1000 participants: farmers and those involved in community forestry development projects.
- Forest planting by farmers (Office of Forestry, Khon Kaen zone)—elements of agroforestry in the training of about 90 farmer leaders.
- Training of agricultural officers (Office of Forestry, Khon Kaen zone)—elements of agroforestry in the training. Target group is agricultural officers in district offices. Approximately 60 people have been trained so far.
- Development of community forestry (Office of Forestry, Khon Kaen Province)—management of community forestry. Target group is farmer leaders from areas that have degraded forests. Around 150 people have been trained.

The target groups range from farmers and farmer leaders to agricultural officers. Courses are 2–5 days long.

Among international institutions involved in agroforestry or agroforestry-related training, 2 can be mentioned: ICRAF Chiang Mai office and RECOFTC. In addition, some educational institutions, including Colleges of Agriculture and Technology and some universities, provide some short-term training for farmers and the public. Some of the training topics are shown in Table 5.2. Most of these courses last 3–10 days and target farmers and extension officers.

Table 5.2. Some short-term training provided by educational institutions in Thailand

Educational institution	Title	Feature
Kasetsart University, Bangkok	• Agroforestry related topics, as per request[1]	In response to the requests of various agencies; especially foreign agencies, from Laos, Vietnam, Bangkok, Nepal, Pakistan and Indonesia
Sukhothai Thammathirat University, Nonthaburi	• Technology in forestry promotion	Agroforestry is an element in the training
Chiang Mai University, Mae Jo University, Naresuan University, Northern region	• Conservation of natural resources and environment	Conservation of natural resources and environment with elements of agroforestry in the content
College of Agriculture and Technology, Khon Kaen	• Short-term training in vocational agriculture	Lectures, practical sessions and field trips to observe successful integrated farms
	• Forest planting activity	College students obtain tree seedlings from Royal Forest Department to be planted in the College ground
	• Greening of the Northeast	Promotion of integrating fruit trees and dairy cows
	• Mobile vocational training	Integrated agriculture
College of Agriculture and Technology Ubol Rachathani	• Short-term training in vocational agriculture	Involve many activities in agriculture
College of Agriculture and Technology Srisaket	• Integrated agriculture	

[1] Courses offered 1992–present include: Farm-Level Forestry; Integrated Farming System; Agroforestry Diagnosis and Design; Community Forestry and Agroforestry; Community Plantation; Agroforestry Project Management; Community Forestry Extension and Income Generation; Social Forestry, Agroforestry and Integrated Watershed Management

Non-government organizations (NGOs)

Many NGOs all over the country are involved in agroforestry training and promotion. In the Northern and Northeast regions, there is PLAN International (Thailand), an NGO whose main objective is promotion of the welfare of rural people. The PLAN in the Northeast has its main objective in the field of AIDS, but also promotes community forestry. Its training in community forestry has been done in many parts of the Northeast including Khon Kaen province: Phu Wiang, Nong Song Hong, and Manjakiri districts; Mahasarakham province, and Nong Bua Lampoo provinces. In addition to training activities, PLAN conducts some research with the objective of identifying appropriate models for community forestry in the Northeast.

Another NGO with agroforestry activities operating in the Northeast is the Population Community Development Association. This NGO promotes new, potentially-high-earning occupations for rural people including agricultural activities. One project promotes intensive high-value vegetable production in which farmer members (about 20–30 in each group) are each provided with a small piece of land (approx. 800 square metres) with a high watertable. The project provides aid in constructing deep-water wells. One condition for the farmer recipients of this project is that they take part in developing community forestry on the rest of the land provided by the Population Community Development Association.

In the Southern region, the NGOs have formed a network called 'alternative agriculture' which operate in almost all provinces in the South. This network conducts some training and knowledge dissemination to farmers on issues related to agroforestry.

Teaching staff and faculty

Teaching staff in *universities* mainly hold MSc or PhD degrees in the fields of agriculture and forestry (Table 5.3). Several factors contribute to their interest in agroforestry:

- their research experience and their own realization of problems of degradation of land resources and environment
- the shortcomings of a market economy for small farmers
- the ecological and socioeconomic services trees can provide
- participation in training courses in agroforestry, such as those organized by ICRAF, APAN and RECOFTC.

Table 5.3. Qualification of agroforestry lecturers in 10 universities in Thailand

University	Total number of lecturers	PhD	MSc
Kasetsart	10	8	2
Sukhothai Thammathirat	3 (invited lecturers)		
King Mongkut Institute of Technology	1	1	
Chiang Mai	11	9	2
Mae Jo	2?	1?	1?
Naresuan	?	?	?
Prince of Songkhla	3	3	
Songkhla Teacher's Training college	2		
Khon Kaen	6	4	2
Mahasarakham	1	1	
Total	39*	27	7

* Data on teachers' qualifications is incomplete

Teaching staff are normally well-qualified in their respective fields. However, they should be given opportunities for further training in the interdisciplinary field of agroforestry. In addition, since agroforestry usually requires team teaching, staff should be aware of effective ways of conducting team-teaching.

The teaching staff at *certificate/diploma* level mostly hold BSc degrees in agriculture (Table 5.4), while a few have BSc degrees in environmental management. This confirms that agroforestry and related subjects are mostly taught in agricultural institutions and, therefore, the content is more influenced by agriculture than forestry.

Table 5.4. Qualifications of agroforestry lecturers at certificate and diploma levels in 10 colleges.

College of Agriculture and Technology (location)	Total number of agroforestry lecturers	MSc	BSc	BEd	B Agric extension
Trang province (South)	1		1		
Chumporn province (South)	5		5		
Satul province (South)	2		2		
Pang-nga province (South)	2		1		1
Narathivas	2		2		
Surat Thani	5		5		
Patalung (South)	1		1		
Khon Kaen (Northeast)	4		4		
Ubol Rachathani (Northeast)	2		2		
Srisaket (Northeast)	4	1	2	1	
Total	28	1	25	1	1

Physical facilities

All universities have classrooms, computers, basic software, access to Internet, and some textbooks. Demonstration plots are apparently available. These include demonstration plots within the university, and farms that practise agroforestry all over the country. One problem with the agroforestry farms is the lack of an organized database on their existence and features. Most institutions offering certificates, mainly colleges of agriculture and technology, have a demonstration farm within the college. These are usually labelled 'integrated agriculture' or 'agriculture under the New Theory'. These concepts and practice are under royal patronage in Thailand and are adopted by various government agencies concerned. Technical colleges and vocational schools still lack Internet access.

Teaching materials—including textbooks, self-learning teaching materials such as audio-video tapes, CD-ROMs, and slide sets—are in short supply in universities, technical colleges and vocational schools.

Students

Information on number of students in agroforestry in various institutions and at various levels is incomplete.

At *undergraduate level*, the number of students is large (more than 100) in programmes where agroforestry or agroforestry-related courses are taught as core or compulsory courses (for example, the BSc in forestry with a social forestry major at Kasetsart University) and, at certificate level, in colleges of agriculture and technology that offer agroforestry-related courses as electives for all field options

However, when agroforestry is taught at *graduate level*, such as in Khon Kaen and Prince of Songkhla universities, the number of students is low. Students undertaking agroforestry and agroforestry-related courses at this level mostly have an agricultural background. Those from forestry backgrounds are found in the Faculty of Forestry, Kasetsart University. Some natural resources and environmental programmes offer agroforestry and agroforestry-related courses to students from diverse backgrounds. For example, in the MSc programme in agricultural resources and environment at Khon Kaen University, students' backgrounds range from

medical sciences to sociology. Agroforestry teaching in some programmes, therefore, needs to be adapted and modified to take into account the different background of students.

Graduates

While there is no full and formal programme of agroforestry currently offered in Thailand, graduates from various programmes of study have often undertaken some courses in agroforestry or areas related to agroforestry. Graduates who have undertaken agroforestry during their studies are probably more aware of the role of trees in the agroecosystem, and of the socioeconomic aspects of natural and agricultural systems. They tend to be advocates of retaining and restoring trees in various systems.

As far as job opportunities are concerned, the picture is diverse. Graduates work in both government and private sectors. It is reasonable to claim that those graduates who have undertaken agroforestry or related courses are aware of the significant role of trees in agriculture and environment. This awareness is likely to have desirable effects on their work towards the conservation and restoration of natural resources and environment. In addition, in Thailand at present, local people and administration bodies are mobilized to protect and make judicial use of their own resources. Graduates with knowledge in agroforestry-related fields can fit into this movement, for example by working in subdistrict administration for management of natural resources.

Research and extension programmes

At the university levels, there are many research programmes in Thailand related to agroforestry. Some examples are shown in Table 5.5. However, at technical colleges and vocational schools, there are few research projects and more emphasis is placed on extension through short-term training. Some universities and international organizations also provide short-term training courses (see above).

Table 5.5. Research projects and programmes in some universities and technical colleges in Thailand.

Institution (region)	Title of research project or programme
Kasetsart University (Central)	Integrated agroforestry system
	Agroforestry model for pulp production
Prince of Songkhla University (South)	Improving the productivity of smallholders in rubber agroforestry systems: sustainable alternatives
	Collaborative study on agroecosystems and tropical rainforest for sustainable development in Yunnan province and southern Thailand
Khon Kaen University (Northeast)	Agroforestry promotion through isotopic techniques
	Nitrogen fixation of leguminous trees and nutrient cycling from leaf litter in agroforestry of the Northeast region
	Soil fertility in Dong Lan teak plantation in Khon Kaen province
	Potential use of multipurpose trees for integration into rice paddy agroecosystems of Northeast Thailand
Mahasarakham University (Northeast)	Use of community forestry in Mahasarakham province
	Studies on intercropping in traditional bamboo growing in Northeast Thailand

Administration and policy

The national policy—as seen in the 8th National Social and Economic Plan (5-year plan 1997-2001)—supports agroforestry and agroforestry education. This national plan has the following features:

- Seeks human-centred development
- Empowers local governments in administering their resources
- Emphasizes equitability of resources and income, and not on maximum profit
- Emphasizes restoration of natural resources and environment.

Conservation of natural resources and environment, and agriculture as a livelihood with the emphasis on self sufficiency and self reliance, are officially supported by royal patronage. His Majesty the King of Thailand is an advocate of a economy, as opposed to market economy at least in one-fourth of the economy of the nation. This concept has been quickly embraced by concerned government agencies, resulting in the promotion all over the country of integrated agriculture or, using the new and popular term: 'agriculture according to the New Theory'.

