Working Paper

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Lutgarda L. Tolentino, Leila Landicho and Jesus C. Fernandez

Southeast Asia

World Agroforestry Centre
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Working Paper nr 99

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Preface

The Southeast Asian Network for Agroforestry Education (SEANAFE) is a group currently composed of 94 learning institutions, mostly universities, in Indonesia, Laos, Malaysia, Philippines, Thailand, and Vietnam. It was established in 1999 to "help improve agroforestry education, training, research and extension, and contribute to socioeconomic development, empowerment of farming communities and sustainable natural resource and environmental management in the Southeast Asian region."

SEANAFE recognizes the vital role of learning institutions in responding to the changing needs of the modern society in relation to the current economic and environmental concerns worldwide. Agroforestry, as an evolving discipline and practice, continues to take on new roles and a renewed importance in addressing such concerns. The growing number of SEANAFE member-institutions indicates the increasing interest among academic institutions in Southeast Asia to engage in agroforestry education. Yet, enrollment in forestry, agriculture, agroforestry, and other allied programs has been observed to decrease in the past five years in Southeast Asia.

In the Philippines, agroforestry is already integrated in most of the priority programs and projects of development organizations. It is seen to provide multiple benefits, especially in meeting the socioeconomic needs of upland dwellers while maintaining ecological stability, which are the two prime goals of most natural resource management programs in the country. As such, more trained people are needed to realize these benefits and help achieve the goals of development organizations. However, attracting students to pursue university programs related to agroforestry remains to be a challenge.

In this working paper, SEANAFE argues the need to have more human resources with competencies in agroforestry and encourages learning institutions in the Philippines to respond accordingly to this need. It hopes to stimulate further discussions and greater interest among SEANAFE member-institutions and other organizations in the region through sharing of ideas and experiences in making agroforestry more appealing to students and other stakeholders. SEANAFE intends to come up later with similar reports for the rest of its member-countries.

WILFREDO M. CARANDANG, PhD
SEANAFE Board Chair

Abstract

Although enrollment in agroforestry has been declining in the Philippines, there has been a growing demand for a competent pool of human resources in this field. This is because agroforestry has been recognized as a major component in most institutional programs of national and local development organizations in the country. In the next 10 years (i.e., 2009-2019), these organizations would likely employ about 1, 284 agroforestry graduates (or about 128 graduates per year) to help carry out their institutional programs. Foremost of the specific competencies needed are: community organizing for agroforestry development (i.e., from production, harvesting, processing, to utilization, marketing, and conservation practices), training and extension, preparation of feasibility studies on agroforestry development; land capability assessment for sound agroforestry technologies, and identification of appropriate and site-specific species and cropping combinations. These competencies are expected to ensure a more effective and efficient implementation of upland development programs in the Philippines particularly in the areas of climate change mitigation and adaptation and provision of livelihood opportunities.

At present, most national and local line agencies and development organizations avail themselves of such manpower requirement by tapping external experts and/or by retooling their existing staff through short-term training programs and mentoring. The Philippine Agroforestry Education and Research Network (PAFERN) and the National Agroforesters' Association of the Philippines (NAAP) are expected to play key roles in creating continuing formal and informal education activities and enhancing the necessary linkages to meet the agroforestry competency requirements of organizations engaged in agroforestry development in the country.

Keywords:

agroforestry education, agroforestry competencies, agroforestry human resources needs, Philippines

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Acronyms

BSAF	Bachelor of Science in Agroforestry
BSA-AF	Bachelor of Science in Agriculture major in Agroforestry
BSF-AF	Bachelor of Science in Forestry major in Agroforestry
BSA	Bachelor of Science in Agriculture
BSF	Bachelor of Science in Forestry
BSES	Bachelor of Science in Environmental Science
CHED	Commission on Higher Education
DA	Department of Agriculture
DAR	Department of Agrarian Reform
DENR	Department of Environment and Natural Resources
DMMMSU	Don Mariano Marcos Memorial State University
IAF	Institute of Agroforestry
ICRAF	World Agroforestry Centre
LGUs	Local Government Units
MAO	Municipal Agriculture Office/r
MENRO	Municipal Environment and Natural Resources Office/r
NAAP	National Agroforesters' Association of the Philippines
NGOs	Non-government organizations
PAFERN	Philippine Agroforestry Education and Research Network
PG-ENRO	Provincial Government-Environment and Natural Resources Office/r
PSG	Policy, Standards and Guidelines
SCUs	State Colleges and Universities
SEANAFE	Southeast Asian Network for Agroforestry Education
UPLB	University of the Philippines Los Banos

Introduction

Agroforestry is a dynamic, ecologically-based natural resources management (NRM) system that, through the integration of trees on farms and in their agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits (Leakey 1996). It deliberately combines woody perennials with herbaceous crops and/or animals, either in some form of spatial arrangement or temporal sequence on the same land (Lundgren and Raintree 1983).

Agroforestry has been practiced in the Philippines for so many decades ago. The literature considers the famous Banaue Rice Terraces built by the Ifugao ancestors as one indigenous agroforestry system in the country. According to Carandang et al. (2006), agroforestry has gained its status as a science in the Philippines as a result of the multitude of research and development works done on it by various academic and research institutions, private organizations, nongovernment organizations (NGOs) and even peoples' organizations in the country.

The roots of agroforestry as an academic discipline in the Philippines could be traced to 1976 when Don Mariano Marcos Memorial State University (DMMMSU) in Northern Philippines started to offer a four-year BS Agroforestry program. As of 2009, 34 state colleges and universities are offering different types of agroforestry curricula. Back in 2000, a study, titled "Demand and Placement of Agroforestry Graduates in the Philippines," indicated several job market potentials for agroforestry graduates (Del Castillo et al. 2000). Conducted by the University of the Philippines Los Banos Institute of Agroforestry (UPLB-IAF), the study also revealed various employers' mounting interest for agroforestry competencies among their staff as they consider the potentials of agroforestry as an intervention for development. The results of the study and the increase in the number of academic institutions may suggest the need for continuous training and production of human resources in agroforestry. In the past five years, however, a declining enrollment trend has been observed in forestry, agriculture, agroforestry and other allied programs in the Philippines. The limited employment opportunities in recent years is considered as one of the major factors for the declining interest of students in NRM programs, including agroforestry.

