

Sustainable Agriculture Education – How Can Agroforestry Contribute?

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1. PEOPLE, AGRICULTURE, AND TRENDS

Sometime in 1999, the world's population passed the six billion mark. This was roughly a doubling of the 1960 figure. Catering for the needs for food, energy, and services of all these people has caused an enormous pressure on the natural resources. The loss of tropical forests is perhaps the most striking effect. But the last 30 years have also seen an unprecedented agricultural development: the Green Revolution has roughly doubled the output of main cereals like wheat, maize, and rice.

The Green Revolution, technology-intensive and depending on inputs of fertilizers, pesticides and improved seeds, has also shown some limitations, however. It has mainly benefited larger enterprises and well-off farmers who could afford the inputs required. Small-scale farmers in the uplands have benefited less. An estimated one billion people, many of them poor, live and work in situations where their farming, herding or fishing operations cannot benefit much from mainstream agricultural technologies.

There are also other concerns: intensive use of chemicals threatens the environment and biodiversity is lost in the shift to improved seeds and in the dominance of monocultures. Water is another concern. A lot of the gain in agricultural production is attributed to larger inputs of irrigation water. The sustainability of these mainstream technologies is also sometimes doubtful: water depletion and soil erosion are two common problems.

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Looking ahead, demographers project that the world's population will again double within the next 50 years or so (birthrates are decreasing, but a large young generation means many young parents). To cater for the material and social needs of this growing population, as well as raising the level of the poor is a continuous challenge for society. What is the road ahead? Can the Green Revolution continue to deliver, or are new approaches needed?

2. AGROECOLOGICAL APPROCHES

These new approaches to agricultural innovations were discussed in a high-level 'Conference on Sustainable Agriculture: Evaluation of New Paradigms and Old Practices' held in Bellagio, Italy in April 1999 (CIFAD 1999).

These agroecological approaches 'seek to create optimum growing conditions for plants and animals not as individual species, but as parts of larger ecosystems where nutrients are provided and recycled in mutual supportive ways'. While the external input might be low in the agroecological approaches, they could be intensive regarding the input of labor, knowledge, and management. Other characteristics are:

- Systems are managed with multiple objectives in mind
- Favourable policies are often critical for success
- Training and other opportunities for upgrading of human resources is important
- Increases in production of 50-100 percent are fairly common
- Diversification of farming systems can raise total production significantly

One principal conclusion from the conference was the recognition of the processes by which these agroecological approaches have been developed, improved, and extended. Largely, they have emerged from experience and experimentation, much of it by farmers themselves, often stimulated by working with NGOs, research organizations, and universities. This process was characterized as participatory technology



development, as farmer-centered research and extension, or as farmer-to-farmer agricultural improvement. This is rather different from the approaches used in mainstream agriculture research and development.

3. PERSPECTIVES ON AGOFORESTRY EDUCATION

Over the last decades, education in agriculture has been walking hand-in-hand with the Green Revolution. The mainstream agriculture development has been in focus of most agriculture education programs. Students have learned how to manage, develop, and disseminate the high-input, technologically-advanced agriculture that characterize the Green Revolution.

It is only in the last decade or so that more systems-oriented, holistic approaches have started to enter the educational systems. Subjects such as soil and water conservation and integrated pest management are now featured prominently in various educational programs. Agroforestry is also making its way into the educational systems in Southeast Asia. In the following, I would like to elaborate on the status and trends in agroforestry education in Southeast Asia. The information is largely based on a status and needs assessment carried out in 1998 (Rudebjer and Del Castillo 1999).

The study covered Indonesia, Lao PDR, the Philippines, Thailand, and Vietnam. Being a very diverse region, culturally and historically, it is natural that the development in agroforestry is taking different pathways. The educational policy climate also varies a lot. The Philippines has the most prominent agroforestry education with full undergraduate program offered in roughly 30 institutions. Other countries are just starting to integrate of agroforestry into various subjects. An outlook of the national situations showed the following:

3.1 Indonesia

- At BSc level, agroforestry is not a recognized study program; 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.



- '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.

3.2 Lao PDR

- Currently, there is no MSc education offered in Lao PDR, but agroforestry is taught as a subject in BSc and Higher Diploma programs, and in non-formal training
- Curricula in agroforestry needs to be reviewed and harmonized.
- 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 programs.

3.3 The Philippines

- Twenty-nine universities and colleges in the Philippines teach degree programs in agroforestry at different levels.
- Curricula need modernizing, current standards date back to 1981.
- There is an adequate number of agroforestry teachers.
- Access to demonstration areas and sites for practical studies is unsatisfactory.
- Students have a tendency to be attracted to new education programs.
- Self-employment for agroforesters is important, while the career paths in government agencies are still a constraint.