The present economic slump in Thailand and the whole of Southeast Asia has provided an impetus for agroforestry promotion. As more urban labour returns to rural areas after the closure of many factories, the importance of the agricultural sector is highlighted.

Another policy change relates to the autonomy of state universities which are being taken out of government administration by 2002. Universities will receive an annual lump sum from the government, which they will be free to administer. The government will evaluate their performance yearly through a 'quality assurance (QA)' technique. The amount of the lump sum to be given to each university the following year will be based on the evaluation score. This has a bearing on agroforestry education development, since the curriculum is one item on the evaluation. Under this new system, the universities need to be more entrepreneurial**.**

Annex 5.1 The formal educational system in Thailand

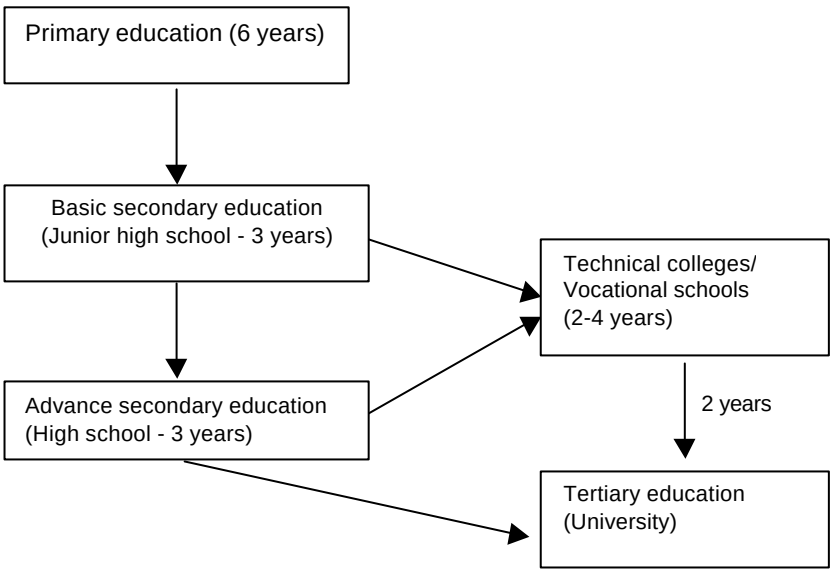
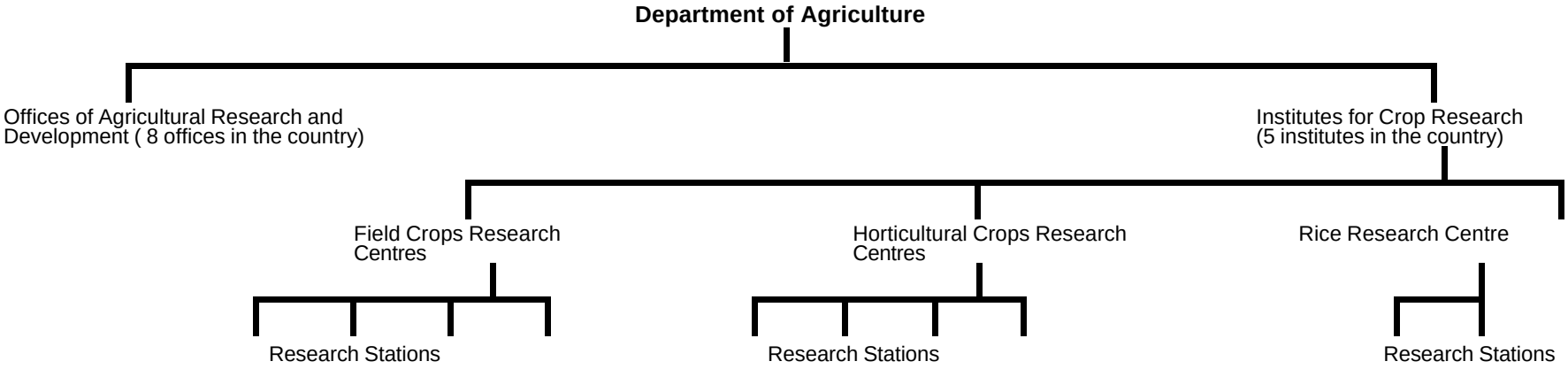
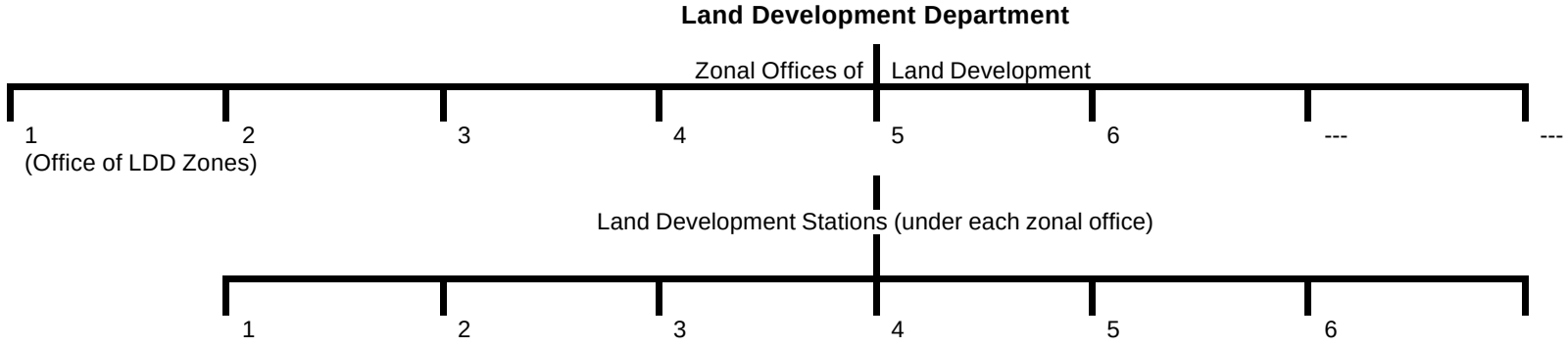


Figure 5.1 A flow chart of formal education in Thailand.

Annex 5.2 Organization of the Department of Agriculture and the Land Development Department, Thailand



Divisions within the Department of Agriculture involved in agroforestry training.



Divisions within the Land Development Department involved in agroforestry training.

Figure 5.2 Organization of the Department of Agriculture and the Land Development Department, Thailand.

Annex 5.3 List of MSc theses in agroforestry or agroforestry-related fields

The following MSc theses in agroforestry of agroforestry-related fields were completed under the MSc programme in Agricultural System, Chiang Mai University, 1990-1997.

Donato C del Castillo, 1990. Analysis on the sustainability of a forest-tea production system: A case study in Ban Kui Tuai, Tambon Pa Pae, Ampho.

Anang Gunawan Yahya, 1991. Farm planning for highland permanent farming system in a village of Mea Taeng District, Chiangmai Province.

Johan Iskandar, 1991. An evaluation of the shifting cultivation systems of the Baduy Society in West Java using system modelling.

Ashadi, 1992. Socio-economic evaluation of integrated soil-water conservation and cropping systems: Case study in Namlang Area, Mae Hong Son Province.

Suporn Amaruekachoke, 1992. Problems and prospect of alley cropping on the steep land.

Phu Van Hoang, 1993. Evaluation of cropping systems on sloping land in the northern-mountainous region of Vietnam.

Chhabi Lal Paudel, 1995. Effect of alley widths and pigeon pea pruning on the productivity of pigeon pea / maize intercrop.

Sakda Sookviboon, 1996. Management of Leucaena hedgerows and tillage in maize-red kidney bean system

Bijaya Bajracharya, 1993. Gender roles in agroforestry system in the Eastern hill of Nepal: Case study of Salle village.

Milan Adhikary, 1994. Determinants of fodder tree adoption in the Mid Hill of Nepal.

Surendra Bahadur Thapa, 1996. Indigenous knowledge in agroforestry and soil conservation Mid Hills Region of Nepal.

Sayan Tanpanich, 1997. Canopy structure and root architecture in Miang-Based agroforestry systems

Annex 5.4. List of institutions included in the survey

Table 5.6. List of 85 institutions selected for procuring information on agroforestry education and training.

Institution	Location	
	Region	Province
Universities		
Kasetsart	Central	Bangkok
Sukhothai Thammathirat	Central	Nonthaburi
King Mongkut Institute of Technology	Central	Bangkok
Thammasat	Central	Bangkok/ Pathumthani
Silpakorn	Central	Bangkok/ Nakorn Pathom
Ramkhamhaeng	Central	Bangkok
Mahidol	Central	Bangkok/ Nakorn Pathom
Chiang Mai	North	Chiang Mai
Mae Jo	North	Chiang Mai
Naresuan	North	Phitsanulok
Khon Kaen	Northeast	Khon Kane
Mahasarakham	Northeast	Mahasarakham
Ubol Ratchathani	Northeast	Ubol Ratchathani
Suranaree	Northeast	Nakhon Rachasima
Prince of Songkhla	South	Songkhla
Walailak	South	Nakorn Srithammarat
Technical colleges/vocational schools		
College of Agriculture and Technology Chiang Mai	North	Chiang Mai
College of Agriculture and Technology Chiangrai	North	Chiangrai
College of Agriculture and Technology Chainat	North	Chainat
College of Agriculture and Technology Uthaithani	North	Uthaithani
College of Agriculture and Technology Petchaboon	North	Petchaboon
College of Agriculture and Technology Kampaengpetch	North	Kampaengpetch
College of Agriculture and Technology Nakornsawan	North	Nakornsawan
Rachamongkol Institute of Technology Lampoon	North	Lampoon
Rachamongkol Institute of Technology Phitsanulok	North	Phitsanulok
Rachamongkol Institute of Technology Tak	North	Tak
Rachamongkol Institute of Technology Nan	North	Nan
Rachamongkol Institute of Technology Payap	North	Chiang Mai
Rachamongkol Institute of Technology Lampang	North	Lampang
Rajapat Institute Pibulsongkhram	North	Phitsanuloke
Rajapat Institute Kampaengpetch	North	Kampaengpetch
Rajapat Institute Nakornsawan	North	Nakornsawan
Rajapat Institute Chiangrai	North	Chiangrai
Rajapat Institute Petchaboon	North	Petchaboon
Rajapat Institute Lampang	North	Lampang
Rajapat Institute Caiang Mai	North	Caiang Mai
Rajapat Institute Utaradit	North	Utaradit
College of Agriculture and Technology Nakorn Sithammarat	South	Nakorn Sithammarat
College of Agriculture and Technology Krabi	South	Krabi
College of Agriculture and Technology Pangnga	South	Pang-nga
College of Agriculture and Technology Trang	South	Trang
College of Agriculture and Technology Songkhla	South	Songkhla
College of Agriculture and Technology Patalung	South	Patalung
College of Agriculture and Technology Satul	South	Satul
College of Agriculture and Technology Narathivas	South	Narathivas
College of Agriculture and Technology Khon Kaen	Northeast	Khon Kaen
College of Agriculture and Technology Ubol Rachathani	Northeast	Ubol Rachathani
College of Agriculture and Technology Srisaket	Northeast	Srisaket