With the recent economic and environmental concerns worldwide, particularly on climate change, agroforestry is seen to be taking new roles and a renewed importance in developmental fields. Thus, it is necessary to reexamine these roles and the manpower competencies needed to maximize the potentials of agroforestry in addressing these concerns. In this regard, the UPLB-IAF conducted a study titled "Assessing the Need for Agroforestry Competencies among the Development Organizations in the Philippines" in 2009. This study aimed to: a) identify the current programs and project activities of the different development organizations and government agencies in the Philippines; b) find out the tasks performed by the staff to carry out the project activities of the development organizations; c) identify the agroforestry competency requirements of the development organizations; and d) measure the projected need/demand for agroforestry graduates in the Philippines in the next 10 years.

The study was funded by the Swedish International Development Cooperation Agency (Sida) through the Southeast Asian Network for Agroforestry Education (SEANAFE).

Methodology

Selection of respondents

Using stratified sampling, 190 institutions engaged in NRM and conservation programs, global climate change research, and sustainable upland development endeavors were selected as respondents. These institutions were located in 34 provinces of the Philippines where agroforestry schools were also operating.

The respondents were classified as: a) national government agencies covering the Department of Environment and Natural Resources (DENR), Department of Agriculture (DA), and the Department of Agrarian Reform (DAR); b) local government units (LGUs); c) state colleges and universities (SCUs) engaged in agroforestry education programs; and d) non-government organizations (NGOs). The LGUs comprised of either the Office of the Provincial Agriculturists, Office of the Provincial Government-Environment and Natural Resources Office (PG-ENRO) and/or the Provincial Planning and Development Offices (PPDO).

Of the 190 identified participants of the study, only 82 institutions returned the questionnaires within the time provided, which made up the final group of respondents. These institutions represented the national government agencies, LGUs, academic institutions, and NGOs. The LGUs and the DENR were the most represented while DAR and NGOs, the least. Table 1 shows the distribution of the respondents by institutional classification and geographical distribution.

Table 1. Distribution of respondent-institutions according to classification and geographical location.

Classification	Number per geographical location			TOTAL (n=82)
	Luzon	Visayas	Mindanao	
LGUs	17	7	2	**26**
DENR	9	4	7	**20**
SCUs	7	3	7	**17**
DA	4	3	3	**10**
DAR	4	1	0	**5**
NGOs	3	0	1	**4**
TOTAL	**44**	**18**	**20**	**82**

Data gathering

The research team mailed the survey questionnaires (Appendix 1) to the target respondents with enclosed self-stamped envelopes to facilitate return. The survey collected data on the respondents' major thrusts and programs; current profile of manpower involved in carrying out institutional programs and activities; projected need/demand for agroforestry graduates in the next 10 years; and competency requirements.

A field follow-up was conducted in regions with low survey response turn-out. These regions were Region 5 (Camarines Norte and Camarines Sur provinces) in Luzon; Region 6 (Bacolod and Iloilo provinces) in the Visayas; and Region 11 (Davao City) in Mindanao.

Scope and limitations of the study

Because of resource and time constraints, the research team used mail survey as its data gathering technique. As such, the research team designed an "easy-to-fill-up" survey questionnaire.

To facilitate response, the research team provided the respondents a list of tasks that are normally attendant to carrying out institutional programs and activities, which they could just check, as well as a list of preferred agroforestry and related competencies. For the latter, the respondents simply ranked the competencies, with 1 as the least preferred and 5 as the most preferred. The list of core agroforestry competencies was obtained from the Policy, Standards and Guidelines (PSG) for BS Agroforestry (BSAF), and the scope of practice of agroforesters as provided for in the proposed House Bill for the Professionalization of Agroforestry in the Philippines.

Results and discussion

Priority programs, projects and activities of the respondents

Tables 2a and 2b show the priority programs of the surveyed institutions and the specific projects and activities they adopt to carry out these programs, respectively. It should be noted, however, that some respondents were carrying out activities on some programs which they did not consider as their priorities.

For most (40%) of them, sustainable NRM is top priority program particularly for the DENR offices and the LGUs. This is because the Philippine government has embraced the concept of sustainable forest management since the late 1980's as its main policy thrust to ensure the long-term stability of the forest and natural resources (www.forestry.denr.gov.ph). The measures that execute the government's thrust on promoting sustainable forest management include the 1987 Philippine Constitution; Master Plan for Forestry Development; Philippine Strategy for Sustainable Development and Philippine Agenda 21; and the Community-based Forest Management Program. In addition, the 1991 Local Government Code mandates the LGUs to share with the national government the responsibility of managing and maintaining the ecological balance within their territorial jurisdiction. This law has enabled the LGUs to engage in sustainable NRM programs.

About 20 percent of the respondents considered information, education and advocacy as their priority program. This type of program is more widespread among the respondents. Expectedly, all the SCUs indicated instruction, research, extension, and production in NRM as priority, these being part of their four-fold mandate/function. DAR appeared to be more focused on its priority program being on land tenure development which is based on its organization mandate. Similarly, the DA's mandates on agricultural development, sustainable agriculture, and food security were reflected as priority programs. The LGUs had the most number of priority programs as they are responsible in taking care of the full development of the communities under them.

Agroforestry development appeared as the topmost project/activity that the respondents engage in to carry out sustainable NRM program. The other projects/activities included reforestation and regreening, watershed management, upland development, and community-based forest management (CBFM). It is noteworthy that all these activities, particularly CBFM and upland development, adopted agroforestry as a land use management strategy. For instance, Executive Order No. 263, Series of 1995 issued by the Philippine President, specifies agroforestry as the main production technology in CBFM implementation. Moreover, the Philippine Government launched in 2005 the upland development program to develop and rehabilitate around 4 million hectares of upland areas through agroforestry. Likewise, the Development Bank of the Philippines' current reforestation project being undertaken by the LGUs, academic institutions, and people's organizations also espouses agroforestry practice.

