U.P. Foundation, Inc.
Inaugural Professorial Chair
Lecture

# Alternative Seed Training and Education for Sustainable Agriculture

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Associate Professor

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# About the Author

Dr. Pamela G. Fernandez is an Associate Professor of the Department of Agronomy. She is among the few professors who first advocated sustainable agriculture within their different functions in the university. Though she teaches courses in general crop science/production and ecological agriculture, her basic area of concern is seed technology. Through her experience in seed training and in seed-related projects with sustainable agriculture framework, she has developed a pedagogy in teaching that addresses the development education needs of NGOs, POs and other entities who wish to see relevant changes in formal education. She had also incorporated sustainable agriculture as a framework in her courses, research and extension activities.

# Abstract

Sustainable agriculture (SA) is the framework adopted for the revised BS Agriculture curriculum. After 4 years, a holistic implementation of the new curriculum still remains to be seen. Many teachers still continue to teach the old curriculum. Some have incorporated SA concepts into their course but have not made significant alterations in their pedagogy for more effective student learning. Researchers and extensionists, on the other hand, still continue operating within the old paradigm. The programs, policy, operation and structure of the university have not changed much and have even allowed the old framework to take a stronger foothold. The paper presents flaws in education that actually explains why current or modern agriculture is unsustainable. It points mostly to the psyche of teachers, researchers, extensionists and administrators, themselves being products of the same education system. They are the ones who plan and implement programs and policies that ultimately threaten SA.

Alternative education (also called development, non-formal education) is considered more relevant to SA than the current formal education. It can be applied to formal education, given the blurring distinction between formal and non-formal education. The paper (lecture) presents the author's and her group's experience and various gains in alternative seed training and education. Most of the group's learnings were gathered from NGO and PO participants and partners. The paper also presents characteristics of an effective teacher, based on the traits of a good facilitator (i.e., being expert not only in subject matter but also in pedagogy and human relations). It gives features of an SA-seed curriculum, alternative pedagogical approaches and many others. It also calls for strategies to effect attitudinal and behavioral change in educators and students or learners. It aims to serve as a reference for those who wish to reflect on how to transform themselves, their work, and their courses into SA. The learnings of the group and other gains derived from non-formal education would be applied to other courses, curriculum and programs, as well as to the

# Executive Summary

The College of Agriculture of UPLB has adopted sustainable agriculture (SA) as the framework for its BSA curriculum. Many other agricultural colleges and universities are also undergoing review and transformation of their curricula to SA. Much of the shifts undertaken, however, have been mostly only at the level of incorporation of SA concepts into the curriculum. A comprehensive reform would be one that transforms all the different dimensions of the entire organization, including its staff. With a piecemeal approach, only superficial changes would be expected, thus a failure to achieve SA.

This paper (and lecture) aimed to present the experiences of the Seed Science and Technology Division of the Department of Agronomy, in their effort to help push for SA, through seed training and education. Their search for ways to achieve SA through the seed led them to an alternative philosophy, strategy, approach and set of concepts and practices in seed production and genetic conservation. Their methodology and the curriculum take the character of alternative or non-formal education, which some group also refer to as development education. Their learnings are based on nearly a decade of conducting trainings and short courses on seed technology and genetic conservation framed within SA. These learnings have been applied to teaching formal seed courses and other courses, in research, and in extension. Their major source of insights have been the participants themselves, network partners, and resource persons of the short courses.

Pushing for SA requires fundamental reforms in education. The Seed Tech group uses the seed as the avenue for change and transformation to SA. The seed is a powerful change agent. So is the teacher. Teachers are, and should be, development agents themselves. Unfortunately, many teachers do not think so, or if they do, their orientation is diametrically opposed to SA. Current education is flawed in many other respects and these flaws have been ultimately translated to "unsustainability" in agriculture. Teaching is being said to actually threaten SA. To address the defects and other constraints in formal education it is important to know first what they are. These problems are variously described in this paper.

The most problematic aspect in formal education seems to point to the educators themselves. The graduates or the products of formal education often have a "colonial", individualistic, competitive, grade-centered, reductionist and unquestioning psyche. They imbibe western and elitist values. These traits are a far cry a from a mass-oriented, nationalist values subscribed to by non-formal education. All these characteristics make it difficult for the products of such education (i.e., students, teachers, researchers, extensionists and administrators) to internalize SA and actualize a more holistic, integrative, value-laden and people-oriented education program.

Transformation of staff takes time and will meet a lot of resistance. This becomes even more difficult if the administrators are ignorant about the needed changes, or if they themselves do not believe that SA is the way to go, give it whatever name. Much of the resistance is due to the incapability to grasp what SA is as a result of the reductionist mind set, a different set of values and closed-mindedness. A number of those who resist SA may also do so because they have highly benefited from, or simply dislike being criticized as part of, the old system that is now put under question. Often, the conservative position of staff is not separate from his/her political position. Yet there are many individuals, programs and initiatives in and off campus that are, or can be considered as, leaning toward SA. For a more synergistic interaction and concerted effort among advocates and practitioners a motivating and supportive environment would be

needed. This means changes in the area of incentives, recognition and staff development, as well as in policy, overall structure and operation.

The non-formal sector, i.e., the NGOs and POs, are in the forefront of alternative education. They emphasize nationalistic, mass-oriented, development-oriented, scientific education. Much of the learnings of the Seed Tech group in alternative seed education is through its interactions with the non-formal sector. The various trainings and short courses that had been conducted by the group had always been a means for learning, e.g., of new or alternative technical concepts, more dynamic and appropriate facilitation, and pedagogical approaches that are interactive, dialogic, participatory and contextual. Teachers are considered change and development agents. For them to be effective in this role they should be competent not only in the subject matter which is constantly changing, but also in facilitation and human relations. The group has also been enriched in the area of indigenous knowledge systems, especially on local seed practices. These learnings had been very useful in the formal courses framed within SA. The old curriculum is admittedly short on SA alternatives. Another set of learnings is about field realities. Many of the seed-related needs of the resource-poor farmers are very different from those defined by the academe and government agencies.

The seed courses offered by the group, both formal or non-formal, had redefined certain concepts such as that of an appropriate seed, seed quality, seed testing and certification, production approaches and technologies. The basic course curriculum is infused with non-technical topics, principles and activities such as human resource development (HRD), values analysis, redefinition of science and development, drawing out and discussion of issues, training facilitation, leadership and team building, and community organizing. The ultimate goal of any seed course conducted are attidudinal and behavioral change in participants and students, as well as farmer and community empowerment. Seed technology and genetic conservation in the form of community seed banks are also linked together. Non-formal pedagogy is adopted in both training and formal classes.

The impact of the course on the participants and trainors has been multidimensional. Some gains are in terms of acquiring more learning resources, knowledge and skills. Others are in terms of achieving attitude and behavioral change. Transformation even at the personal level is believed to already go a long way in furthering SA. Conscientization of the individual, through the module on issues and HRD, is a prerequisite to such transformation.

Although the university should provide the environment and means for the arious changes, transformation can also simply start from oneself. The staff, especially the teachers must be role models. They should practice what they preach. Willingness to change one's lifestyle for the welfare of the ecology and for others is fundamental.