Institution	Location	
	Region	Province
Research and training institutes		
Royal Forest Department Office of Forest Planting Promotion, Division of community Forestry	Central	Bangkok
Mae Sariang Zonal Forest Office	North	Mae Hong Sorn
Phrae Zonal Forest Office	North	Phrae
Lampang Zonal Forest Office	North	Lampang
Chiang Mai Zonal Forest Office	North	Chiang Mai
Chiangrai Zonal Forest Office	North	Chiangrai
Office of Socioeconomic Promotion and Development on the Highlands	North	
Office of Land Development Zone 9	North	Nakornsawan
Office of Agricultural Research and Development Zone 7	South	
Office of Agricultural Research and Development Zone 8	South	
Centre for Rubber Research Songkhla	South	Songkhla
Centre for Rubber Research Surat Thani	South	Surat Thani
Rubber Research Stations	South	Ranong, Yala, Phuket, Krabi, Trang, Narathivas, Tarn To, Khlong Tom
Horticultural Research Centre, Trang	South	Trang
Horticultural Research Centre, Chumporn	South	Chumporn
Office of Land Development Zone 5	Northeast	Khon Kaen
Office of Agricultural Research and Development Zone 3	Northeast	Khon Kaen
Khon Kaen Zonal Forest Office	Northeast	Khon Kaen
Mahasarakham Provincial Forest Office	Northeast	Mahasarakham
Horticultural Research Centre, Srisaket	Northeast	Srisaket
NGOs		
ICRAF	North	Chiang Mai
Foster Parents Plan International (Thailand)	North	Chiang Mai
Network for alternative agriculture	South	
Population and Community Development Association (PDA)	Northeast	Khon Kaen
Foster Parents Plan International (Thailand)	Northeast	Khon Kaen
Government extension agencies		
Huay Hong Khrai Royal Development Study Centre	North	Chiang Mai
Regional Centre for Agricultural Extension (Southern region)	South	
Songkhla Provincial Agricultural Office	South	Songkhla
Centre for Agricultural Extension in the Northeast	Northeast	Khon Kaen

Chapter 6

Agroforestry education in Vietnam

Nguyen Van So[14]

Summary

In recent decades, rural area development in most countries in the Southeast Asian region including Vietnam has changed. Appropriate approaches and technology are needed to balance production and conservation and achieve sustainable development. Agroforestry is an excellent way to meet the challenge of balancing these aspects.

Many government and non-government organisations in Vietnam have tried to use agroforestry in rural development to balance short and long term approaches, reconciling the demands of increasing food requirements and environmental protection. Agroforestry is still less developed in rural areas for many reasons, but especially the lack of human resources in agroforestry. The survey and recent national workshop on agroforestry education show that strengthening institutional capability is very much needed to back up rural development in Vietnam.

Most institutions in Vietnam have agreed that a national network linked up with a regional one is helpful in achieving national policy, strengthening people's abilities, and creating a holistic and systematic approach among education, research and extension workers.

Agroforestry development in Vietnam—a background

There is a large and growing population of subsistence farming families in the uplands of Vietnam. Upland soils are fragile and the natural ecosystems, including forest resources, are changing rapidly. Steep slopes are eroding adversely affecting people and ecosystems in the lowlands. Scarce shrubs and grass are overgrazed. The fallow periods in shifting cultivation cycles are becoming shorter and shorter. Natural forest is disappearing and deforestation threatens species of birds, mammal and plants with extinction.

As in other Southeast Asian countries, forested areas in Vietnam are under the jurisdiction of forestry agencies that previously considered forest occupancy as illegal and prohibited such occupation in those areas. Government programmes were geared towards physically removing swidden cultivators from what foresters considered their own domain. These punitive measures were expensive, and not successful. The government of Vietnam, including educational institutions, has now adopted a more humane approach that allows farmers to plant trees intercropped with food crops. Agroforestry offers practical strategies in the development of forested areas of Vietnam.

As an indigenous resource management system, agroforestry is now practised by millions of Vietnamese farmers and communities. Recent efforts by the forestry department to assist communities are undertaken almost exclusively through foreign donor-assisted programmes.

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Aims of agroforestry development

Agroforestry is a recognized tool in integrated resource management for forest conservation and the alleviation of rural poverty in Vietnam. The major aims are:

- to balance protective and productive concerns in an integrated strategy in the development of the uplands of Vietnam
- to achieve a good balance between development and conservation concerns. Some issues that need to be addressed are:
  - current land use and resource management practices
  - site amenability to and local preferences for possible land and resource use alternations
  - species adapted to site conditions
  - availability of preferred planting materials and livestock varieties
  - capital and labour available to invest in system development
  - farmers' short- and long-term economic objectives
  - preferences regarding appropriate mix of subsistence and cash crops
  - the need to harmonize local land and resource use with government regulations
- to bring about people-centred agroforestry and participatory rural resource management for sustainable development.

Facilitating and constraining factors in agroforestry knowledge and human resource development

Facilitating factors: Agroforestry research and development is increasing nation-wide, and a quantum leap has been taken over the past 5-10 years in generating and disseminating knowledge and experience on agroforestry system development in Vietnam. Thousands have received training in agroforestry both locally and abroad, and involvement in agroforestry project implementation has contributing to experiential learning. A number of Vietnamese professionals have become highly knowledgeable in agroforestry methods, and sensitive to progressive extension techniques.

There is an increasing trend to tap traditional agroforestry systems and indigenous species as resources for farm and forest development. With greater attention to indigenous sustainable land use adaptations, extension approaches may become better able to facilitate gradual transition to sustainable land management (Rambo and Cuc et al. 1996, Mittelman and Alisuag, 1995). The recent establishment of a National Extension Program with the mandate to employ 'farmer demand-based' extension methods creates a new way to develop farmer-centred approaches for design and development of sustainable land and resource use alternatives.

Constraints: Compared to the scale of activity required, Vietnam lacks the sizeable and well-informed corps of people needed to facilitate an integrated system of conservation and development through agroforestry. There is, in particular, a need to develop an integrated and multidisciplinary set of skills for collaborative planning and participatory extension of appropriate and cost-effective methods, and for flexible and adaptive project implementation (Xuan Mai Forestry College 1996; MARD 1996; Mittelman 1996). At the moment, personnel tend to possess specialist rather than interdisciplinary skills.

According to Mittelman (1988), effective two-way communication between the extension service and farmers is required to hybridize modern scientific knowledge and effective traditional practices. Integrated sustainable land use and forest management approaches that are economically viable and provide adequate incentives for farmer involvement are neither well understood nor widely established in Vietnam. Limited appreciation of farmer practices, especially traditional forest management and shifting cultivation, continues to hinder appropriate modifications of existing systems by grafting on best practice approaches tailored to local environments, cultures and objectives (Sam 1994, Taylor 1996). While the 'basket of technologies' available for agroforestry extension is now considerable, this wide range of

options is still poorly appreciated in Vietnam. There is a tendency to adhere to conventional extension approaches and techniques.

Farmers are often seen as ignorant and passive recipients of technology they should adopt for their own benefit. Yet, experience has shown conventional technology transfer approaches to be particularly ineffective in marginal production environments, where the constraints on system improvement and the need to develop agroforestry are greatest. In contrast, extension services have been especially weak in upland areas. Lack of adequate in-service training for forestry officers has also tended to aggravate the lag between policy formulation and implementation. Extension personnel tend to work *for* rather than *with* rural people. For the most part, options presented to farmers have been too complex, inflexible and unresponsive to basic needs. Extension has not been adapted to delivering information identified by farmers as crucial to pursuing their own development objectives, nor to raising awareness of the critical role of conservation and sustainable use in accomplishing those objectives.

Agroforestry extension personnel remain poorly equipped to facilitate a process in which rural people consider their options systematically, and select from a range of alternatives adapted to serving local development needs and conservation mandates. Agroforestry techniques available to Vietnamese farmers need to be expanded in number and refined based on experience and information flows among farmers, local, national, regional and international agencies supporting the development of sustainable resource management. Forestry development must not be viewed in isolation, but as a component of a broader rural poverty elimination strategy (UNDP and FAO 1996, Mittelman 1988). The concept of integrated conservation and development efforts in Vietnam far outstrips the current levels of understanding and practice.

Method for data collection

A survey of the present situation of agroforestry education in Vietnam began in May 1998. Based on the agreement made during the Regional Workshop in UPLB, the Philippines, it began by formulating questionnaires for several institutions throughout Vietnam, in order to collect information relevant to agroforestry education, and to assess their willingness to participate in the survey.

The survey was made with the collaboration of the Social Forestry Support Program—assisted by Helvetas, involving a network of five forestry educational institutions in Vietnam. The survey included other agricultural and forestry institutions from vocational, and technical schools to agricultural and forestry colleges, universities and research centres, as well as international NGOs working in rural areas. Questionnaires were sent out to these institutions and NGOs throughout the country. After two weeks, answers were examined to select the institutions targeted for a national workshop.

Format and content of the questionnaire were agreed upon among project coordinators and partner-countries at the end of a UPLB regional workshop, and it was translated into Vietnamese. The questionnaire covered eight areas: basic information, curriculum offered, agroforestry training, faculty, facilities, students and graduates, research and extension activities, and institutional links related to agroforestry education and training activities in Vietnam.

Generally, the method we applied for collecting data was participatory and used an evolving process where all ideas or viewpoints are equitably respected.