Likewise, agroforestry development specifically figured out as the focus of activities in two other priority programs of the respondents. These programs were on Information, Education and Policy Programs in NRM and Instruction, Research, Extension and Production in Agroforestry.

These findings indicate that agroforestry development and promotion have been integrated in the programs, projects, and activities of most of the surveyed institutions. While not explicitly mentioned, it could be deduced that the kinds of activities respondents may have some agroforestry element in them e.g., upland development, watershed development, nursery establishment and management,

establishment of soil erosion control measures, livelihood generation, etc. This could be attributed to the multiple benefits that can be derived from agroforestry, especially in meeting the socioeconomic needs of the upland dwellers, while maintaining ecological stability, which are the two prime goals of most NRM programs in the Philippines.

Table 2a. Priority programs of the respondents.

PRIORITY PROGRAMS	RESPONDENTS							
	DENR (n=20)	LGU (n=26)	SCUs (n=15)	NGOs (n=4)	DA (n=10)	DAR (n=5)	TOTAL	%
Sustainable natural resources management*	*20*	*10*	*0*	*3*	*0*	*0*	*33*	*40.24*
Information, education and policy programs in natural resources management*	*2*	*3*	*7*	*3*	*1*	*0*	*16*	*19.51*
Instruction, research, extension and production programs in agroforestry*	*0*	*0*	*15*	*0*	*0*	*0*	*15*	*18.29*
Environmental Management Program	*5*	*0*	*4*	*1*	*0*	*0*	*10*	*12.20*
Agricultural development	*0*	*6*	*0*	*0*	*6*	*0*	*12*	*14.63*
Livelihood Development	*1*	*7*	*0*	*0*	*0*	*0*	*8*	*9.76*
Land tenure improvement	*0*	*0*	*0*	*0*	*0*	*5*	*5*	*6.10*
Tourism and Industry Development	*0*	*4*	*0*	*0*	*0*	*0*	*4*	*4.88*
Sustainable agriculture	0	3	0	0	1	0	4	*4.88*
Food security	0	1	0	0	2	0	3	*3.66*
Biodiversity conservation	*3*	*0*	*0*	*0*	*0*	*0*	*3*	*3.66*
Infrastructure support services	*0*	*2*	*0*	*0*	*1*	*0*	*3*	*3.66*
Climate change mitigation	*2*	*0*	*0*	*0*	*0*	*0*	*2*	*2.44*

**multiple responses

Table 2b. Specific projects/activities to carry out the priority programs of the respondents.

SPECIFIC PROJECTS/ACTIVITIES	RESPONDENTS*						
	DENR (n=20)	LGU (n=26)	AI (n=15)	NGOs (n=4)	DA (n=10)	DAR (n=5)	TOTAL
Sustainable natural resources management							
1. Agroforestry development	18	8	0	2	0	0	28
2. Reforestation and regreening	7	12	0	1	0	1	21
3. Watershed management	5	8	0	0	4	1	18
4. Upland development	9	1	0	0	1	0	11
5. Community-based forest management	8	1	0	0	0	0	9
6. Nursery establishment and management	0	1	0	0	0	0	1
Information, education and policy programs in natural resources management							
1. Capability-building (e.g. agroforestry, organic farming, SWCM, SALT)	0	0	7	2	1	2	12
2. Promotion of organic fertilizers	0	1	0	2	1	0	4
Instruction, research, extension and production programs in agroforestry							
1. Offering of formal degree programs in agroforestry	0	0	13	0	0	0	13
2. Agroforestry project development	0	0	8	0	0	0	8
3. Watershed management	0	0	6	0	0	0	6
4. Reforestation and regreening	0	0	6	0	0	0	6
Environmental Management Program							
1. Mines and geosciences development	1	0	0	0	0	0	1
2. Watershed management	3	0	3	0	0	0	6
3. Upland development	1	0	0	1	0	0	2
4. Reforestation	0	0	0	0	0	0	0

Agricultural development							
1. Natural resources management	0	0	0	0	1	0	1
2. Establishment of soil erosion control measures	0	0	0	0	1	0	1
3. Crops development	0	1	0	0	0	0	1
4. Sustainable agriculture	0	2	0	0	1	0	3
5. Nursery establishment and management	0	0	0	0	1	0	1
6. Plantation establishment and management	0	0	0	0	2	0	2
Livelihood Development							
1. Technology transfer	1	1	0	0	1	0	3
2. Mangrove development	0	1	0	0	0	0	1
3. Community organization and devt.	0	2	0	1	0	0	3
Land tenure improvement							
1. Community organization and development	0	0	0	0	0	3	3
2. Agricultural development	0	0	0	0	0	1	1
3. Organic farming	0	0	0	0	0	1	1
Tourism and Industry Development							
1. Ecotourism	0	1	0	0	0	0	1
2. Livelihood generation	0	1	0	0	0	0	1
3. Infrastructure development	0	1	0	0	0	0	1
4. Mangrove development	0	1	0	0	0	0	1
Sustainable agriculture							
1. Agricultural development	0	0	1	0	2	1	4
2. Organic farming	0	0	0	0	1	0	1
Food security							
1. Watershed management	0	0	0	0	2	0	2
2. Reforestation	0	0	0	0	1	0	1
3. Organic farming	0	0	0	0	1	0	1
4. Nursery establishment and management	0	0	0	0	1	0	1
5. Coastal resources management	0	1	0	0	0	0	1
Biodiversity conservation							
Coastal resources management	3	0	0	0	0	0	3
Infrastructure support services							
1. Streambank rehabilitation	0	1	0	0	0	0	1
2. Rehabilitation of irrigation systems	0	2	0	0	1	0	3
Climate change mitigation							
1. Solid waste management	1	0	0	0	0	0	1
2. Reforestation	2	0	0	0	0	0	2

**multiple responses

Existing human resources carrying out the project activities of the respondents

While the majority of the respondents were engaged in agroforestry development activities, only about three percent of their technical staff members were either agroforestry graduates or specialized in agroforestry in their BS (Agriculture or Forestry) programs. Most of these staff members were working in LGUs. Table 3 shows that foresters and agriculturists made up the majority (84%) of current technical staff members carrying out the priority programs of the respondents.