- Funding for research is limited.
- A national network of agroforestry education institutions in the Philippines is established.

3.4 Thailand

- Agroforestry is offered as a subject in various programs, such as social forestry, forest resource management, soil science, and earth science. But bureaucracy is a constraint to curriculum development.
- There is an adequate 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 are interdisciplinary.

3.5 Vietnam

- There is an urgent need for agroforestry and community forestry, and a corresponding need for improving agroforestry curricula.
- Teachers lack 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 allocate lands or community-based development in the uplands.
- The interest in institutional links exist, but possibilities are limited by distance and by lack of infrastructure or funds.

4. REGIONAL ISSUES

In summary, the study identified the following regional issues:

- 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 development 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 up-dating 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 was yet to be recognized as a field of specialization in many schools, and there are no specific government job areas in agroforestry.



The Southeast Asian Network for Agroforestry Education (SEANAFE) was established in 1999, as a vehicle for addressing these issues. The mission of SEANAFE is to improve the quality and availability of agroforestry education through:

- Curriculum development;
- Training of teaching staff;
- Teaching materials support and development;
- Fellowships for students' thesis research;
- Staff exchange; and
- Sensitizing stakeholders through workshops and meetings.

SEANAFE is managed by its members via a bi-annual General Meeting that sets the overall guidelines. The SEANAFE Board oversees the strategies and direction of the network. The day to-day activities are coordinated by the SEANAFE Secretariat located at the Institute of Agroforestry at the University of the Philippines Los Baños (UPLB), in collaboration with the International Council for Research in Agroforestry (ICRAF)-based SEANAFE Support Project.

5. SEANAFE AND SUSTAINABLE AGRICULTURE

With SEANAFE in place, how can this new network contribute toward sustainable agriculture education? I would like to highlight three areas where I think SEANAFE can play an important role:

Curriculum development

As mentioned earlier, agroecological approaches emphasize the process by which farmers participate in the development and testing of new technologies. Similarly, SEANAFE is advocating more participatory approach to curriculum development, as opposed to the traditional top-



down oriented ones. Reasons are that the agroforestry jobs often are not very well defined. In many cases the 'agroforester' need to enter new areas of work, including self-employment, rather than embarking on an established career path. This in turn means setting specific educational objectives that aims at a specific job might be tricky. A more flexible and open-ended approach is preferred, where the voices of a whole range of stakeholders are heard. To capture the full range of knowledge, skills, and attitudes to be developed in the agroforestry education program, a participatory curriculum development approach is used by SEANAPE.

A key ingredient here is to identify who are the stakeholders for an agroforestry education program, to establish what kind of interest these stakeholders have, and to identify the way by which that particular stakeholders could contribute to the participatory curriculum development process.

Learner-centered teaching/learning approaches

A subject as agroforestry is well suited for teaching/learning approaches that puts the learner in the center. It is well documented that learning is more effective when the students are taking active part. Doing is more effective than listening, for instance. Agroforestry, as a complex learning system that involves a whole range of bio-physical and socio-economic topics, as well as a holistic understanding of the agroecological landscape, is very well suited for an active involvement of the learners. By designing learning experiences that draw upon and involve the various experiences of the learner, the curriculum developer can build in learner-centered approaches in the curriculum. Choosing teaching/learning approaches becomes an integrated part of the curriculum development.

Field-based learning

To develop methods and tools for working with farmers in a participatory manner is a key ingredient in agroforestry education. While on-campus demonstration plots have their obvious advantages to demonstrate technologies in an easily-accessible way, they have one main draw-back: they do not include the main component of any agroecosystem -- the farmer. For students to learn and understand the



complexities of the farmers' decision-making, to appreciate the knowledge and skills of the farmer, and understand the strategies and risks among small-scale farmers, students need training in working with farmers. To develop sound and efficient ways of doing so is one of the main missions of SEANAFE, and something that also requires attention during the curriculum development process.

6. CONCLUSIONS

Agroforestry practices are very common in Southeast Asia, in particular among upland farmers who may not have benefited much from the Green Revolution. With the increasing pressure on the natural resources in the uplands, there is an increasing need for alternative approaches that can contribute toward sustainable agriculture. Agroforestry, being a holistic and systems-oriented approach, is well suited as a vehicle toward these objectives. In synergy with soil and water conservation, and integrated pest management, agroforestry can help provide the materials and services need in the third millenium.

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