Criteria for selection of institutions

To select respondent institutions (Table 6.1), the following criteria were used as guide:

- Institutions actively involved in agroforestry education, extension and research in agroforestry
- Both agricultural and forestry education-institutions are targets of the survey
- A good geographical spread of sample institutions, to get information throughout the country, representing different ecological zones, e.g. lowland and upland; and tropical and subtropical zones
- Educational institutions were chosen to represent various technical and academic levels, from vocational and technical schools to college and universities
- A sampling of national government institutions such as agricultural and forestry research institutes and centres, as well as NGO-operated training institutions
- Focus on some prominent agricultural and forestry educational institutions in the North, Central Highland, Coast, and the South by direct visits to find more information.

Table 6.1. List of institutions included in the study

No.	Institution	Place	Ministry	Responsible person
1	Forestry extension office	Ha Noi	MARD	Pham Duc Tuan
2	Forestry Research Institute	Ha Noi	MARD	Ha Chu Chu
3	VASI	Ha Noi	MARD	Ng Huu Nghia
4	HN Agricultural University	Ha Noi	MOET	Pham Chi Thanh
5	VACVINA (government organization)	Ha Noi	MARD	Ng. Van Man
6	Agricultural vocational school	Cao Bang	MARD	Duong T Dong
7	R & D centre	Thai Nguyen	MOET	Nguyen K Quac
8	Forestry faculty	Thai Nguyen	MOET	Do Hoang Son
9	Forest Tech. School no. 4	Phu Tho	MARD	Ha Kieu Thoa
10	Forest Tech. School no. 1	Quang Ninh	MARD	Phan Cung
11	Forest Vocational School	Ha Tay	MARD	Dinh Xuan Duc
12	Xuanmai Forestry College	Ha Tay	MARD	Pham Xuan Hoan
13	Forestry Vocational School	Lang Son	MARD	Nguyen V Tuy
14	Hue's University	Hue	MOET	Le Duc Ngoan
15	Tech. School no. 2	Trang Bom	MARD	Pham Thi Nguyet
16	Forestry vocational school no. 3	Binh Duong	MARD	Ha Xuan Uong
17	Central Highland University	Darlac	MOET	Vo Hung
18	Pleiku Technical School	Pleiku	MARD	Nguyen Danh
19	Rubber Research Institute	HCM	MARD	Tran TT Hoa
20	Faculty of Forestry, UAF	HCM	MOET	Nguyen Van So
21	Faculty of Agriculture, CAF	HCM	MOET	Tran Cong Thien
22	Faculty of Agriculture & Forest Economics, UAF	HCM	MOET	Nguyen A Ngoc
23	Can Tho University, Faculty of Agronomy	Can Tho	MOET	Nguyen Bao Ve

Data analysis

The questionnaires were analysed by grouping institution types, regions, and academic levels. The main purpose was to see the differences and similarities within and among groups. Preliminary results were used to select participants for a one-day national workshop organized in Hanoi on 20 May 1998. During this workshop, data from prominent institutions was validated and more ideas, suggestions and planning activities for each region collected. Finally, all the data was assessed and synthesized to make the country report on current Agroforestry Education and Training activities.

Current state of agroforestry education and training in Vietnam

Overview

Agroforestry education and training activities are generally considered important in developing the agriculture sector and rural areas in Vietnam.

Educational institution surveyed had different perceptions of the importance and role of agroforestry. Some associated agroforestry with land-use management practices to conserve water and soil resources in the upland; others simply saw agroforestry practices as SALT (Sloping Agriculture and Land Technology), or VAC[15] techniques. Others look at agroforestry as a new important science which can bring about sustainable development which takes into account technical, socioeconomic, cultural and ecological considerations.

The following factors affect the way an institution perceives agroforestry education: site, access to information on agroforestry and related subjects; links with national and international projects; and the institutional mandate for education and training. For instance, we found a positive relationship between the number of projects in an institution and the content of agroforestry in its curriculum.

The educational system in Vietnam of relevance to agroforestry education is described in Annex 6.1.

Universities

Almost all agricultural and forestry universities in the nation were targets of the survey. Within this group, there are various approaches to agroforestry. This variation depends on it's the educational mandate and location of the institutions. They can be divided into three categories:

1. Universities of agriculture and forestry (institutions with many disciplines such as agronomy, forestry, animal science, fisheries, agricultural and forestry economics). These institutions have a strong commitment to develop agroforestry curricula, and to do research and extension. They include the Colleges of Agriculture and Forestry in Ho Chi Minh City, in Buonmethuot, Central Highlands, in Hue, and in Thai Nguyen.
2. Most agricultural universities (for example CanTho agricultural university in Mekong Delta) either have little or no concern for agroforestry education or (for example, the Agricultural University no. 1 in Hanoi), they perceive agroforestry as a part of a land-use management subject in farming system approaches.
3. The Forestry College in Xuan Mai HaTay province has a high priority in jointly developing agroforestry and community forestry education.

It was noted that all universities and colleges belong to the Ministry of Education and Training (MOET), except Xuan Mai Forestry College, which falls under the Ministry of Agriculture and Rural Development (MARD).

Technical colleges/vocational schools

In Vietnam, technical colleges train high-school school students to become technical workers in agriculture and forestry. The degree offered is a technical diploma. Both types of schools are concerned to develop agroforestry as a subject in their curricula. However, they still have limited agroforestry knowledge and limited ability to offer it as a separate subject. In most

[15] VAC is a traditional agroforestry system throughout Vietnam. It is an integrated farming system which combines 3 components: *Vuon* (home garden); *Ao* (Fish pond) and *Chuong* (Livestock house)

cases, agroforestry is integrated into the land-use management subjects. Technical and vocational schools belong to MARD and the provincial government, with a mandate to develop human resources needed locally.

Research and training institutes

Administratively, research institutes are under the supervision of MARD. Vietnamese research institutes in agriculture and forestry not only do research but also offer graduate education (MSc and PhD degrees) under a joint arrangement between MARD and MOET. The objectives are to promote a closer link between research and education activities, and to link universities with other research institutions.

Both agricultural and forestry research institutes encourage graduate students to choose agroforestry themes for theses and dissertations. Agroforestry and related subjects are often taught with assistance from teaching staff of universities and colleges.

NGOs

Several international NGOs working in Vietnam consider agroforestry an appropriate technology for upland rural development. Mostly, they focus on agroforestry short-training courses for upland farmers, although some have shown interest in long-term human resource development for the country.

Land tenure policy, land-use practices, agroforestry management practices, and marketing and processing for agroforestry products are some of the concerns that NGOs address in the uplands. The NGOs also confirm the need to build the education and training capability of national institutions, through short-term training and academic education.

According to the NGOs, there is an urgent need for case studies throughout the country: to collect data on indigenous knowledge systems and practices; to test modified designs on farms; and to accumulate these experiences to benefit agroforestry education in Vietnam.

Government extension agencies

Recently, MARD organized a national network of agriculture and forestry extension agencies. It includes the central agriculture and forestry extension units, as well as several provincial and district level units. Extension activities undertaken by these units are mostly part of the different national and international programmes. Agroforestry extension activities seem weaker than those in pure agriculture or forestry.

Agroforestry curricula

In Vietnam, curricula are developed following officially specified disciplines registered as code number for different academic levels. There are officially registered codes for agronomy, silviculture, forestry, soil science, plant or animal biology, etc., but not yet for agroforestry. As a result, there are Diploma, BSc, MSc and PhD degrees in agronomy, soil science, forestry, biology, etc., but not officially in agroforestry. The process of introducing a new discipline, like agroforestry, is complex and very long, since it must be approved by the central government decision-makers.

Graduate level

Graduate programmes (MSc and PhD) are offered by universities and research institutes. Both agricultural and forestry research institutes from MARD have been given the permission to

offer graduate courses, although the syllabus must be approved by a science committee within MOET.

The survey showed that there is no separate agroforestry curriculum at the graduate level. However, a subject entitled 'Advanced Agroforestry' is a core course for all graduate students in agriculture and forestry.

In the survey, two research institutes and two colleges offer graduate programmes that incorporate agroforestry in their curricula. The College of Agriculture no. 1 in Hanoi teaches agroforestry as part of some other subjects, and the other three institutions have separate agroforestry subjects (Table 6.2). In addition, students at all four institutions have presented theses and dissertations in agroforestry.

Table 6.2. Graduate (MSc, PhD) training in agroforestry in Vietnam

University, College, Faculty	Part of a subject	Separate subject	None
• Vietnam's Agricultural Science Institute		x	
• Vietnam Forestry Science Institute		x	
• College of Agriculture no. 1 in Hanoi	x		
• College of Agriculture and Forestry, Thuduc, Ho Chi Minh City		x	

Undergraduate level

At undergraduate level, almost all universities and colleges in Vietnam that offer BSc degrees in agronomy and forestry, train their students in agroforestry (Table 6.3).

Table 6.3. Agroforestry content in BSc curricula in universities and colleges in Vietnam

University, College, Faculty	Separate subject	Part of a subject	None	Location
• Forestry faculty, CAF	x	-	-	Ho Chi Minh City, South of Vietnam
• Agronomy faculty, CAF	x	-	-	Ho Chi Minh City, South of Vietnam
• Faculty of Agriculture & For. Economics, CAF	-	x	-	Ho Chi Minh City, South of Vietnam
• Agronomy faculty, Cantho Univ.	-	-	x	Cantho province, Mekong delta
• Forestry faculty, Central Highland University	x	-	-	Banmethuot, Darlac province
• Forestry faculty, Hue University	-	x	-	Thua thien Hue, central Vietnam
• Animal science faculty, Hue Univ.	-	x	-	Thua thien Hue, central Vietnam
• Agronomy faculty, no 1 Agricultural University	x	-	-	Hanoi
• Forestry faculty, Xuan Mai Forestry college	x	-	-	Xuan Mai, Ha Tay province
• Forestry faculty, CAF Thai Nguyen	x	-	-	Thai Nguyen province
Total no.	6	2	1	

Certificate and diploma levels

Certificate and diploma programmes in agriculture and forestry are offered in at least eight vocational and technical schools in Vietnam. They mostly considered agroforestry as part of the subject 'land use management' (Table 6.4).

Table 6.4. How agroforestry as a subject is treated in different vocational and technical schools

Vocational and technical schools	Separate subject	Part of related subject	Not offered	Location
• Technical School no. 2 at Trang Bom	-	x	-	DongNai province, South Vietnam
• Central Highland Technical school	-	x	-	Gia Lai Pleiku province
• Technical School no. 1 at Quangninh	-	x	-	Quang Ninh province, North
• Vocational School in Hatay	-	x	-	Hatay province, North Vietnam
• Forestry Vocational School in Langson	x	-	-	Lang Son province, North Vietnam
• Forestry Vocational School in Phutho	x	-	-	Phu Tho province, North Vietnam
• Agriculture & Forestry Vocational School in Co Bang	-	x	-	Co Bang province, North Vietnam
• Forestry Vocational School in Song Be	-	x	-	Binh Duong province, South
Total no.	2	6	-	

All institutions in the country participate in efforts to update the knowledge and academic level of technical officials in agriculture and forestry through in-service education and training. Part-time undergraduate and graduate courses are offered, where students need to be present half time in the institution. To earn an academic degree by MOET, participants are required to pass an entrance examination organized by the ministry and the institution.