Table 3. Educational backgrounds and specializations of current human resources involved in implementing the priority programs and project/activities of the respondents.

FIELDS OF SPECIALIZATION	NUMBER OF CURRENT STAFF MEMBERS TASKED WITH IMPLEMENTING PRIORITY PROGRAMS AND PROJECTS/ ACTIVITIES						
	DENR	DA	DAR	NGO	LGU	SCUs	Total
BS/MS Agroforestry	0	1	0	0	1	6	8
BSA-AF	7	0	0	0	10	5	22
BSF-AF	2	0	0	8	5	0	15
Sub-total for graduates in agroforestry programs	**9**	**1**	**0**	**8**	**16**	**11**	**45**
BS/MS/PhD Forestry	355	1	1	6	48	59	470
BS/MS/PhD Agriculture	33	392	52	5	151	122	755
BS/MS/PhD Environmental Science	19	2	6	1	1	5	34
Sub-total for graduates in non-agroforestry programs	**407**	**395**	**59**	**12**	**200**	**186**	**1259**
Other degree programs*	49	2	63	16	56	13	199
TOTAL	**465**	**398**	**122**	**36**	**272**	**210**	**1503**

*includes Sociology, Law, Commerce, Accountancy, Public Administration, Political Sciences, Engineering, Literature, Computer Technology, Medical Technology, Community Development, Anthropology, Architecture

The majority of DENR staff members were forestry graduates which is not surprising since most of the department's programs focus on the uplands. Expectedly too, agriculture graduates were prominent in DA and DAR. The pool of staff in LGUs was mostly agriculture graduates. This is maybe because of the Municipal and Provincial Agriculture Offices devolved to the LGUs, which are composed mainly of people with specialization in agriculture. While some LGUs have created Municipal and/or Provincial Environment and Natural Resources Offices (MENRO or PG-ENRO), these are still mostly manned by agriculture graduates. For state colleges and universities, most of the faculty members have specialization in agriculture. This could be because these state colleges and universities mostly started as agricultural schools.

Table 4 lists the tasks normally assigned to the technical staff to facilitate the implementation of the programs and activities of the surveyed institutions. The list was generated by the research team and from feedbacks of the respondents based on the job descriptions of their technical staff. The top five tasks are: (1) technical assistance in the development and implementation of NRM projects; (2) monitoring and evaluation of NRM projects; (3) as resource persons in training programs; (4) nursery establishment and management; and (5) community organizing and development. It is noted that core agroforestry tasks did not make it to the top ten list of common tasks, such as a) assessing and evaluating the interaction of agricultural and forest tree crops; b) research in agroforestry and climate change; c) establishment of agroforestry demonstration farms, and d) site capability assessment for sound agroforestry technologies. This maybe because of the limited competencies of the current staff in these areas, or that most of the surveyed institutions have yet to engage in these core agroforestry undertakings. These core agroforestry tasks are defined in the scope of practice of agroforesters contained in the proposed House Bill on the Professionalization of Agroforestry in the Philippines formulated in 2008 by the Taskforce on Agroforestry Education (TAFE) of the Commission on Higher Education (CHED).

These findings indicate that the respondents were carrying out agroforestry activities for their NRM programs despite the absence of personnel with agroforestry specialization and that their staff members were performing multi-tasks outside of their field of specializations.

Table 5 shows that the respondents employed several strategies to strengthen staff capacity to carry out the various agroforestry and related tasks of their programs. The majority of them (82%) have sent their staff to short-term training courses in agroforestry. Short-term training courses provide immediate impact on knowledge, skills and attitude development of the trainees.

On the other hand, about 33 (40%) of the respondents tap external agroforestry experts to provide technical assistance to their staff. Technical assistance provides direct guidance and feedback on the staff's performance, especially if a clear mentoring process is established by the institution with the experts. Almost a third (30%) of the surveyed institutions, particularly the state colleges and universities, provide opportunities for their staff to complete formal degree programs to beef up manpower on a long-term basis.

Table 4. Tasks assigned to staff members (whether or not agroforestry graduate or non-agroforestry graduates) of the respondents.

TASKS	NUMBER OF INSTITUTIONS									TOTAL
	Agroforestry graduates			Sub total	Non-agroforestry graduates				Sub total	
	BSAF	BSA-AF	BSF-AF		BSA	BSF	BSES	Other degrees		
Technical assistance in the development of agroforestry and other related projects	1	7	7	15	21	30	5	8	64	79
Monitoring and evaluation of development projects	1	7	7	15	14	31	5	12	62	77
Nursery establishment and management	1	9	5	15	19	24	1	9	43	68
Resource persons in training programs	2	6	3	11	17	21	6	13	57	68
Community organizing and development	1	7	6	14	14	26	4	10	54	68
Implementation of community-based development projects	0	8	5	13	15	19	3	9	46	59
Advocacy/information and education campaign of agroforestry, upland development, sustainable development, and climate change	1	7	2	10	14	21	3	9	47	57
Plantation establishment and management	0	7	5	12	12	22	1	7	42	54
Oversees/takes charge in the implementation of agroforestry-related projects	0	3	3	6	9	22	5	7	43	49
In-charge of the livelihood and supportive technologies	1	5	2	8	16	13	7	4	40	48
Takes charge of the management of reforestation project	1	6	5	12	4	21	2	5	32	44
Establishment of agroforestry demonstration farms	0	3	3	6	8	18	5	5	36	42
Surveying and mapping	0	3	3	6	6	21	2	5	34	40
Process monitoring and documentation of agroforestry-related projects	0	2	2	4	6	17	2	6	31	35
Conducts research projects in agroforestry, climate change and watershed management	1	3	3	7	10	11	3	3	27	34
Develops modules and teaching materials	3	3	1	8	6	11	4	5	26	34
Technology development and verification trials	1	1	1	3	11	10	3	3	27	30
Teaching of agroforestry courses in formal degree programs	1	3	0	5	6	9	1	3	19	24

TASKS	NUMBER OF INSTITUTIONS									TOTAL
	Agroforestry graduates			Sub total	Non-agroforestry graduates				Sub total	
	BSAF	BSA-AF	BSF-AF		BSA	BSF	BSES	Other degrees		
Site and land capability assessment for sound agroforestry technologies	0	2	1	3	4	9	2	3	18	21
Conducts carbon stock assessment of agroforestry and forestry projects	0	1	0	1	0	6	2	3	11	12
In-charge of the marketing and other support services	1	1	0	2	4	3	0	1	8	10

Table 5. Strategies employed by the respondents to enhance staff skills in agroforestry and other related functions.