The paper also contains excerpts and list of writings about education principles and problems. It presents SA- and seed training needs as expressed by ex-short course participants and network friends. Other details include those on goals of SA and education, constraints in transformation to SA, traits of an SA educator and trainor, alternative seed concepts and learning activities. Selected sayings are also presented to lead readers and the audience to do self-reflection and soul searching. The open forum which had been documented, and the written feedback, along with the lecturer's answers, are also included. Copies are given back to those who indicated interest in them during the lecture (i.e., through the feedback questionnaire).

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# I. INTRODUCTION

Education, whether formal, non-formal or informal, are instruments to reproduce a certain paradigm. Sustainable agriculture (SA) calls for a different paradigm in education. Adopting SA, therefore, requires transformation not only in the agricultural system but also in the whole education paradigm. The curriculum, course contents, and methodologies, as well as the overall policy, structure and operation of an educational institution need to undergo holistic transformation. Failure to overhaul the education system would only lead to superficial reforms and would not accomplish the real goals of SA.

The seed has always been instrumental in introducing change. It is because the seed is a basic input in production and a carrier of characteristics that determine adaptability of plants under specific environments and management systems. The past has demonstrated the seed's role in concretizing various government programs, mostly through HYVs or high-yielding varieties. As a powerful agent of change, the seed can, therefore, also be used to counter problematic programs. The Seed Science and Technology Division of the Department of Agronomy (the Seed Tech group) capitalized on this property of the seed to promote SA.

This paper describes the "Seed Tech" group's learnings from eight to ten years of training and teaching seed technology, as well as in teaching other courses where our learnings found application. The many years of doing both formal and a non-formal type education in a university setting has brought the group to the realization that, indeed, there are many things by which the current curriculum and the institution, in general, can be improved if they are to attain their goals as a state-funded institution. What we saw that needs reform extends beyond the technical field and include the education system itself. Weaknesses in formal education will be presented herein, along with discussions on how such problematic education system has contributed to "unsustainable" agriculture. Alternative education, in the form of non-formal education (or development education) is also presented to serve as a framework in the reformation of formal education, specifically to serve SA. A description of an alternative seed training and education program to promote SA, developed by the "Seed Tech" group of Agronomy, is then described. This would offer an example of what can be done to help promote SA, in the field of seed technology and alternative seed education. The group's perspective is shared by various authors, both coming from formal and non-formal sector. Excerpts of their work are given in Supplement 1.

This paper and the lecture earlier presented lead readers and the lecture audience to the group's evolved methodology, curriculum and philosophy in seed education. It is meant to serve as reference for those who wish to pursue an alternative type of education (i.e., non-formal one) in their respective areas of specialization, technical or otherwise. The paper presents a wider coverage and more detailed discussion than the actual lecture to make up for the limitation imposed by time for presentation. The various impact of the group's endeavor is presented at the end to offer readers some insights and various learnings in the area of seed training and education in a university setting.

The Literature Cited section, as well as the boxes (tables), appendices, figures and supplements are also intended to be learning materials in themselves. A glossary of selected terms relevant to the subject has also been prepared (Appendix 1) to help clarify or define some terms. The question-answer portion of the lecture, as well as the written feedback along with the lecturer's answers,

# II. WHERE UPLB IS IN SUSTAINABLE AGRICULTURE EDUCATION

## IIa. SA at the University

So much has already been written about SA. One can refer for example, to the Literature Cited section of this paper. The College of Agriculture believes in it, as reflected in its shifting the BS Agriculture curriculum to SA. The State Colleges and Universities (SCU's) in the country had undergone various seminar-workshops to initiate the conversion of their curricula to SA (Zamora, 1999; Zamora and Sumayao, 1999). Unfortunately, the prevailing mindset is still that SA is simply a set of concepts that can be incorporated into a course or curriculum. Failing to recognize that SA should be the "successor" philosophy, framework and production paradigm to the Green Revolution, and not just a bunch of concepts and technologies, would lead to the continued production of the same kind of students. Sustainable agriculture would then remain threatened through, and by, formal education. For total reform there must be changes in the whole system, i.e, in the framework, goals, structure, policies, operation and staff. A holistic change would be a great challenge and can take a long time to be fully realized, but the university cannot and should not remain passive. Otherwise, it will continue to be an active participant in the destruction of minds leading to "unsustainable" agriculture. The basic aspect that the university needs to be changed is its psyche.

While contents of some fundamental agriculture courses, at least in the outline level, had been enriched with various SA concepts, the whole course, framework and conduct have still remained conventional. Some professors and instructors have altogether ignored the outline if not downplay SA in various ways. Some of the reasons given (e.g., by Briones et al, 1995; Fernandez, 1999) for such phenomenon range from sheer ignorance to simple resistance (Box 1). There are emerging reasons why some professors (or academicians) resist shifting to or acknowledging SA. It is human nature to close oneself from any argument if challenged and cornered. Although the criticism is directed to the paradigm many consider this to be a personal affront. Resistance may also stem from a feeling of insecurity or even disloyalty to the system one benefited

**Box 1. Why do professors refuse to adopt SA?**

Y ignorance 1: they are not convinced that SA is the way to go
Y ignorance 2: they still believe in the current paradigm
Y ignorance 3: they still do not know what SA is
Y ignorance 4: they do not know that they are change agents themselves
Y they accept SA but are still learning how to go about changing
Y they are a victim of the flaws of formal education (e.g., had already set certain poor habits in learning, attitudes, values)
Y complacency: lack of will power (energy) and motivation to validate their misconceptions and to learn further
Y stopped learning; non-realization that education is a lifelong process and that agriculture trends had considerably changed
Y inability to see oneself as part of the problem
Y different set of values (Western, elite), don't care attitudes anti-progressives
Y vested interest or loyalties (e.g., connection with the industry)
Y they tell insecure or disloyal turning against the paradigm that gave them security and recognition
Y they closed their minds as they take criticisms of the system personally

Modified from: Briones et al, 1995

so much from. It is believed that the conservatism of academicians are highly linked to their political position. The reductionist thinking mode could also be operating making one unable to be critical and holistically grasp the real problems and the essence of SA.

On the other hand, only very few non-formal education initiatives (training, extension) in the university focus on SA in terms of content or framework. Many are geared toward commercial or income-generating activities rather than on development- type goals (see glossary in Appendix 1 for the meaning of development). Expectedly, therefore, the curriculum in these programs would be narrow and devoid of topics that help in the understanding of SA. An SA-framed curriculum should include topics like SA-related issues, current trends, values clarification, redefined concepts (e.g., of science, education and learning, research, extension and development), the role of self and the group in SA, and agroecology (Briones et al, 1995). A more holistic curriculum on agriculture or seed technology can be found more in other schools (e.g., Xavier University and Siliman University) or in trainings conducted by POs and NGOs. This trend was also revealed in the most current survey conducted by the Seed Tech group (Appendix 4).