Teaching staff

Qualifications of teaching staff in agroforestry and related subjects are shown in Table 6.5.

Table 6.5. Teaching staff/faculty of agroforestry and related subjects in different institutions

Institution	PhD, MSc	BSc	Diploma	Department	Discipline
• VASI	many	0	0	Invited teachers	Agricultural research
• VFSI	2	2	0	Silviculture	Forestry research
• Forestry faculty, CAF HCM City	3	4	0	Social forestry	Education
• Agronomy faculty, CAF HCM City	1	0	0	Agronomy	Education
• Faculty of Agriculture & Forestry Economics, CAF HCM City	1	1	0	Economics	Education
• Agronomy faculty, Cantho University	0	0	0		
• Forestry faculty, Central Highland University	4	0	0	Silviculture	Education
• Forestry faculty, Hue University	1	0	0	Farming systems	Education
• Animal science faculty, Hue Univ.	2	0	0	Agriculture & forestry	Education
• Agronomy faculty, no 1 Agricultural University	5	5	0	Environment/ ecology	Education
• Forestry faculty, Xuanmai Forestry college	2	2	0	Silviculture	Education
• Forestry faculty, CAF Thai Nguyen	0	2	0	Silviculture	Education
• Technical school no. 2 at Trang Bom	0	2	0	Silviculture	Technical training
• Central Highland Technical school	1	2	0	Silviculture	Technical training
• Technical school no. 1 at Quangninh	0	3	0	Silviculture	Technical training
• Vocational school in Hatay	0	2	0	Agriculture & forestry	Technical training
• Forestry vocational school in Langson	0	4	0	Silviculture	Technical training

Institution	PhD, MSc	BSc	Diploma	Department	Discipline
• Forestry vocational school in Phutho	0	1	0	Silviculture	Technical training
• Agriculture & Forestry vocational school in Cao Bang	0	2	0	Agriculture & forestry	Technical training
• Forestry vocational school in Song Be	0	2	0	Forestry	Technical training
Total	22	34	0		

Facilities and teaching materials

The standards of physical facilities and the availability of teaching materials vary greatly, depending upon each institution's access to resources. Most prominent institutions in the capital and in big cities have good access to resources and have adequate facilities, including field laboratories for agroforestry.

All institutions have recognized and developed at least one field-laboratory site (on-campus or on-farm demonstration-site for a specific agroforestry model). The availability of other facilities—textbooks, journals, audiovisual equipment, computers, photocopy machines, laboratory equipment, etc.,—varies from none to medium levels in the institutions (Table 6.6).

Table 6.6. Facilities for agroforestry education and training of different institutions in Vietnam

Institution	Documents		Tools and equipment			Demonstration farm site	Note
	text books	Journals	com-puters	office machi nes	agroforestry tools, equipment		
• VASI	10	2	10	28	+	many farms	both English & Vietnamese
• VFSI	20	59	3	17	+	many farms	both English & Vietnamese
• Forestry faculty, CAF HCM city	15	10	5	10	few	10 sites	both English & Vietnamese
• Agronomy faculty, CAF HCM city	10	5	10	12	few	2 demo farms	both English & Vietnamese
• Faculty of Agriculture and Forestry Economics	2	5	2	3	few	none	both English & Vietnamese
• Agronomy faculty, Cantho Univ.							no information
• Forestry faculty, Central Highland University	2	10	1	5	few	2 demo farms	both English & Vietnamese
• Forestry faculty, Hue University	5	15	5	9	few	3 demo farms	both English & Vietnamese
• Agronomy faculty, no. 1 Agricultural University	100	100	2	2	few	3 demo farms	both English & Vietnamese
• Forestry faculty, Xuanmai College	7	15	0	0	0	1 demo farm	both English & Vietnamese
• Forestry faculty, CAF Thai Nguyen	3	10	0	0	0	4 demo farms	both English & Vietnamese
• Technical school no. 2 at Trang Bom	2	3	1	1	0	2 demo farms	Vietnamese

Table 6.6. Facilities for agroforestry education and training of different institutions in Vietnam, continued

Institution	Documents		Tools and equipment			Demonstration farm site	Note
	text books	Journals	com-puters	office machines	agroforestry tools, equipment		
• Central Highland technical school	50	2	10	3	few	1 demo farm	both English & Vietnamese
• Technical school no. 1 at Quangninh	95	10	20	5	few	3 demo farms	both English & Vietnamese
• Vocational school, Hatay	0	0	0	0	0	1 demo farm	
• Forestry vocational school, Langson	2	2	0	1	0	3 demo farms	Vietnamese
• Forestry vocational school in Phutho	0	2	6	4	0	3 demo farms	Vietnamese
• Agriculture & Forestry vocational school, Cao Bang	0	0	0	0	0	2 demo farms	Vietnamese
• Forestry vocational school, Song Be	2	4	3	5	0	1 demo farm	Vietnamese

Some prominent institutions, like the College of Agriculture and Forestry in HCM City, Agricultural University no. 1 in Hanoi, Xuan Mai Forestry College and VASI, have developed agroforestry textbooks or syllabuses for both undergraduate and graduate programmes. Other technical and vocational schools develop their own teaching aids using these materials.

Students and graduates

Few institutions in the survey commented on students. In discussions during the national workshop, we found that there seems to be a nation-wide decline in the numbers of young people studying agriculture and forestry (including agroforestry). Even though all institutions find enough students to enter the different areas of study in agriculture, there are fewer and fewer high-quality students. In the recruitment of students to agriculture and forestry schools, the Vietnamese government gives priority to people from ethnic groups, remote area and country sites, and takes gender issues into account. But the proportions of female, ethnic and country students are still low (approximately 10%, 5% and 20% respectively), according to data from CAF Thu Duc, HCM City.

Graduates from different academic levels in agriculture and forestry are also encountering difficulties in finding jobs, particularly the young and the city graduates. Interestingly, agriculturists and foresters with agroforestry competence can find jobs faster. This could mean that agroforesters will have an advantage over agriculturists or foresters in finding jobs. Most educational institutions in Vietnam therefore plan to offer academic levels in agronomy or forestry with specialization in agroforestry.

Research in agroforestry

Many prominent institutions throughout the country have several research programmes in agroforestry fields. In Vietnam, educational institutions are expected to fulfil three main tasks: education, research and extension. Similarly, all research institutes have an educational responsibility to keep their national researchers up-to-date academically. The survey showed the following agroforestry research activities (Table 6.7).

Table 6.7. Research topics and programmes in agroforestry, carried out by Vietnamese institutions

Institution	Topics, issues, and programmes	Supportive source
• VASI	Red river delta, mountainous farming system	IRRI, ICRAF, APAN
	Improvement of the crop composition in three mountainous provinces in Northern Vietnam	National fund
• VFSI	Appropriate agroforestry techniques in several provinces	MARD extension unit
• Forestry faculty, CAF HCM City	Community-based development in Uplands	IDRC, F. Foundation
	Agroforestry and soil and water conservation in Uplands	CSI, Bfdw, SEARCA
	AF, a means for strengthening local people's capability in managing natural resources	Project: FAO/VIE 020
• Forestry faculty, Central Highland University	Survey some local agroforestry models	National fund
• Forestry faculty, Hue University	RVAC	National fund
	Community-based development in Uplands	IDRC, Ford Foundation
• Forestry faculty, Xuanmai college	Social forestry and agroforestry	Helvetas project
• Forestry faculty, CAF Thai Nguyen	MPTs, SALT, economical aspects of agroforestry	National fund, BfdW
• Group of technical and vocational schools	Practical aspects of several agroforestry models	Province extension unit

Extension programmes

As mentioned above, extension is one of the three elements in the Vietnamese educational system. Therefore, each institution has tried to strengthen its links with the national extension network, from the central to the local units. With greater attention to indigenous sustainable land-use adaptations, extension approaches may become better able to facilitate a gradual transition to sustainable land management (Rambo and Cuc et al 1996, Mittelman and Alisuag 1995). The recent establishment of a national extension programme which employs 'farmer demand-based' extension methods, creates a new potential to develop farmer-centred approaches for sustainable land and resource use alternatives. This pushes all institutions to change attitudes in extension work, to apply a facilitating approach rather than a top-down one.

Administration and policy

The central government and decision-makers recognize the link between rural poverty and environmental degradation. Government acts and regulations on rural development and conservation policies reflect the need for a balance. Integrated programmes aimed at alleviating rural poverty and conserving natural resources are the result of this recognition. In 1996 the newly formed Ministry of Agriculture and Rural Development (MARD) stated that forest and watershed conservation and rehabilitation efforts will succeed only when the survival needs of upland populations are first satisfied. This principle provided the rationale for consolidating the responsibility for forestry, agriculture, and fisheries, irrigation and extension in MARD.

A number of government programmes emphasize agroforestry and community forestry approaches to rehabilitate degraded hills, improve farming production, and conserve critical

watershed areas. In this context, considerable attention is given to developing sustainable land-use and forest management systems to increase the carrying capacity of sloping upland and highland areas by employing appropriate agroforestry techniques. Nearly all programmes designed to achieve rural development and conservation goals in Vietnam now involve efforts to develop agroforestry and community forestry systems.

However, although many educational institutions recognize the need for developing agroforestry to meet the farmer's needs, not much has yet been done to support agroforestry education. As a result, many educational institutions seem not to be very well guided to develop agroforestry education.

Institutional links

Recently a network among seven educational institutions in the country was established, supported by the Swiss Development Cooperation (SDC)–Helvetas Social Forestry Support Program (SFSP). The network consists of five forestry faculties, one soil and fertilizer research centre, and one provincial extension station. However, institutional links are not yet well developed between agricultural and forestry institutions, between research institutes and universities, between government and NGOs, and between extension units and universities. Specifically, there is a need for mechanisms for sharing human and financial resources to implement activities in agroforestry.