STRATEGIES	FREQUENCY *
Sending to relevant short-term training courses related to agroforestry	67
Tapping technical assistance from consultants and experts	33
Sending staff to formal degree programs	25
Providing more field and community exposures	4
Sending staff to workshops and conferences related to agroforestry	4
Collaboration with other agencies	3
Hiring additional staff on a contractual basis	1

*multiple responses

Need for Manpower with Agroforestry Competencies

The majority (81.70%) of the respondents recognized the need for more human resources equipped with agroforestry competencies (Table 6). This need is evident across all types of institutions. Interestingly, all the NGOs also expressed the need to have agroforestry graduates among their staff.

Table 6. Perceived need for agroforestry graduates.

RESPONDENT-INSTITUTION	NEED FOR AF GRADUATES	NO NEED FOR AF GRADUATES	NO ANSWER	TOTAL (n=82)
LGUs	21	4	1	**26**
DENR	17	2	1	**20**
SCUs	16	1	-	**17**
DA	6	2	2	**10**
DAR	3	1	1	**5**
NGOs	4	-	-	**4**
TOTAL	**67**	**10**	**5**	**82**
Percent	**81.70**	**12.20**	**6.10**	**100.00**

About 36 percent of the respondents said that they need personnel with agroforestry specialization for more a efficient and effective implementation of their programs (Table 7). This was particularly true for DENR and the LGUs, which implement community-based forest management and upland development initiatives. In the case of the academic institutions, particularly those offering the BS Agroforestry program, they must have at least six graduates of agroforestry as faculty members in order to comply with the requirement of CHED to ensure quality in program offering. Facilitating the provision of technical services to farmer-beneficiaries was the reason given by most of the NGOs for needing staff with agroforestry competencies.

Most of the institutions not in need of agroforestry graduates did not state any reason. A few of them mentioned that, if needed, they could tap external technical experts instead of hiring new staff. This was true particularly for national government agencies where filling up of vacant items and recruiting additional staff could be very tedious processes. Meanwhile, institutions like DAR did not consider agroforestry as main priority at the moment. A few of them also mentioned that their staff members are already well-trained as a result of their staff development programs, and hence, they see no need to hire additional manpower (Table 8).

Table 7. Reasons of respondents for needing agroforestry graduates.

REASONS	FREQUENCY	Percent
For more efficient and effective delivery of services related to agroforestry development and upland development initiatives	23	34.33
To strengthen agroforestry program of the institution, particularly along the areas of instruction, research and extension as mandated by the Commission on Higher Education	9	13.43
To have employees that are competent and possess technical knowledge in agroforestry	8	11.94
To facilitate technical services to the farmer-beneficiaries	5	7.46
Because agroforestry is integrated in the program initiatives of the organizations	2	2.99
Changing environmental paradigms	2	2.99
Agroforestry experts treat projects and approaches holistically	1	1.49
No reason stated	17	25.37
TOTAL	**67**	**100.00**

Table 8. Reasons of respondents for not needing agroforestry graduates.

REASONS	FREQUENCY	Percent
The existing staff are already well-trained	2	20.00
The office can just tap experts from other organizations	2	20.00
Agroforestry is not our priority	2	20.00
The office prefers graduates of general agriculture	1	10.00
The existing staff can just develop agroforestry skills through training	1	10.00
No answer	2	20.00
TOTAL	**10**	**100.00**

The respondents were asked to rank the core agroforestry and additional competencies they prefer using a score of 1 to 5 with 1 as lowest and 5 as highest. The core agroforestry competencies refer to the knowledge, skills and attitude that an agroforester should possess as specified in the scope of practice of agroforesters contained in the proposed House Bill on the Professionalization of Agroforestry in the Philippines. The bill was formulated by the CHED-created Taskforce on Agroforestry Education (TAFE) in 2008. The additional competencies preferred are the knowledge, skills and attitude that could be carried out by BS graduates other than agroforesters.

Among the core agroforestry competencies (Table 9), community organizing and development for agroforestry got the highest average score (3.97) from the respondents. This can be explained by the fact that most of the programs in forestry and NRM are development-focused, and participatory and people-oriented. The DENR, for instance, has shifted its forest conservation programs from punitive measures to more people-oriented forestry programs. The other top four competencies required by the surveyed institutions are: (a) feasibility studies preparation including specifications for agroforestry (3.81); (b) training and extension for agroforestry (3.81); (c) land capability assessment for sound agroforestry technologies (3.78); and, (d) planning and implementation of supportive agroforestry technologies (3.76).

On the other hand, Table 10 shows the top five additional competencies preferred by the respondents as follows: (1) participatory rural appraisal, participatory extension and development activities (with an average weighted score of 4.06); (2) problem identification and analysis (4.00); (3) resource

mobilization and generation (3.91) and organizational development (3.91); (4) community resource management planning (3.89); and (5) team leadership skills (3.85).

Table 9. Core agroforestry competencies preferred by the respondents.