## IIb. University Constraints

Many authors have ventured into defining the different constraints an academe has in promoting SA (e.g., Briones et al, 1995; Ison 1990; Lacy, 1993; Mac Rae et al, 1989; Fernandez, 1992). Solutions to these constraints are quite challenging but there are already emerging initiatives in the campus, as well as a number of sensitized individuals who are already contributing to the change process. Unfortunately, however, such efforts are not well integrated, nor are they well supported. Structural, policy and operational constraints exist (Lacy, 1993; Briones et al, 1995), but all these translate to people factor (Boxes 2-4). Attention should,

**Box 2. Can agricultural colleges meet the needs of SA? What are their constraints?**

**1. Assumptions and biases** regarding the relationship between humans and nature, and the concept of progress (increased application of technology); detachment from other sectors;
**2. Researchers background:** The demographic characteristics, education, and experience of research scientists;
**3. Institutional structure:** The specialized departmental organization of research institutions (discipline and commodity orientation);
**4. Disciplinary imbalances:** Imbalances among analyses on the molecular, cell, organism and ecosystem levels; over emphasis on plant and subplant level, less on ecosystem level;
**5. Emphasis on farm level analysis and technology development:** less emphasis on developing, discovering or integrating alternatives;
**6. Molecular biology:** New agricultural biotechnologies that may overemphasize short-term, narrow technical considerations and proprietary products;
**7. Education reforms:** Compartmentalization of education by discipline, and the limited informal and field experiences for students; lack of integration of formal and informal educational experiences;
**8. Needed changes in extension:** The background and education of current Extension Service agents; faulty model of education;
**9. Impact assessment:** The emphasis on economic effects in research impact assessments, to the neglect of environmental effects and social consequences for farmers, rural communities and society at large;
**10. Public policy analysis:** Limited capability for comprehensive public policy analysis (e.g. on taxes, commodity programs, water subsidies, trade policy, credit allocations, environmental allocations, environmental regulations, research and education programs, food safety, and market regulations, and international aid program).

From: Lacy, 1993

**Box 3. Problematic structure of organizations, reflecting flawed education paradigm.**

Y Hierarchical, authoritarian, non-participatory management
Y Management positions held on the basis of seniority or research abilities rather than management skills
Y Non-tolerance to eccentric or creative innovation
Y Institutional rewards promote individual often isolated research (related to senior authorship of published papers)
Y Resource pressures can lead to rapid decline in the critical mass needed to maintain creativity and learning
Y Introspection and resistance to new ideas, process and changing environmental circumstance
Y Staff development (if at all existing) often in form of content (new ideas acquisition) rather than in balance with developing new skills (e.g. management, group work skills)
Y Status divisions highly set in stone (e.g., researcher vs. extensionist; natural vs. social scientist)
Y Traditional meeting procedures which stifle innovation, change and creativity

From: Ison, 1990

**Box 4. Structural, policy and operational constraints at UPLB.**

1. Units (departments, institutes) are divided into disciplines and there is no effective mechanism for integration of the different units.
2. The three-fold function of instruction, research and extension are also not well integrated.
3. The reward and recognition system favors individual more than team efforts.
4. Bias in giving more merit for number of publications in refereed journals rather than on the sustainability of the content. Production of other learning materials esp. for SA are not given due emphasis.
5. Other measures of merit are not necessarily within SA framework. For example:
a) Too much credit given to efforts in the development of "improved" varieties and related activities, without addressing the issue of equity and sustainability of such varieties (may refer to recent promotion instrument).
b) Entering into monopoly agreements with private companies and rewarding patenting of research output.
c) Overpromoting staff who spend more time working on consultancies or servicing institutions other than UPLB.
d) Restricting the hiring of and the benefits provided to newly hired instructors and researchers.
e) Underutilization of student evaluation for the improvement of teacher's performance.
6. Lack of follow through in academic programs that attempt to incorporate SA. General policy direction has not been well defined before and it has seemingly catered more to commercialization, top-down approaches and a flawed development paradigm.
7. Top-down teaching approaches; instructors are regarded as information giver and the students as mere information receiver. Dynamism and interactive teaching is severely lacking. Emphasis has been on teaching and not on "learning how to learn."
8. Lack of integration of technical courses with issues, values and principles of SA.
9. Scarcity of learning materials on SA.
10. Conflicting or inconsistent policies and program, threatening the promotion of SA.
11. Lack of real solid definition of development, the university's development partners. More emphasis has been given to commercial potential of research outputs and the "transfer-of-technology" approach to development.

From: Briones et al, 1995

therefore, be given to the conversion and transformation of all university constituents, including administrators, policy makers and managers. Teachers are part of the problem, not only because of their mindset and flawed pedagogy but also because they are the same people who become administrators. Researchers (many like to call themselves scientists), extension and administrative personnel also bear the defects of education in their psyche. Being products of such system, they have been trained by the same system for almost all their life. They also feed into the education function (knowledge generation and transfer) of the university. On campus, many scientists hold critical administrative posts that spell policies translated into promoting still a conventional approach to agriculture.

Barriers to SA and agricultural education are well articulated by many authors. MacRae et al (1989) focused on the problems of scientific inquiry (i.e., on it being conventional, reductionist, "objective", quantification-oriented), the values of scientists (i.e., their narrow worldview, dissociation of emotion, self-deception), and how agricultural research is implemented (i.e., in relation to goals, funding priorities, publication, isolation). Ison (1990), on the other hand, defined the problematic structure of agricultural organizations (Box 3). The same structural constraints can be identified for UPLB since most of the scientists and teachers are products of the same education system.

A primary constraint in SA implementation are the goals of formal (agricultural) education itself. These goals include producing students who are sensitized to a commercial, export-oriented, import-dependent agriculture. Formal education also aims to generate and transfer a body of knowledge (through research and extension) for the flourishing of that same model of economy. To see where we are in agricultural education the general and specific goals for SA education defined by King and Francis (1994) could be a useful measures. The list (Box 5) is quite a departure from the status quo. Current education is short on being participatory, on networking and on holistic reform, among others. A redefinition of goals for SA, as well as reform in structure, reward systems, education of scientists, working together, broadening of the scientific method and funding, are called for by Mac Rae et al (1989).

**Box 5. General and specific goals of sustainable agriculture education.**

**General:**

1. **Participatory:** The need for those in the sustainable agriculture movement to listen to all agricultural actors and organizations, and to become facilitators, not directors, of a participatory and very broad educational process;
2. **Networking:** The need to connect groups and individuals, through a variety of networking techniques and processes. Through participatory educational processes, understanding of sustainable agriculture concepts and goals can be built;
3. **Realization of change in various dimensions:** The need to get all those involved in agriculture to think about the change process and the changing concepts of sustainable agriculture. There is a need to plant an intellectual seed in their minds so they can define the context of learning. There is a need to let individuals decide about specific sustainable agricultural changes they will undertake in their own lives, jobs, organizations, and/or farms;
4. **Effective communication and information sourcing:** The need to be able to communicate carefully, finding out where information is, access it equitably, and make it available;
5. **Realization of and building on differences:** The need to recognize individual and organizational differences, and to develop strategies to bring groups together.

***Specific: The participants in sustainable agricultural education will be able to...***

1. locate and retrieve pertinent information for their particular questions and concerns;
2. recognize and describe the current status of contemporary agriculture;
3. describe current concepts and practices of sustainable agriculture;
4. improve the environment;
5. do things differently (compare to what they are doing now) to improve the quality of life.

Modified from: King and Francis, 1994

# III. PROBLEMS WITH FORMAL EDUCATION

There is an abundance of literature, both local and international as well as from developed and developing countries, which critique formal education. Excerpts can be found in Supplement 1.