Training (short courses) in agroforestry

While considerable progress has been made during the past decade of agroforestry project support, a disproportionate amount of that support has been channelled to conventional 're-greening' projects, whose main aim was the reforestation of barren lands.

These projects employed top-down approaches—ranging from extension of expert-designed technical models to the use of financial or in-kind incentives—to encourage adoption and involvement of local populations in reforesting upland areas with fast-growing exotic tree species.

Final evaluations for these projects strongly suggest the need for alternative approaches that enlist the participation of local residents in the project design process, all the way through the entire course of project development and evaluation.

Effective two-way communication between the extension service and farmers is required to hybridize modern scientific knowledge and effective traditional practices. Integrated sustainable land use and forest management approaches that are economically viable and provide adequate incentives for farmer involvement are neither well understood nor widely established in Vietnam. Limited appreciation of traditional farmer practices, especially in forest management and shifting cultivation, continues to be a problem. These constraints lead to the urgent need to develop short agroforestry training courses in Vietnam.

To achieve this, we should assess training needs for 'Training of Trainers' at both institutional and farmer levels.

Conclusion and recommendations

Almost all agricultural and forestry educational institutions confirmed the urgent need to develop agroforestry education both at the formal and non-formal levels, to meet present and future demands.

Formal education

While a new agroforestry discipline is not yet recognized in Vietnam, we recommend that agronomists and foresters be given more opportunities to work together in an interdisciplinary manner to address rural development problems that require knowledge in areas such as agronomy, forestry and animal sciences.

It is possible to offer agroforestry as a field of specialization or major in traditional academic degrees such as a BSc in Agronomy, Forestry, or Animal Science. To achieve this, agriculture and forestry educational institutions in the country need to strengthen links among each other and with neighbouring countries, exchanging experiences and staff to enhance the growth of agroforestry education. Facilities and human resources for agroforestry education in the country must be improved. In addition, research and extension activities are necessary elements of the agroforestry education system. Case studies and short training courses for farmers must be linked with national trends in rural development, including forest-land allocation, land use, credit and market systems, and other related policies and programs. It is also important to encourage graduate and postgraduate students to choose agroforestry topics for theses and dissertations.

Non-formal training

Non-formal agroforestry training is needed for farmers and extension workers in government and non-government organizations. It can be short training courses; re-orientation workshops or training; or farmer-to-farmer training and extension. Cross-field visits and study tours would be helpful not only in acquiring more knowledge but also in strengthening links among different groups working in agroforestry in the region and country.

External factors

The development of agroforestry education depends on a number of external factors, such as an enabling policy environment, education policies, and research and extension links. These components need to be complementary and mutually supportive.

It is recommended that Vietnam explore possibilities for tapping all existing rural development projects, related networks, and national expertise, to strengthen its agroforestry education. It is most important to promote synergy among on-going projects and to make them complement each other.

Participants at the national workshop held on 20 May 1998 recommended that Vietnam should:

- establish a national information network on agroforestry education
- exchange experiences and information in the country
- develop human resources for agroforestry
- develop curricula, textbooks and other facilities to enrich agroforestry education
- undertake case studies and on-farm research to improve agroforestry education in Vietnam.

All these proposed activities need to be done first at the country level and later, regionally.

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Annex 6.1. The educational system in Vietnam

The educational system in Vietnam:

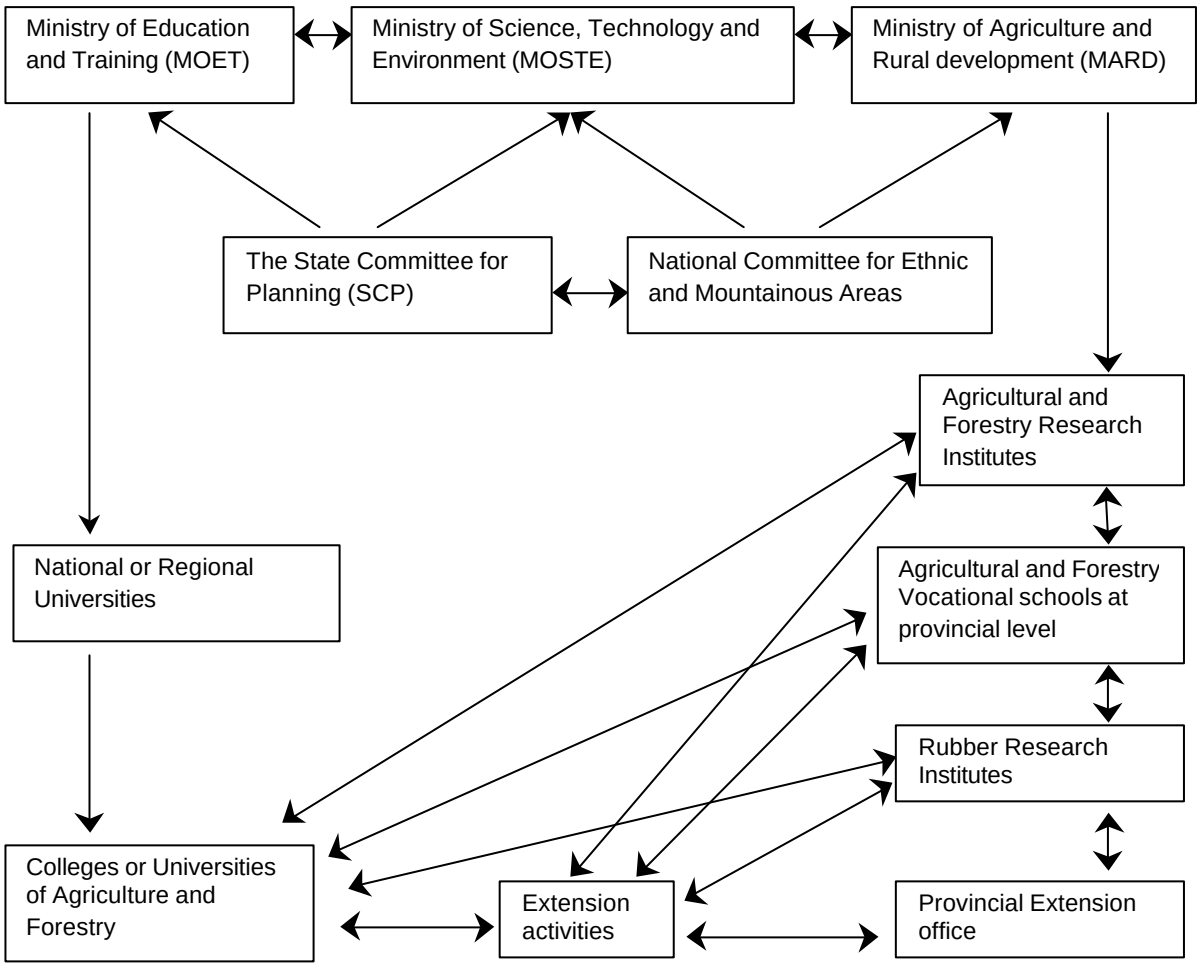

Figure 6.1. Different channels and links affecting educational institutions in Vietnam.

Annex 6.2. Participants in national workshop, Hanoi, 20 May 1998

No	Institution	Responsible person	Address, Tel., Fax	Particulars
1	College of Agriculture and Forestry, Thuduc, Ho Chi Minh City	Rector: Dr Bui Cach Tuyen, Representative: Mr Nguyen Van So	Thu Duc district, Ho Chi Minh City Tel: (08) 8966780 Fax: (08) 8960713	Nat. Univ. of HCM city Email: ngvanso@comfor.edu.vn
2	Forestry vocational school no. 3	Director: Mr Ha Xuan Uong Rep: Mr Luong Cong Ich	Binh An, Thuan An, Binh Duong prov. Tel: (065) 851531 Fax: (065) 850853	Ministry of Agriculture & Rural Development (MARD)
3	Forestry technical school no. 2	Director: Mr Vo Van Khieu Rep: Ms Pham Thi Nguyet	Trang Bom, Thong Nhat district, Dong Nai prov. Tel: (061) 866242	MARD
4	Hue College of Agriculture and Forestry	Rector: Prof. Dr Le Khac Huy Rep: Mr Le Duc Ngoan, Ms Nguyen Thi Kinh	24 Phung Hung, Hue Tel: (054) 822535 Fax: (054) 824923	Regional University, Thua Thien Hue
5	Faculty of Agriculture & Forestry in the Central Highland	Rector: Prof. Dr Nguyen An Ninh Rep: Mr Vo Hung	Km no. 4, Highway 14, Buon Ma Thuot town, Darlac prov. Tel(050) 853279 Fax: (050) 855572	Regional University, Central Highland
6	Forestry vocational school in Pleiku	Director: Mr Dang Van Du Rep: Dr Nguyen Danh, Mr Tran Van Chanh	Pleiky town, Gia lai Province. Tel: (059) 820252 Fax: (059) 820252	Forestry technical school for the Central Highland
7	Helvetas project	CTA: Bardoff Paul Rep: Peter Taylor	218 Doi Can street Tel: (04) 8329833 Fax: (04) 8329834 sfsp.pt@hn.vnn.vn	SFSP
8	Vietnam's Agricultural Science Institute	Director: Prof. Dr. Nguyen Huu Nghia, Rep: Ha Dinh Tuan	Thanh Tri, Hanoi Tel: (04) 8615556 Fax: (04) 8613937 Nghia@vasi.ac.vn	Secretary of APAN Vietnam
9	Forestry College of Vietnam, Xuan Mai	Rep: Mr Pham Xuan Hoan	Hatay, Vietnam Tel: (034) 840233 Fax: (034) 840540 in:fcv@org.vn	MARD
10	College of Agriculture & Forestry in Thai Nguyen	Rector: Nguyen Xuan Quac Rep: Dr Ly Van Trong	Thai Nguyen Prov. Tel: (0280) 851427 Fax: (0280) 852921	Thainguyen University
11	Lang Son Forestry vocational school	Rep: Mr Nguyen Van Tuy		
12	Quang Ninh Forestry vocational school	Rep: Mr Phan Cung		
13	Farming system Center, CAF TN	Vice-director: Tran Ngoc Ngoan		
14	Finnish Forest Dev't	CTA: Ander Wikerg		
15	Forestry Vocational School of Cao Bang	Mr Le Minh Dong Mr Hoang Quang Binh	Tel: (026) 860232/ 860127	

Annex 6.3. Results of the national workshop 20 May 1998

Three groups covering the north, central and southern parts of Vietnam analysed current agroforestry education and suggested needs for improvement.