CORE AGROFORESTRY COMPETENCIES	AVERAGE WEIGHTED SCORE
Community organizing and development for agroforestry	3.97
Preparation of feasibility studies and specifications for the production, harvesting, processing, utilization and marketing of woody perennials and agricultural crops and/or animals for multiple products and services including conservation and cleaner production practices	3.81
Conduct extension, development and training activities in agroforestry	3.81
Land capability assessment for sound agroforestry technologies	3.78
Planning and establishment of appropriate supportive technologies such as agroforestry nurseries, soil and water conservation measures, wood products manufacturing and processing	3.76
Development of management plans with a step-by-step timeline plans with recommendations on appropriate species and strategies for the unique sites; a plan for long-term fertility management	3.70
Planning and implementation of agroforestry projects	3.65
Recommend appropriate species and cropping combination (forestry + agricultural crops) and agroforestry technologies in a specific site/area	3.62
Business management, including marketing of agroforestry and related products	3.61
Diagnosis, design and development of agroforestry projects	3.56
Familiarity with the policies, plans and programs of agencies involved in uplands, lowlands and coastal development	3.54
Monitoring and evaluation of agroforestry projects	3.34
Assessment and evaluation of ecological and economic interaction among agricultural and forest tree crops	3.30
Conduct agroforestry experiments/research and technology development and verification trials	3.30
Carbon stock assessment of agroforestry farms and plantation	3.19
Agroforestry systems modeling	3.18

As noted earlier, the priority programs and projects of the surveyed institutions are along the areas of sustainable upland development, community-based forest management, watershed management, and reforestation. These programs and projects require the active participation of the upland dwellers and farming communities, including other stakeholders in terms of identifying problems and solutions. Hence, the organizations' technical staff must be adept on participatory approaches in determining the specific needs of stakeholders. Because funding support is an essential element in carrying out their programs, it is also necessary for the respondents to have staff members who could generate resources.

Table 10. Additional competencies preferred by the respondents.

ADDITIONAL COMPETENCIES	AVERAGE WEIGHTED SCORE
Participatory rural appraisal, participatory extension and development activities	4.06
Problem identification and analysis	4.00
Resource mobilization and generation	3.91
Organizational development	3.91
Community resource management planning	3.89
Team leadership skills to work with and inspire members and relate to other groups	3.85
Packaging of project proposals	3.69
Land use planning	3.58
Communication skills n oral, written and electronic forms	3.51
Mature, sensitive and effective and ethical relationship with individuals	3.50
Networking/Linkage building	3.48
Staff management	3.48
Proactive, creative and risk-taking abilities	3.41
Information materials development	3.35
Financial management	3.31
Process monitoring and documentation skills	3.26
Knowledge about policies and institutions	3.26

Projected Demand for Agroforestry Graduates

As previously shown in Table 6, 67 respondents expressed their need for agroforestry graduates. In the next 10 years, these respondents would likely to employ about 1,284 agroforestry graduates (Table 11a). This finding implies that around 128 agroforestry graduates are likely to be employed yearly by either of the national government agencies, LGUs, academic institutions and NGOs. Though the number required may not be big enough to ensure employment of all would-be graduates from the 34 PAFERN institutions offering agroforestry programs and specializations, it nevertheless provides encouragement to students to pursue a career in agroforestry. The number could be more if data were gathered from all the 190 target respondents. The DENR indicated needing the most number of agroforestry graduates in the next 10 years.

Interestingly, the respondents indicated some biases for their preferred agroforestry graduates (Table 11b). The DENR respondents mostly preferred forestry graduates with specialization in agroforestry and a few more graduates of full-degree program in agroforestry. The DA respondents, on the other hand, preferred agriculture graduates with specialization in agroforestry. The preference of these two national government agencies may be due to the requirements specified in the job positions existing within their offices. For instance, the forester and agriculturist positions already exist in DENR and DA, respectively. Graduates of either field with specialization in agroforestry would be an added value to the position.

Meanwhile, the academic institutions preferred graduates with advanced program degree in agroforestry. As specified in the new PSG for BS Agroforestry, one of the minimum requirements for the offering of the BS Agroforestry program is having at least six faculty members with advanced degrees in agroforestry.

Table 11a. Projected demand for agroforestry graduates in the next 10 years (2009-2019)

Respondent-institutions	Next three years			Next five years			Next 10 years			TOTAL
	Male	Female	Sub-total	Male	Female	Sub-total	Male	Female	Sub-total	
DENR	61	54	115	93	77	170	113	109	222	507
LGU	42	33	75	53	40	93	56	53	109	277
DA	38	19	57	64	34	98	60	38	98	253
SCUs	17	13	30	27	24	51	44	29	73	154
NGO	21	8	29	20	10	30	22	12	34	93
Total	179	127	306	257	185	442	295	241	536	1284

Table 11b. Types of agroforestry graduates preferred by the respondents.

TYPE OF AGROFORESTRY GRADUATE	FREQUENCY (N=67)*						TOTAL
	DENR	DA	DAR	NGO	LGU	SCUs	
Graduate of a full-degree program in agroforestry	9	-	-	3	9	4	25
Agriculture graduate with specialization in agroforestry	-	6	-	1	9	1	17
Forestry graduate with specialization in agroforestry	14	-	-		3		17
Professionals with advanced knowledge in agroforestry (MS/PhD)	2	1	-	1	2	8	14
Agroforestry graduate with entrepreneurial competencies who can manage agroforestry farms	1	-	-		3	1	5

* multiple responses

Conclusions and recommendations

This study found that agroforestry is an important component of NRM programs and indeed has a niche in national government agencies particularly the DENR, LGUs, NGOs, and SCUs. Thus, personnel with technical background competencies unique to agroforestry are needed to effectively and efficiently implement institutional programs particularly on upland development, watershed management, community-based forest management, and reforestation. Foremost of these competencies are: (a) community organizing and development, (b) feasibility studies preparations, (c) training and extension, (d) land capability assessment, and (e) planning and implementation of supportive agroforestry technologies. At present, the respondents either tap external experts or send their staff to short-term training courses to address their needs for agroforestry competencies. In the next 10 years, about 1,284 agroforestry graduates are likely to be employed by the surveyed institutions. The challenge is how to generate this number considering the declining interest of students in forestry, agriculture and agroforestry, as well as to enhance the capabilities of existing personnel of national and local development organizations to meet their agroforestry competency requirements in implementing programs.