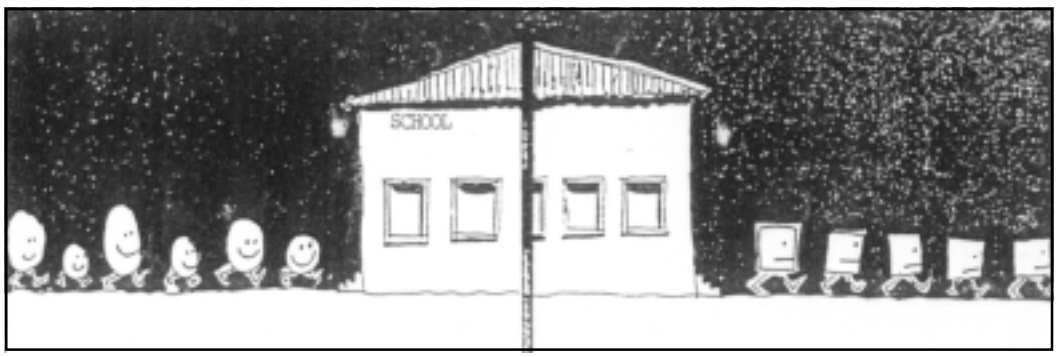
Formal education is commonly regarded to be more important than, and superior to, non-formal education. This is manifested in the preferential hiring of those who have taken more formal education and in the greater government budget (although still meager) allocated to formal than to non-formal education. Unfortunately, the current philosophy and the way formal education is actualized is quite problematic. Certain assumptions, i.e., that formal education is a prerequisite to national development, have still to be met, since the expected manpower development through formal education has failed to deliver the expected economic growth, or the development of productive, critical, and highly responsible citizens. On the contrary, it has maintained or even worsened the inequity and further aggravated the environmental problems (Doronila, 1991b).

To reflect on what is wrong with formal education, it might be instructive to refer to a set of figures describing formal education (Figures1a-d) (Arnold et al, 1986) and to a list of features characterizing either formal or non-formal education (Box 6). The question one should ask is whether one would agree or disagree with the items in the list, consider them as flaw or an ideal trait, or be able to identify them in oneself or in the teachers that one has had.

The many problems of Philippine formal education is being shared by other developing countries. The following highlights a few major aspects of the problem.

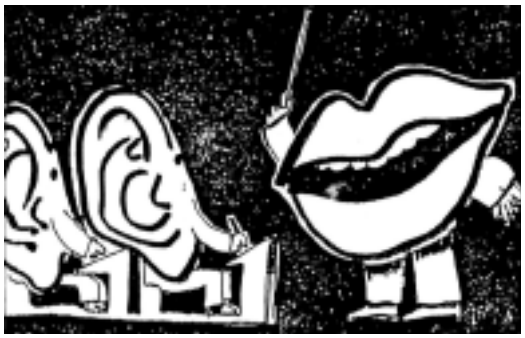
**Figure 1. Illustrations depicting some problems in education (Arnold et al, 1986).**

**1 a**




Human beings are adapted to the state of school

**1 b**



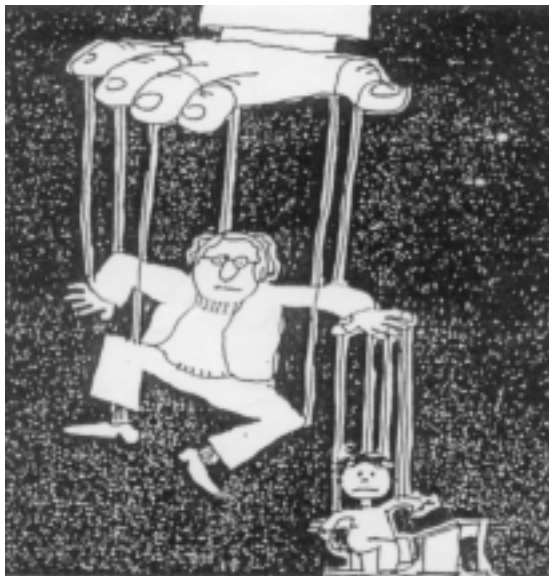
Teachers are often authoritarian...

and "spoon-feed" their students with knowledge.

*continued next page*

*Figure 1 continued*

**1 c**



The student is dependent on the teacher.
The teacher is dependen on the Ministry.

**1 d**

They exert pressure, and threaten students.

Teaching often has little in common with real life.

## Box 6. A sample presentation of the features and flaws of formal education.

Audience is engaged to agree or disagree with each item, to consider whether they are a flaw or an ideal situation, or to reflect whether they themselves have had teachers with such traits.

1. Education, especially in Developing Countries…
   a) specializes on lecturing, rote learning, regurgitation.
   b) is preoccupied with teaching students what to learn rather than how to learn
   c) *(outcome rather than process oriented).*
   d) is authoritarian *(power lies on teacher; top-down).*
   e) teaches children to leave home.
   f) develop students that are non-critical, non-analytical, fatalistic.
   g) addresses real problems of Philippine Society.
   h) tends to serve more the ideology and labor force requirement of the First World *export-oriented; import-dependent).*
2. Students usually like to ask questions, have the habit to critically reflect on experience.
3. Bright students *(laudes?)* are preferred as teachers because they know more than others.
4. A **relevant** agriculture curriculum development can be accomplished without farmer and student participation.

*continued next page*

*Box 6 continued*

5. Most teachers do not put effort in knowing the realities and abilities of individual students; delivering the basic set of concepts is usually enough.
6. Teachers in the technical field need only confine themselves to the subject and disregard issues and human resource development aspects of learning.
7. Formal education has not changed much after the curriculum was changed to sustainable agriculture.
8. Real education traditionalists are young men and women just out of graduate school (preservers of own immediate past).
9. Flaws in teaching has greatly contributed to the **un**sustainability of agriculture.
10. Academicians are in the habit of self-criticism.
11. Faculty members are generally conservative and this shows up in an unwillingness to alter the status quo of the educational program.
12. Educational conservatism of faculty members are often independent from their political position.
13. Learning has traditionally emphasized development of skills, attitude and behavioral change.
14. Teachers have been effective change-agents promoting an ideological predisposition leading teaching to the social, cultural and economic development of the country.
15. Formal curriculum seldom promotes learning of teachers from their students and students from each other, nor allow farmers as formal teachers.
16. Compartmentalization of education by discipline and function is healthy for sustainable agriculture.
17. Many practitioners or advocates of sustainable agriculture who engage in training or education lack the basics of **training how to learn**.
18. Sustainable agriculture incorporation into the curriculum mainly means incorporation of concepts into courses.

## IIIa. Ideology Served and the Kind of "Educated" People Produced

Education is not neutral (Freire, 1984). In the Philippines education is said to reproduce, through producing a labor force, the major ideological predispositions, such as the following:

a. an identity and consciousness that is pro-neocolonial,
b. values supportive of personalistic and authoritarian political structure and
c. non-critical, fatalistic and non-analytical outlook

It reproduces the ways of perceiving, thinking about and acting upon the world, crystallized into a set of values, beliefs, goals, norms and attitudes (Doronila, 1991b). It separates education from the social context, thus making it irrelevant in content and processes to the real problems and directions of Philippine society. Competencies and predispositions described are the ones required for the maintenance of an export-oriented, import-dependent economy, the same economic and political order decades ago and which can even be traced far back in the history of the country.

Philippine education is elitist, leaning towards the few and the so-called intellectually strong (Doronila, 1991b). It divorces young people from the society for which it is supposed to be preparing them. It makes learners believe that all knowledge comes from books and a formal education (Bishop, 1989). It denigrates our (Filipinos') own knowledge in favor of foreign-oriented content taught in a foreign language, resulting in a weak national identity (Doronila, 1991b). It teaches children to leave home rather than stay home (Prakash and Estera, 1998).