Southern Vietnam

The group from the southern province of Hue representing five schools consisted of: Mr Danh (Pleiku), Mr Boi (Thuduc), Mr Hung (Darlac), and Mr Uong (BìnhDuong).

Table 6.8. Current status of agroforestry education in Southern Vietnam.

Education development concern	Pleiku Technical School	Central Highland University, Darlac	College of Agriculture and Forestry, Thuduc, HCM City	Binhduong Vocational School	College of Agriculture and Forestry, Hue
Agroforestry curriculum	Part of the land use subject (40/60 hrs)	Separate subject (45 hrs) , 2-day practicum	Separate subject (45 hrs)	Separate subject (48 hrs)	Part of the subject 'Farming Systems'
Agroforestry thesis	None	5–6 theses a year	8–10 theses a year	None	Not clear
Agroforestry seminar	No	Yes	Yes	No	Yes
Textbook	Lecture syllabus at technical level	Syllabus for BSc level	Syllabuses for BSc and MSc levels	Vocational syllabus	Syllabus for BSc level
Training	With the support of NODA project (New Zealand)	Through GTZ project in the province	Support from different NGOs: CSI, SEARCA, etc	None	SALT
Teaching staff	Tran Van Chanh, BSc	Vo Hung, MSc	Nguyen Van So, MSc	Mr Luong cong Ich Ms Ng Thi Hue BSc	Mr Le duc Ngoan (MSc), Mr Duong Viet Tinh (MSc)
Facilities	Textbooks, magazines, materials, photos, etc.	Textbooks, magazines, materials, photos, etc.	Textbooks, magazines, materials, photos, slides, etc	textbooks, lecture notes	Textbooks, magazines, materials, photos, etc.
Demonstration farms	None	On-campus	On-campus and on-farm (five locations)	Nursery at campus and other models	Three models
Equipment, tools	Computers, printers, overheads, slides, cameras	Computers, printers, overheads, slides, cameras, video TV	Relatively acceptable	Computers, printers, overhead, slide, cameras	Computers, printers, overhead, slide, cameras
Experiment tools and equipment	None	Not enough	Not enough	None	None
Agroforestry project and research activities	NODA project	Helvetas	Several	None	2 projects
International cooperation	Australian National University	GTZ Project	Several	None	IDRC and SAREC

The following needs were identified:

- Develop separate curricula for agroforestry courses
- Develop teaching staff in education methods and disciplines; English capability; staff exchange and research
- Improve availability and quality of teaching materials through:
  - working for a unified perception of agroforestry and the education process for each academic level from ranger to BSc and MSc
  - developing a unified agroforestry curriculum for each ecological zone
  - strengthening information system among institutions to promote exchange of materials, such as video films, slides and printed English reading materials on agroforestry.
- workshops and training courses to link up all institutions and their demonstration farms
- demonstration farms in each ecological zone.

Northern Vietnam

The participants from Northern Vietnam were Mr Trong, Mr Anders Wikberg, Mr Ngoan, Mr Binh (representing Thai Nguyen) and Bac Can.

The current state of agroforestry education in northern Vietnam region can be described as follows:

- Educational institutions offer agroforestry courses according to their own perspectives and experiences
- Agroforestry is offered as part of agronomy subjects like farming systems, agricultural systems, and land use systems. Mostly, these subjects focus on Sloping Agricultural Land Technology (SALT), and contain case studies conducted in various projects.
- Agroforestry teaching materials and references are scarce
- Increasing numbers of students are choosing agroforestry topics and issues for their final report
- Institutions offer both formal education and short training courses for local farmers at demonstration areas.

The following development needs are considered most important:

- Convening a country meeting including teachers and extension workers to standardize agroforestry curricula framework, for each academic level and training courses
- Training-of-trainers courses, based on people-centred approaches
- Exchange of course syllabuses with other institutions
- Production of syllabuses and textbooks for agroforestry subjects (in disciplines like agronomy, forestry, animal husbandry, aquaculture and apiculture)
- Establishment of demonstration areas as field laboratories for the teaching of agroforestry.

Central Vietnam

The Central Vietnam Group consisted of Mr Hoan, Tuan, Cuong, Tuy, Khoai, and Toai, representing agricultural research institutes and central government agencies and institutions in the mid-land of the Red River delta.

The following is a brief description of agroforestry education today in central Vietnam:

- Agroforestry is offered as a combination of agriculture, forestry, animal husbandry, aquaculture and other subjects, or as an integral part of a land-use subject

- Educators still lack necessary information and knowledge about the agricultural aspects of agroforestry
- Institutional cooperation between disciplines like agronomy, animal science is lacking in education
- An appropriate mechanism is lacking for educators to reach local farmers and their fields, and to forge closer links with other sciences including household economics and management, and social sciences.

The following constraints to effective agroforestry education were identified:

- Teachers and students lack opportunities to work in rural areas, and the ability to interact effectively with local farmers (problems with communication skills and the right attitude)
- There are not enough human resources (teachers) in agronomy and forestry sciences
- There is a lack of job opportunities for graduates (particularly agroforesters)
- There are few incentives to work in upland areas among both kinh(lowland) and ethnic young people
- There is a shortage of necessary teaching methods, facilities and materials
- Teachers are inadequately trained for agroforestry subjects.

The central Vietnam group made the following recommendations and suggestions:

- Build human resources for agroforestry education: agroforestry knowledge and skills
- Establish new departments of agroforestry (in colleges and research institutes): and establish postgraduate programmes in agroforestry
- Establish a national network for agroforestry education (including college, research institutes, NGOs, government, policy makers)
- Link with the proposed regional agroforestry education network
- Survey graduates' activities in agroforestry, and make needs assessment
- Reduce gap between educational institutions and rural area realities by developing country-specific case studies
- Build informative channels to exchange information and news among network partners.

Annex 6.4. Policies affecting agroforestry development in Vietnam

(Source: translated and cited by Andrew Mittleman, 1997)

Land Law of 1998: calls for 1 million smallholder households to be involved in agroforestry, and for the different forestry institutions to provide them with the necessary financial and technical support.

Decree CT-327 (1992): allocates land to rural households and communities for forestry and agricultural production purposes, but also enables land allocation for state enterprise and private sector investment in agriculture, forestry, fisheries and livestock. CT-327 provides for the development of bare land (denuded hills and mountains), and water surfaces using household and State resources. It creates an integrated program to address forestry and agriculture production, conservation, and rehabilitation. The aim was to increase the productive capacity of household units by ensuring that economic benefits accrued to them directly. Reforestation with commercial tree species and forest regeneration was prescribed for barren lands re-greening. CT-327 supports the stabilizing of shifting cultivation through integrated agriculture-forestry-fisheries system development (known as 'VAC'). Production is to be supported by processing and marketing, while taking close account of the need to ensure environmental protection.

17-HDBT(1992): concerns the authority for declaration and management of various classifications of forest.

Decree 12-CP (1993): provides for state enterprise development of the commercial agriculture and forestry production sectors.

Decree 13-CP (1993): establishes an extension network for agriculture, forestry and fishery at the central, province and district levels. The purpose is to link farmers with sources of scientific and economic information as well as credit to improve production and income.

Decree 14-CP (1993): on credits to households for forestry, agriculture and general rural development, specifying special guidelines for concessionary rates to poor households in mountainous areas.

Decision 525-TTg (1993): specifies policies and methods for economic and social development in the mountainous areas. The immediate objective is to speed up the socioeconomic development in the mountains and in areas inhabited by ethnic minorities. To do so, forest and multipurpose tree (including fruit) plantations should be developed, with cash crops, medicinal plants, and animal husbandry. Mining and processing of agricultural and forest products is also called for.

Forests should be zoned for special use (parks and reserves), protection (agroforestry, plantation and regeneration) and production (timber harvest). Industrial developments (such as steel mills and hydropower plants) should be developed to generate economic benefits from natural resource exploitation and processing, since mountainous areas are unfavourable for intensive agricultural production.

Decision 525-TTg calls for increased efforts to settle shifting cultivators by allocating lands to them for sustainable agriculture, agroforestry and forestry production in exchange for participation in forest protection. It calls for 'closing the forest gate' in watershed, special-use, and rocky mountain area forests, as well as in areas of poor forest, which need to be protected to enable natural regeneration. Households are entitled to a share of the economic benefits when regenerated or plantation forests are harvested.

These activities are to be further supported by the development of a transport network, water supply for irrigation and domestic use, establishment of rural health care units, rural

electrification and telecommunication, education, training, and provision of subsidies for food and other essential goods in short supply.

Decree 64-CP (1993): provides guidelines on the establishment of a credit system and provision of credit to rural households for agriculture, forestry and fishery development.

Decree 02-CP (1994): specifies rules for long-term allocation of forest land to organizations, households and individuals. Allocation covers natural and plantation forest land as well as degraded or 'barren' areas. The objectives include protection of watersheds and natural vegetation, and production, depending on land and land cover characteristics. Fifty-year renewable allocations follow approval of management plans. Financial support for implementing the management plan can be obtained from the State. In cases where land is already under agricultural uses or is otherwise amenable to it, forest land can be allocated for agricultural production. Decree 02-CP provides the legal basis for private and community ownership of forest lands. Legitimate ownership is fostered, it appears, when a community and its households submit integrated sustainable use and conservation plans for agricultural lands and forests. On the basis established by other forest and land use decisions and decrees, such plans should include agroforestry, sustainable agriculture and community forestry conservation and production systems. Households and communities are awarded formal tenure status upon State approval of the plans.

Decision 164Ttg(1995): establishes forestry promotion programmes including agroforestry on mountain slopes, sustainable farming on impoverished soil and barren hills, application of technical advances to improve natural and planted forests, selection and promotion of indigenous and valuable specialty trees, tree planting in the plains and coastal areas, protection of forests from pests and forest fires, improved cultivation processing of forest and non-wood forest products, the program on training, technology transfer, and forestry promotion.

Decision 556/TTg (1995): radically alters Program 327 by concentrating subsidies on 'non-productive' aspects of forestry development such as conservation of intact forests and biological diversity, with productive aspects given over for support by the commercial market instead of the State sector. 327 is redirected to enlisting local residents to preserve and restore natural forests in upland areas. No longer included are establishment and management of plantation forests, planting of barren lands with industrial crops, fruit trees and pastures, or activities related to stabilizing shifting cultivation.

73-CP (1995): bringing under one organization the management of agriculture, forestry, water resources, and rural development.