To address this urgent need among national government agencies and academic institutions in the Philippines, the following short- and long-term recommendations are given:

Short-term Recommendations

1. PAFERN must disseminate immediately the results of this study to relevant training providers, including its member institutions, so that they could response to the need to develop more responsive and need-driven short-term training courses on the various core agroforestry competencies required by national and local development organizations. These training courses could be either stand-alone or packaged together as a complete training program depending on the needs and available resources of the target clients. Offering the training courses for specific institutions should be promoted also to ensure better impact in addressing their specific needs.

2. PAFERN institutions must encourage their faculty members to ensure that agroforestry, forestry and agriculture students undertake their undergraduate thesis research in such a way that it would allow them to acquire the competencies preferred by their prospective employers.

3. Corollary to no. 2, faculty members of PAFERN member institutions must keep themselves abreast with new developments in agroforestry to effectively mentor their students. For a more practical and cost-effective way of keeping updated, faculty members must maximize the use of the Internet to subscribe to free online journals, download materials from relevant websites, and join e-discussion groups. This would enable them to improve their teaching materials and methods, thus, enhancing interest and competencies of their students.

4. Since CHED has approved the implementation of a standard BSAF program among SCUs, PAFERN must encourage open sharing of materials and teaching approaches in agroforestry among its member institutions. This would contribute to producing competent graduates nationwide, thus, addressing the manpower needs of both national and local government line agencies and development organizations.

Long-term Recommendations

1. PAFERN institutions must regularly review and update their existing agroforestry curricular offerings and teaching materials to ensure that the core agroforestry competencies required by national and local line agencies and development organizations are covered. This would increase the market value of their graduates.

2. This study showed that the national government agencies, particularly the DA and DENR, prefer either forestry or agriculture graduates with specialization in agroforestry. As such, the CHED may have to consider the continuous offering of the BSA-AF and BSF-AF programs especially since the move to professionalize the BS Agroforestry program has been deferred by PAFERN and the National Agroforesters' Association of the Philippines (NAAP).

3. LGUs have expressed their need for agroforestry graduates to carry out their institutional programs and they have the power to create local positions. In this regard, PAFERN can work closely with LGUs and lobby with concerned officials regarding the creation of new positions for agroforesters. This will help ensure job placements for BS Agroforestry graduates in the government sector. The municipal LGUs can create an Agroforestry Officer position at the Municipal Agriculturist Office (MAO) or Municipal Environment and Natural Resources Office (MENRO) wherever appropriate. Meanwhile, the provincial LGUs can open a regular item for an Agroforestry Specialist either at the Office of the Provincial Agriculturist (OPA) or the Office of the Provincial Government-Environment and Natural Resources Office (PG-ENRO). Moreover, PAFERN, together with NAAP, should strengthen academia-industry link to enhance employment of agroforestry graduates in the industry.

4. PAFERN institutions offering the BS Agroforestry program should start planning to send their faculty members to pursue advanced programs in agroforestry. This is because the PSG for BS Agroforestry requires that there must be at least six faculty members holding graduate degrees in agroforestry in their faculties. Because the MS Agroforestry program is not yet institutionalized in the Philippines, the University of the Philippines Los Banos may have to revive its draft curriculum and offer the program soon to cater to the needs of the SCUs.

5. PAFERN and NAAP must take the lead in regularly organizing continuing education activities and other learning opportunities on agroforestry for staff of national and local line agencies and development organizations that are directly and indirectly engaged in agroforestry development as a component of their institutional programs.

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Attachment 1

ASSESSING THE NEED FOR AGROFORESTRY COMPETENCIES AMONG THE DEVELOPMENT-ORIENTED ORGANIZATIONS IN THE PHILIPPINES

SURVEY QUESTIONNAIRE FOR EMPLOYERS

(Note: Please fill-up the survey questionnaire as completely as possible. The specific responses will remain confidential. Kindly send back the accomplished survey either by fax (049) 536-3809 or email (agro_cfnr@yahoo.com preferably not later than April 15, 2009). You may also wish to send the questionnaire via courier using the enclosed self-stamped envelope. Thank you for your cooperation)

1. BACKGROUND INFORMATION

Name of Respondent : _____

Designation/Position : _____

Name of organization : _____

Means of contact : Tel _____ Fax _____ Email_____

Mailing address : _____
_____

2. BASIC INFORMATION ABOUT THE ORGANIZATION

a. What are the thrusts and priority programs of your organization?

_____

_____

_____

b. What are the development programs/projects of your organization related to:

☐ *Agroforestry/Upland development/watershed management/sustainable development/rural development*

_____

_____

_____

☐ *Climate change mitigation and/or adaptation*

_____

_____

_____

□ *Others*

_____

_____

c. **Staff Profile** (*This item/question aims to find out the number and background of the employees engaged in the implementation of development projects of the organization. This question intends to determine the agroforestry-related and additional tasks that are usually assigned to the employees. Please use additional sheets if necessary)*

Educational background (*please encircle the highest degree obtained*)	**Number of Employees**				**Tasks Normally Assigned** *(Please refer to Table 1 for the list of agroforestry-related tasks/duties and transfer the letter codes to the corresponding items in this matrix; code entries could be more than one)*				**Additional Tasks Usually Performed by the Employees** (*Please refer to Table 2 for the list of other tasks. Kindly transfer the letter codes in this column; code entries could be more than one*)			
	Regular		Contractual		Regular		Contractual		Regular		Contractual	
	Male	Fem	Male	Fem	Male	Fem	Male	Fem	Male	Fem	Male	Fem
BS/MS Agroforestry												
BS Agriculture major in Agroforestry												
BS Forestry major in Agroforestry												
BS/MS/Phd Forestry												
BS/MS/PhD Agriculture												
BS/MS/Phd Environmental Science												
AB/MA Sociology												
Other degree programs (please specify)												

Table 1. List of agroforestry-related tasks of the employees (Please transfer your answers to 2.b)