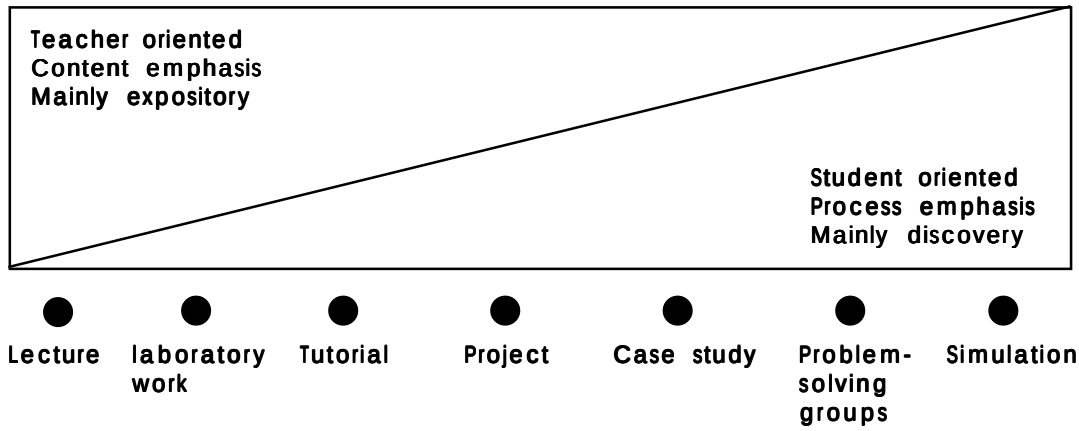
Philippine education reinforces the culture of silence. The authoritarian programs groom illiterates to become complacent workers, satisfying the demands of the market place. Faculty members, on the other hand, are described by Whitlock (1986) as highly conservative. Their conservatism shows up in the unwillingness to

alter the status quo of the educational program. They are not liberal. Their educational conservatism are not separate from their political positions. The real traditionalists are said to be the young men and women just out of graduate school. They wave the banners of their disciplines and feel they would not be able to hold up their heads among their peers at the annual national meetings if they were not teaching the same courses in the same way as their colleagues at every other institution (Whitlock, 1986).

## IIIb. Actualization of Formal Education

Formal education has been highly criticized for its inappropriate teaching and learning approaches. It capitalizes on too much lecturing and is deficient in other methodologies that are considered more effective for learning (Figure 1e). It is deficient in a kind of learning that not only enhances the knowledge of students, but also appropriate skills and attitudes, leading to behavioral change.

**Figure 1e**




**A continuum of teaching methods**

Source: Adapted from Brown and Atkins, 1988.

Formal education relies heavily on rote learning. It upholds the banking concept, assuming that the learner's mind is a blank sheet to be filled up with prescribed ideas and orientations (Doronila, 1991b). For such kind of education to be done with ease and dispatch, existing knowledge must be fragmented into well-defined categories (disciplines or subject areas) that are not allowed to come into fresh combinations with one another in order to obviate the possibility of producing new knowledge that could challenge meanings, explanations and justification of the status quo. It is also highly institutionalized and centralized (Doronila, 1991b). It is sectorized and hierarchically structured (Bishop, 1985).

Education has been developed in the world of the social minority and exported to the world of the social majority leading to the destruction of the pluriverse world of the social majorities (Prakash and Estera, 1998). Many education practitioners, locked into view as technical experts, find nothing in the world of practice to occasion reflection. They have become too skillful at the techniques that preserve the constancy of their knowledge-in-practice (Schon, 1983). The youth, on the other hand, is isolated in formal schools at the very time they are reaching for more mature values and orientation (Bishop, 1985). Instead of helping them develop really meaningful relationships with adult society and work, they are abandoned largely to their own devices, justifying out actions by saying

that they are learning important things they will need in the future. Youth is placed in this holding pattern at the very time biologically and psychologically they want to be with 'it' rather than 'out of it' (Brembeck, as quoted by Bishop, 1989).

The main emphasis of traditional educational institutions has been placed on the transfer of knowledge rather than on the promotion of critical reflection on experience which is the main process involved in continuing personal growth (Rogers and Taylor, 1998). Most educational systems prefer to teach theory first and then provide experiential learning to apply this theory. Perhaps the ideal approach, if time allows, is to reverse the process.

# IV. FORMAL EDUCATION SERVING SA

Formal education should aim to develop manpower that would serve the development goals of a nation. Development should be defined according to meeting the basic human needs: survival (food, water, clothing, shelter, health), security, enabling needs, as well as personal growth and fulfillment (love, belonging, self-respect) and spiritual upliftment. It should be geared towards a nationalist and mass-oriented perspective. It should strive to rectify the flaws for which it is characterized. A summary of features of what formal education should be is given in Box 7. Some of these features are discussed below. Strategies and approaches to make the education curriculum of UPLB more pro-SA are given in the paper of Briones et al, 1995) (Box 8). The list remains to be actualized.

**Box 7. EDUCATION-what it should be.**
(Based on items in Box 6)

- Gaining knowledge, skills, attitudes
- Learning to ask questions
- Learning how to learn (liberated from oppression of unexamined opinion and feeling)
- Students become more committed to own self-development; innovative, creative, open to ideas, constructive, prepared to take risks, able to contextualize own situation, able to own share in national development
- Effect behavioural changes
- Participatory, dialogic, interactive, processual, critical, contextualized
- Teachers as learners; students and farmers as teachers
- Creative teaching
- Individualized learning
- Participatory in curriculum development
- Holistic curriculum
- Liberal: open to criticism and change
- Teachers/trainors as change agents for real development
- Leans towards nationalistic, mass-oriented scientific education *(change of heart, values)*
- Pay attention to all relevant stakeholders: educators, students, farmers, researchers, extensionists, administrators, etc.
- Functional interdisciplinary structure; supportive policies
- Develop appropriate evaluation methodologies to measure:
  - a) New forms of consciousness or counter-consciousness
  - b) Implementation of plan of activities
- Translate to collective action

**Box 8. Possible strategies and approaches for curriculum conversion to SA.**

***Teachers, researchers, extension staff, administrators should strive to actualize the following:***

1. Produce a primer on what SA is and is not.
2. Encourage and support activities and production of materials that are SA-related.
3. Accumulate more SA learning materials and have an active program to maximize their utilization.
4. Develop a better reward system for those who incorporate SA into their function (e.g., awarding professorial chair lectureship based on merit and on SA-relatedness; more incentives for books and other learning materials related to SA; giving more R & D support to SA-related initiatives)

*continued next page*

*Box 8 continued*

5. Establish a body to serve as SA reviewer (for teaching, research and extension). This body may act as an "SA watch" to keep vigil and ensure that SA permeates all aspects of university function.
6. Conduct more university-wide seminars/meetings esp. to know initiatives and developments in the field of SA.
7. Develop a program that strengthens interphasing with the informal sector; this serves to accomplish the following:
   a) Providing an avenue for learning about alternative/grassroots development efforts and strategies (e.g., in participatory approaches),
   b) Provide a more active university extension service for them
   c) Provide sites for possible exposure visits and collaborative extension/training and farmer-led research activities.
   d) Obtain dynamic resource persons who can be invited to various university functions.
8. Review the university's involvement with the private/commercial sector so as not to unnecessarily compete with or undermine SA initiatives.
9. Integrate departments and institutes that are more or less related to promote better integration and holistic approaches. Interphase more with other colleges and institutes to expand the influence on SA of the College of Agriculture.
10. Revise course curricula to ensure stronger grassroots orientation and exposure of students.
11. Provide a venue where students can truly air their grievances especially with respect to professors who's teaching are not within the SA framework.
12. Develop a program that allows staff to undergo human (resource) development training and value analysis.
13. Review the development paradigm of the university.