Annex 6.5. Proposed reclassification of forest land management guidelines

MARD (1996) has proposed reclassifying forest land now designated under three management categories—special use, protection, and production forest. The reclassification aims to better reflect the actual condition and relative importance of Vietnam's forest lands and resources, enabling management strategies to be better targeted to achieve national forest development and conservation goals. The proposed reclassification would establish guidelines for two existing management categories–special use and production–and one new category–agroforestry—as follows:

1. Special Use Forests–encompassing three management zones:

A '*strict protection zone*' for conservation core areas. Protection is envisioned to be primarily the responsibility of local communities, in cooperation with MARD. (No extractive use would be permissible.)

A '*protected zone*' allowing for natural regeneration and sustainable collection of non-timber forest products by local people. Essential watershed and other similarly critical areas presently zoned as 'protection forest' where use restrictions are less stringent, would be re-zoned as 'special use' to facilitate improved protection. Land zoned under this category by lacking forest cover would be managed for regeneration.

An inhabited and sustainable cultivated 'buffer zone' around protected areas where local communities responsible for protection receive development assistance in the form of infrastructure and human services. Agroforestry and sustainable agriculture extension would assist their development of sustainable land uses.

2. Protection forest land–this category would be abolished.

As noted (under 1b), critical watershed areas currently zoned as protection forest would be re-designated within the stricter 'special use' classification. 'Protection forest land' in non-essential watersheds would become 'production forest', though environmental regulations would continue to 'pose a significant restriction on management' (MARD 1996, p 13).

3. Production forest

Land currently zone as production forest, in addition to the non-essential watershed land to be transferred to this category (from 2, above). Production forest, as the name implies, will be managed for production of forest products. Environmental restrictions would apply, their strictness being dependent on site-specific environmental conditions.

4. Agroforestry land—newly proposed classification

A wide variety of tree-crop combinations would be developed with due regard to the local environmental situation. System design, crop and tree selection would be based on the preference of the land 'owner', normally a farmer with a Land Tenure Certificate. Some of this land could be devoted to forest regeneration or tree plantation, depending on the local environmental situation and farmers' preferred economic strategies.

Annex 6.6. Location of agroforestry education institutions in Vietnam

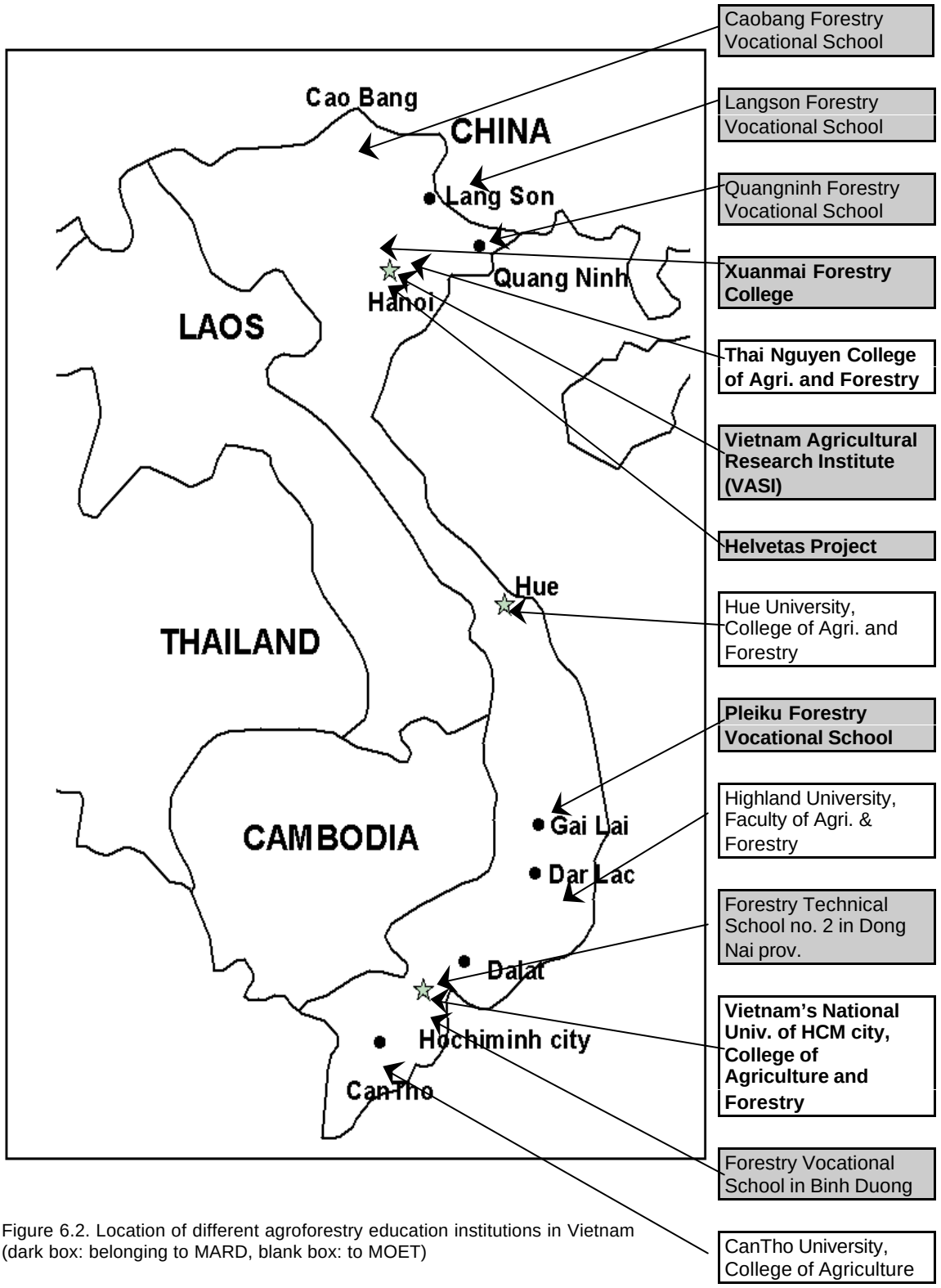

Figure 6.2. Location of different agroforestry education institutions in Vietnam (dark box: belonging to MARD, blank box: to MOET)

Annex 6.7 List of acronyms

BfdW	International NGO named: Bread for the World
CAF	College of Agriculture and Forestry at Thuduc, belonging to Vietnam's National University of HCMC.
CSI	Baptist international NGO: Cooperative Services Internationale
HCMC	Ho Chi Minh City
Helvetas SFSP	Helvetas Social Forestry Support Program
Helvetas	Development organization of Switzerland
MARD	Ministry of Agriculture and Rural Development
MOET	Ministry Of Education and Training
MOSTE	Ministry Of Science, Technology and Environment
NCEMA	National Committee for Ethnic and Mountainous Areas
RVAC	'Rung-Vuon-Ao-Chuong' (forest–garden–fishpond–livestock house)
S.R. VN	Socialist Republic of Vietnam
SALT	Sloping Agriculture Land Technology
SCP	State Committee for Planning
SDC	Swiss Development Cooperation
UAF	The former name of CAF: University of Agriculture and Forestry at Thuduc District, HCMC.
UPLB	University of the Philippines Los Baños
VAC	Indigenous Agroforestry System in Vietnam: 'Vuon-Ao-Chuong' (garden–fishpond–livestock house)
VACVINA	Vietnam's VAC Association
VASI	Vietnam's Agricultural Science Institute
VFSI	Vietnam's Forest Science Institute

Appendix A. Questionnaire for country studies

Questionnaire for country studies on agroforestry education

I. BASIC INFORMATION

Full name of school _____

Address _____

Telephone _____ Fax _____ E-mail _____

Name of head of institution / organization_____

Contact person for agroforestry education / training_____
Classification (please tick):

University Technical college Vocational school Research institute NGO GO(Government organization)

II. CURRICULA OFFERED *(Please attach copy of curriculum in Agroforestry)*

1. Formal education programmes

What courses/programmes are offered at the Institution? (please tick)	**If Yes, please specify programme, level, course title(s), course duration, year established, etc.**
Agroforestry as topic in other courses? Yes No	
Agroforestry as separate course Yes No	

Full agroforestry programme Yes No	
Agroforestry as thesis topic Yes No	
Agroforestry seminar Yes No	

2. Specification of formal degree training in agroforestry

A. Agroforestry curricula offered	***Year started***	***Dept./Unit spearheading the program***	***Person/s in-charge***	***Course duration***
Technician's level				
Baccalaureate				
Masteral				
B. Other Degree Programs				

III. AGROFORESTRY TRAINING

Is the Institution offering training courses in agroforestry (short courses, in-service training, etc)? Yes No

If Yes, please specify:

Title of training course	Brief description	Target audience	No of trainees	Source of funds	Duration (days)

IV. TEACHING STAFF AT FACULTY/TRAINING UNIT

Name of teaching staff involved in agroforestry teaching	Educational background (degree and field)	Mother unit / Department	Position

Is there a need for more in-service, short-term training of the teaching staff? Yes No

If yes, please list priority areas (related to agroforestry topics)

V. FACILITIES

1. Library resources

Classification	Number		Remarks (i.e. language, status etc.)
	Agroforestry-related	Non-agroforestry	
Textbooks			
Proceedings			
Journals			
Newsletters			
Serials			
Slide series			
Video			
Others (please specify)			

Please attach list of available agroforestry books, articles, training materials, etc. Please indicate which ones are produced at the institute, and specify language of document.

2. Demonstration areas

Classification	Location	Size	Agroforestry technologies being showcased	Office and person in-charge
On-station				
On-farm				

3. Available facilities for teaching and training materials production

Item	Specifications (type etc.)	Number	Remarks
Computers			
Software (Word, Excel, Powerpoint, Access, etc.)			
Printer			
Photocopier			
Binding machine			
Photographic Equipment			
Slide projector			
Overhead projector			
Other Audio-visual facilities			

Internet access			
Laboratory Equipment			
Field Equipment			

VI. STUDENTS and GRADUATES

No of theses in agroforestry in 1997 _____by male students _____by female students

VII. RESEARCH AND EXTENSION ACTIVITIES

1. Research

Research project (on-going)	Brief description	Target clientele	Source of funds	Duration

2. Extension

Extension projects and activities (on-going)	Brief description	Target clientele	No of trainees	Source of funds	Duration

VIII. INSTITUTIONAL LINKAGES

Organizations/Agencies	Nature/Type of linkage

-Thanks a lot for your time!