LETTER CODE	AGROFORESTRY-RELATED DUTIES/TASKS
A	Community organizing and development for agroforestry
B	Provides technical assistance in the development and of agroforestry projects
C	Monitoring and evaluation of agroforestry-related projects
D	Oversees/Takes charge in the implementation of agroforestry-related projects
E	Technology development and verification trials
F	Site and land capability assessment for sound agroforestry technologies
G	Conducts research projects/studies in agroforestry, climate change, watershed management
H	Assesses and evaluates ecological and economic interaction between agricultural and forest tree crops
I	Conducts carbon stock assessment of forestry and agroforestry sites/projects including plantations
J	Resource persons in training programs
K	Develops modules/teaching and training materials
L	Teaches agroforestry courses in formal degree programs
M	In-charge of the livelihood/supportive technologies
N	In-charge of the marketing and other support services
O	Establishment of agroforestry demonstration farms/plots
P	Process monitoring and documentation of agroforestry-related projects
Q	Implementation of community-based development projects
R	Nursery establishment and management
S	Plantation establishment and management
T	Takes charge of the reforestation project
U	Surveying and mapping
V	Advocacy/Information and education campaign of agroforestry, upland development, sustainable development, climate change adaptation
W	Others (please specify)
X	
Y	
Z	
AA	
AB	

Table 2. List of additional tasks/duties performed by the technical employees (Please transfer your choices/answers to 2.b)

LETTER CODE	ADDITIONAL DUTIES AND RESPONSIBILITIES
A	Training facilitator
B	Land use planning
C	Networking/Linkage building with other organizations
D	Workshop/Conference organizer
E	Computer operator/data encoder
F	In-charge of the gender program
G	In-charge in the financing/credit services
H	Development/Packaging of project proposals
I	Staff management and administration
J	Information materials development/publication/desktop publishing
K	Clerical works
L	Others (please specify)
M	
N	

d. In your assessment, is your current pool of manpower able to deliver their work performance satisfactorily? Why?

___Yes _____No

_____
_____
_____

e. What strategies do you employ to enhance the staff skills to be able to deliver your organizational thrusts in agroforestry/upland development/watershed management/climate change adaptation/rural development, and others?

_____sending them to relevant short-term training courses
_____sending them to formal graduate programs
_____tapping technical assistance from consultants/experts to help and train the staff
_____others (please specify)

_____
_____
_____

3. NEED/DEMAND FOR AGROFORESTRY COMPETENCIES

a. Considering the priorities and thrusts of your organizations, do you need or prefer employees with agroforestry competencies? _____Yes _____No Why?

_____
_____
_____

b. If your answer is Yes, please rank the preferred agroforestry competencies listed in B.1 and B.2 below using a scale of 1 to 5 (5 as the most preferred and 1 as the least preferred)

b.1. UNIQUE AGROFORESTRY COMPETENCIES

RANK	AGROFORESTRY COMPETENCIES
	Conduct agroforestry experiments/research and technology development and verification trials
	Recommend appropriate species and cropping combination (forestry + agricultural crops) and agroforestry technologies in a specific site/project area
	Assessment and evaluation of ecological and economic interaction among agricultural and forest tree crops
	Land capability assessment for sound agroforestry technologies
	Business management, including marketing of agroforestry and related products
	Diagnosis, design and development of agroforestry projects
	Planning and implementation of agroforestry projects
	Monitoring and evaluation of agroforestry projects
	Community organizing and development for agroforestry
	Agroforestry systems modeling
	Carbon stock assessment of agroforestry farms/plantations
	Familiarity with policies, plans and programs of agencies involved in the uplands, lowlands and coastal development.
	Development of management plans with a step-by-step timeline plans with recommendations on appropriate species and strategies for the unique sites; a plan for long-term fertility management;
	Planning and establishment of appropriate supportive technologies such as agroforestry nurseries, soil and water conservation measures, wood products manufacturing and processing;
	Preparations of feasibility studies and specifications for the production, harvesting, processing, utilization and marketing of woody perennials and agricultural crops and/or animals for multiple products and services including conservation and cleaner production practices
	Conduct feasibility studies, preparation of project proposals and management plants/resource generation
	Teaching of agroforestry subjects in academic institutions (formal level)
	Conduct extension, development and training activities in agroforestry
	Other unique agroforestry competencies (please enumerate)

b.2. OTHER AGROFORESTRY-RELATED COMPETENCIES

RANK	AGROFORESTRY-RELATED COMPETENCIES
	Communication skills in oral, written and electronic forms
	Process monitoring and documentation skills
	Problem identification and analysis
	Organizational development
	Land use planning
	Community resource management planning
	Resource mobilization and generation
	Networking/Linkage building
	Knowledge about policies and institutions
	Participatory rural appraisal,; participatory extension and development activities

	Financial management
	Staff management
	Surveying/Mapping
	Information materials development
	Packaging of project proposals
	Proactive, creative and risk-taking abilities
	Team leadership skills to work with and inspire members and relate to other groups or organizations
	Mature, sensitive, and effective thical relationship with individuals, families and groups from a variety of political, socialm, emotional, cultural and intellectual backgrouns
	Other agroforestry-related competencies

4. PROJECTED DEMAND FOR AGROFORESTRY MANPOWER

a. Do you need agroforestry graduates to implement your current and planned program of activities?
_____Yes _____No Why?
_____
_____

b. If Yes, which type of agroforesters/agroforestry graduates do you prefer?

_____Agriculture graduates with specialization in agroforestry
_____Forestry graduates with specialization in agroforestry
_____Agroforestry graduates with entrepreneurial competencies who can manage agroforestry farms and agro-industrial enterprises
_____Graduate of a full-degree program in agroforestry with technical knowledge and skills in managing agroforestry/upland development projects as managers, community organizers, community development officers
_____Professionals with advanced knowledge in agroforestry , particularly in research and technology development (MS/PhD graduates)

c. Considering your current and planned institutional programs, what is your projected demand for agroforesters or graduates with agroforestry specialization? Please fill-up table below

PROJECTED DEMAND FOR AGROFORESTRY MANPOWER (please specify number)					
In the next three years		In the next five years		In the next ten years	
Male	Female	Male	Female	Male	Female

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