Lifted from: Briones et al, 1995

## IVa. Learning to Unlecture

A lecture is the least effective among the different teaching techniques. It goes without saying then that a teacher should veer away from lecturing. Various other techniques could be devised to unlecture (e.g., Appendix 5) even in classes with a large number of students and with limited time. Some activities that could be tried are group assignments, quizzes, exams, or workshops which all involve group dynamics and group learning (e.g., VSO et al, 1998; Clayfield and Skye, 1995; Pretty et al, 1995). Activities other than lecturing require venues and materials that promote unconventional approaches. Classrooms should be set up for such, while non classroom venues (SA fields or farms) should be available for visits and practical learning. Learning materials, audio visual aids and readings for home study should also be available. These will take care of the limited class time, enhance sharing, and provide a more relaxed and effective environment for learning.

## IVb. Alternative Pedagogy, Content, and Strategies

Alternative methods of delivering the subject matter should consider not only unlecturing but also that different individuals have different preferred learning styles (Box 9, Appendix 5). Teachers could learn from what the non-formal educators advocate. Teachers should be trainors, that is, they should have technical, pedagogical and personal competencies (Figure 2) (Arnold et al, 1986). The recommended pedagogical philosophy and techniques for SA is summarized by MacRae et al (1989) in Box 10. Among others, it stresses that students should be considered as a co-instructor in any course. Students can

## Box 9. Preferred learning styles.

*We all have certain preferences in the way we learn.*

### ACTIVIST LEARNERS

Some of us prefer learn by doing something immediately. We don't bother to wait to listen to all the instructions, to read the manual first but we get on with the job; we try to find out how it works. These people get impatient when someone tells them all about the task first. When they are asked a question, they give an immediate answer without waiting to work it all out fully. They tend to be enthusiastic about new things; they like lots of new experiences ("I'll try anything once"). When they have finished one activity, they want to pass quickly to the next one. They want to see as many new things as possible; they like to meet lots of so new people. They will often volunteer to take the lead in any activity. They like short-term goals and are usually bored by the slower work of implementing and consolidating a programme. They tend to believe what they are told. These people want to find out things for themselves.

### REFLECTIVE LEARNERS

Some of us prefer to 'wait and see'. We sit back and watch others doing the task first, we listen to the talk of others. These people don't give the first answer that comes into their heads; when they are asked a question, they take time to think, they hesitate and are often uncertain. They want more information before they can give a real answer ("I want to sleep on it"). Before making a decision . They try to think through all the implications, both for themselves and for others. These people tend to like sharing their learning with others because this helps them to collect different opinions before they make up their minds.

### THEORISING LEARNERS

Some of us like to build systems, to get down to first principles. We don't want to deal with 'real cases'-they are thought to be too limited; rather we want to understand the whole, general principles first ("What does it really mean? How does this fit with that?"). They speak in gneral rather than in concrete terms. They question the basic assumptions. They make rules out of all cases. They usually think problems, through step by step. They try to make coherent pictures out of complex material (they often represent ideas in diagrams showing relationships). They try to be objective, detached; they are less sympathetic to human feelings, to other people's subjective judgements. These people want the world to be logical; they do not like too many different opinions.

### EXPERIMENTAL LEARNERS

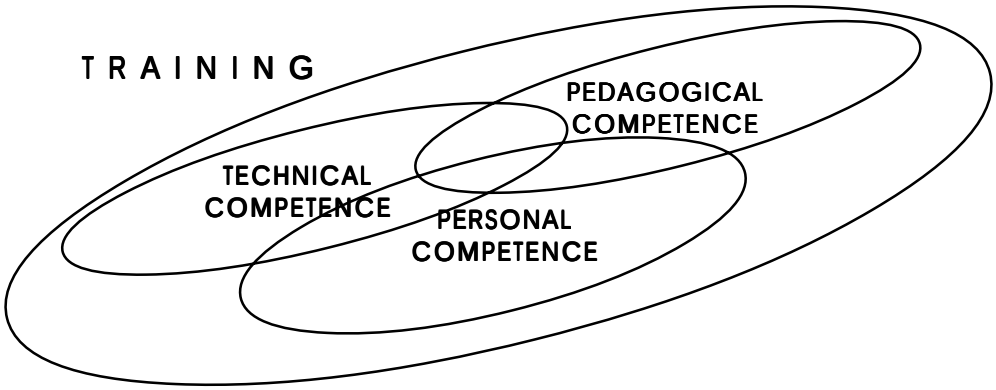
Some of us like to experiment, to apply our new insights. We come back from training courses full of enthusiasm and full of new ideas which we want to try out. Having been told something, these people do not believe it until they see it for themselves ("It may work for you but I want to see if it will work for me"). They try to find new and more effective ways of doing things. They take short cuts or devise new modes of working. They tend to be confident, energetic, impatient of situations as a challenge from which they can learn a good deal. They like being shown how to do something but become frustrated if they are not allowed to do it for themselves very quickly.

*Lifted from Rogers and Taylor, 1998 (Adapted from the works of David Kolb)*

**Figure 2. Types of competence a trainer must have as anexperst and an educator (Arnold et al., 1986).**

Y Pedagogical competence
(he must implement the methods of instruction effectively)

Y Personal competence
(he must create a friendly atmosphere between himself and students)




**Which kinds of competence does the trainer need?**

Training of competence in a trainer must therefore take into account all areas of competence. Thus, for example, technical competence should not be trained in isolation.

**Box 10. Recommended pedagogical philosophy and techniques for SA.**

1. The instructor's task is to create a supportive environment to nurture motivation and self-concepts and to avoid getting in the way of natural development.

2. The systemic, rather than the linear or sequential, approach must be used in which the instructor returns to the subject several times but at different levels.

3. Rather than just providing precise definitions, a new concept should be studied from different angles and in different contexts.

4. The dynamics and interdependence of biological systems must be stressed.

5. Themes that can be vertically integrated should be used to develop ideas. In agriculture, the theme of food quality can use ideas from agricultural disciplines such as soil science, plant science, animal science and human nutrition.

6. Facts are always provided in a broad context.

7. Consider the student a co-instructor in any course. Course time can be set aside to allow students to teach each other (seminars, displays, constructive discussion, circulation of term papers, team projects).

8. Instructors should encourage students to define their personal goals and act as allies to meet these goals. Students design their own programs and evaluation systems with the aid of instructors.

9. Assignments can be designed to approximate real-world experiences including role playing, writing articles for the popular media, conducting surveys, event organizing, and political action projects.

10. Students spend part of their program working directly in the agricultural milieu (farms, food business, government bureau).

Lifted from: MacRae et al, 1989

teach each other and the teacher as well. Moreover, the systemic, rather than the linear or sequential approach should be adopted. There the instructor returns to the subject several times but at different levels.

Also instructive are some elements, mentioned by King and Francis (1994), to be considered in SA education for the different stakeholders (Box 11). Students should learn applied principles of SA. They should get out of traditional classrooms and experience being involved in an SA set-up and learn from farmers directly. University staff on the other hand, must be told about SA and get involved in related projects. They must set themselves as good examples. Administrators, especially department chairs, should actively interact with farmers. Departments are core units where initiatives can sprout. Information on SA grants and implementation of SA projects should be focused on

**Box 11. Some elements to consider in SA Education for different stakeholders.**

**Undergraduates**

1. The educational process has to be reinvented and made less top down. The question "Who does this education and information serve?" must continually be asked.
2. Farmers and farm groups must be involved in the formal education process as nontraditional teachers.
3. As part of their educational experience, students must get out of the traditional classroom. Example options include (a) internships on a working, sustainable farm, and (b) cooperative arrangements with farms. Depending on particular situations, students would earn credit; farmers would be paid.
4. Sustainable principles should be integrated and incorporated in current production practices classes. However, developing autonomous programs in sustainable agriculture should be explored for some institutions. Depending on the particular organizational context, a stand-alone program in sustainable agricultural systems might be more advisable and expedient.
5. Older texts and materials now housed in libraries and which emphasized basic production practices should be considered for inclusion in conventional classes. Such materials could be gathered into specialized libraries or readings. These materials would present a balance of basic information in conventional, production classes. The content of this balance of materials might include, for example, earthworms in soil fertility, organic matter, and biological control.
6. Applied principles of sustainable agriculture, which could be used in larger systems, should be taught in courses.

**Administration**

1. University administration and academics must be told continuously what is happening with sustainable agriculture, and what the concerns of the people are. Universities and administrators must change themselves for the faculty to change.
2. Avenues to administrators are through faculty, farm groups, and advisory councils.
3. Farmers themselves need to talk to administrators and department chairs.
4. Different groups interested in sustainable agriculture must cooperate to get University department chairs involved with sustainable agriculture. Department heads can be taken to visit selected sustainable agricultural farms, and to meet with selected farmers. Arrangements will be made and coordinated with local sustainable agricultural groups.
5. Information on sustainable agriculture grants should be focused on departments. This would allow departments to change direction, within the existing system.

**Extension Staff and University Faculty**

1. Universities must change themselves for the staff to change.
2. People should be trained to use the Sustainable Agriculture Network on the Internet to gather information and network with both like and dislike interests.

*continued next page*

*Box 11 continued*

3. Farmers and producers need to help Extension staff and university faculty learn to think in sustainable agricultural terms, i.e., processes, systems, preventative. This change will move faculty from recipe thinking – technical answers to questions – to more participatory modes. One model will be talk about specifics of
4. sustainable agriculture while letting the principles of sustainable agricultural emerge from the discussions and observations. See No. 8 below.
5. Producers should be involved to help teach sustainable agriculture.
6. Sabbaticals to work on-farm should be offered to faculty as an alternative experience.
7. Multi-disciplinary teams need to focus on sustainable agriculture topics.
8. The economics of sustainable agriculture must be discussed. Methods of sustainable agriculture should be shown which will be profitable for production.
9. One new teaching-learning model will be talk about the specifics of sustainable agriculture, allowing time and circumstances to let the principles of sustainable agriculture emerge from conversation and observation, in a non-threatening manner.

**Farmers**

1. Teaching methods for farmer education should (a) move away from one-way flow of information, the teaching/extension/university to the farmer model, to (b) an interactive and participatory learning model in which all groups share information, farmers are acknowledged as important holders of knowledge, and the teaching/extension/university becomes a facilitator of learning experiences.
2. Farmers want to know where to go for information on sustainable agriculture, and how to find that information.
3. Information on sustainable agriculture should be made more available. For example, information on sustainable agriculture could be put in "fact sheet" form. Content for these "fact sheets" should explicitly state the contexts of particular operations.
4. Farmers should be part of a team writing "fact sheets" about sustainable agriculture.
5. Farmers should be part of curriculum development teams.
6. When compared to non-farmers, practicing farmers are more credible sources of information on sustainable farming practices for other farmers.
7. Farmers be brought together and offered mentoring opportunities.
8. General ecological education should be offered to farmers.

From: King and Francis, 1994

departments to allow them to change direction within the existing system. Farmers should be given more "space" at the university. They should be given more information on SA. They also should be made part of a team writing "fact sheets" about SA.

Education principles are also given by SEARCA (1997) (Box 12). It stresses education to be experiential, contextualized, evocative and creative, scientific (in the broader sense) and gender sensitive.

Along with alternative concepts and delivery of the subject matter is the need to adopt alternative evaluation strategies. Formal education is too quantitative and is mostly on the unidirectional (top down) knowledge-transfer mode. It needs to recognize that learning is beyond what usual examinations measure and what conventional course evaluation asks for. The limitations of the current evaluation system include the inability to measure real student learning, attitude and behavioral changes which can be manifested and measured only in the long run. An alternative form of consciousness (counter-consciousness) can be measured in the short run, but this is not part of the usual evaluation. Current evaluation also measures only what students learn from their teachers and not vice versa, or what students learn from each other.

**Box 12. Education principles.**

1. the learners need to be involved in creating the educational process and outcomes.

2. Education is **experiential** when it builds on the learners' life experiences or provides the learners with a common set of experiences to start from.

3. Education is **contextualized** when it begins from where the learner is. Furthermore, it also acknowledges that much of the efforts in upland development is deeply rooted in the local context and the local ecology.

4. Education is **evocative** and **creative** when it explores methods that encourage the learners to share their experiences and develop creativity in identifying solutions to the problems they encounter.

5. Education is **scientific** when it allows the learner to understand and value both indigenous and other forms of knowledge. This includes developing a critical and analytical attitude towards all forms of knowledge and the techniques or practices they encourage.

6. Education is **gender-sensitive** when it recognizes and challenges the stereotype gender roles and relations in the learning environment and in upland development.

From : SEARCA 1997

## IVc. Learner-centered Education

Formal education is considered too teacher-centered rather than learner-centered. Such encourages lecture, rote learning, content with simple listening and note taking with the purpose of transferring information (Ison, 1990) (Box 13 and 14). On the other hand, a learner-centered system utilizes various approaches that promote the individual potential. It utilizes education as liberating process through deep learning, self-directed search for meaning, and looking at problem-solving methods and real world projects rather than plain lectures and theories. The teacher's role is no longer the authoritative, all knowing expert but a facilitator in the student's personalized development. The focus is on "learning for being" rather than "learning for knowing". Considering that learners have different learning styles and experiences, a learner-centered education should, therefore, be contextualized.

**Box 13. Distinctions Between teacher-centered and Learner-centered Education.**

| FOCUS | TEACHER-CENTRED | LEARNER-CENTRED |
|---|---|---|
| Approach | Expository: talk and chalk | Discovery: 'dialogue and inquiry' |
| Purpose | Transfer of information | Development of individual potential |
| Rationale | Education as technology | Education as liberating process |
| Strategy | Surface learning | Deep learning |
| Teaching link | Direct | Indirect |
| Teacher role | Authoritative: 'all knowing expert' | Facilitative: 'developer' |
| Teacher activity | Telling, checking, correcting | Guiding on route, resources, interpretations |
| Student role | Role learning | Self-direction for meaning |
| Student activity | Listening, note-taking | Exploring, reflecting, questioning |
| Methods | Lecture, seminars, demonstrations problem-solving | Discussions, simulations, |

*Lifted from: Ison, 1990 (Adapted from Ramsden 1992)*

**Box 14. Some distinctions between different traditions of knowledge and knowing which may aid curriculum development.**

| | Scientia | Techne | Praxis |
|---|---|---|---|
| Focus | Learning for knowing | Learning for Doing | Learning for Being |
| Knowledge produced | Propositional | Practical | Experiential |
| Structure | Subject Disciplines | Crafts | Issues |
| Teacher's Role | Expert | Master | Facilitator |
| Teaching Strategies | Lectures on Theory | Practical Demonstrations | Real World Projects |
| Research Style | Basic (Experimental) | Applied (Developmental) | Action (Participative) |
| Role of Researcher | Producer of Knowledge | Producer of Solutions | Co-creator of Improvements |
| Research Goal | Abstract Knowledge | Workplace Solutions | Local Theory and Action for Change |
| Basic Philosophy | Positivism | Utilitarianism | Constructivism |
| Focus of Reflection | What do I now KNOW? | What can I now DO? | Who am I BECOMING? |

Lifted from : Ison, 1990 (Source: Bawden & Macadam, 1998)

## IVd. Learning to Question

Students nowadays are passive, waiting to be spoon fed, accepting and afraid to ask questions. Wiggins (1989) considers these characteristics symptoms of a flawed education. The basic unit of a modern (alternative?) curriculum, he says, is **"the question"** because the aim of curriculum is to awaken, not "stock" or "train" the mind. Educational progress would be measured as the ability to deepen and broaden one's command of essential questions by marshaling knowledge and arguments to address them. One learns self-confidence as a student only by seeing that one's questions, not one's current store of knowledge, always determine whether one becomes truly educated. The modern educational task is to put students in the habit of thoughtful inquiry, mimicking the work of professionals. The teacher and students must have the intellectual freedom to go where essential questions lead, within bounds set by the general questions, themes and concepts of the syllabus. A truly liberal education is one that liberates learners from the oppression of unexamined opinion and feeling. The sign of poor education is not ignorance, but rationalization, the thoughtless habit of believing that one's unexamined, superficial and parochial opinions and feelings are the truth; or the habit of timid silence when one does not understand what someone else is talking about. Curriculum must develop in students the habits of mind required for a lifetime of recognizing and exploring one's ignorance.

The attitude towards learning and classroom behavior can be traced back to a country's history. The Philippines, for example, had been subjected to an authoritative education for centuries, a type that downplays local knowledge and culture. Manifestation of this kind of education can be clearly seen among teachers and students at UPLB.

# V. NON-FORMAL EDUCATION SERVING FORMAL EDUCATION

For the formal education curriculum to be relevant to the goals of SA and SA education, it needs to undergo reforms in all dimensions. Non-formal education can offer the alternative framework in its reformation.

## Va. Role of Training in Alternative Education

Many developing countries have begun to seriously consider an alternative to their formal system of education to enrich the lives of more of their citizens, and to bring more people into the sunshine, at a cost they can bear (Bishop, 1989). Alternative or non-formal education has served formal education in many ways. Formal education, which aims to promote the status quo, is too much laden with barriers that for it to promote SA, can take a long time. With SA as the emerging paradigm, training, which is a form of non-formal education, has become imperative. Development of effective and conscientisized trainors and facilitators, therefore, should be a major undertaking. With the blurring boundaries between formal and non-formal education, a trainor's responsibilities and qualities (e.g., Rogers and Taylor, 1998; Ockelford, 1995) would necessarily be that of a teacher and vice versa. Despite the relative abundance of SA-related training, however, few can be said to have trainors who have the proper pedagogical skills and attitudes (IIRR, 1998).

## Vb. Emphasis on Skills and Attitude Formation

Reforms in education curriculum should pay attention to the different areas or domains of learning and their subtleties. Most of what is done to improve learning is focused on knowledge. Training mostly consists of the acquisition of knowledge without understanding and leads to activities being performed mechanically, not to true thinking and creative activities (Rogers and Taylor, 1998). Skills development, on the other hand, has often been omitted from many curricula. An area that is even more excluded in many forms of education and learning is attitudinal learning, partly as a result of the belief that learning concerns only the intellect and that such domain is more difficult to handle. Transformation to SA requires behavioral changes and unless this is addressed in a curriculum any effort would be doomed to fail. Prerequisites to behavioral change (Box 15) have to be met in the process of conversion. These include awareness of the problem, knowledge of alternatives, motivation for change, and availability of resources for change.

## Vc. Mass-oriented, Nationalist Scientific Education

Non-formal education in the Philippines takes on a unique evolution as it got a strong political undertone in the 60's and 70's, i.e., during the Marcos regime. What it was in the 80's is still highly relevant to the present. The trend of blending formal and non-formal education principles has made the development-oriented, mass-oriented and nationalist education highly useful in the discussion of an alternative seed education (Doronila, 1991a). An organization devoted to such goals is Education Forum based in Diliman, Quezon City (Doronila 1991a, b). It is a service institution providing assistance to public and private institutions

**Box 15. Four prerequisites for behavioral change.**

1. Awareness of the problem
   *Challenges:*
   - admission or knowing own problem
   - contribution to problem
   - applicability of problem to own situation
   - denying that there's a problem

2. Knowledge of alternatives
   *Challenges:*
   - on-farm IK or general knowledge does not exist
   - conditioning toward modernization
   - absence of farm records, documentations, existence of models
   - lack of external information

3. Motivation for change
   *such as:*
   - improvement/care of health (family, personal)
   - care of soil/environment (decrease pollution of ground and surface water)
   - to pass on to future generations
   - raise quality of product (residue free )
   - awareness of the problems associated with conventional farming

4. Resources for change
   - Information
   - Management and analytical skills e.g. farmer: well-informed manager
   - Policy on environment, appropriate program

Source: untraceable

at all levels, as well as to groups and individuals engaged in the reorientation of Philippine education. Its development education is focused on the formation of a consciousness counter to prevailing mentally and or the empowerment of people.

# VI. ROLE OF TEACHERS IN SA AND NATIONAL DEVELOPMENT

National development and SA have a common goal: the improvement of the quality of life of its citizens through economic development, food security, human development, people empowerment, and a stable environment (i.e., one that is safe, clean, balanced, productive and renewable). This goal should be the guideline in teaching. Unfortunately many focus only on economic development, and on the western definitions of economic development.

## VIa. Teachers as Agents of Change or Development, as Learners

Educators, pedagogues and teachers are frequently referred to as 'change agents', because they support the social, cultural and economic development of a country in a particular direction (Arnold et al, 1986). This development role, however, is often disregarded in formal education. Teachers are considered the critical agents of change, first, because they are the principal transmitters and validators of knowledge; and second, because with the exception of students, they comprise the largest subsector in education (Doronila, 1991).

A change agent need to acquire new knowledge. S/He must also undergo a process of further professional development. S/He must reflect on the problems of her/his country, herself/himself be open to change and take pleasure in finding contact to other persons. To effect such role teachers should learn new things and engage in self-directed study (Rogers and Taylor, 1998). They cannot teach effectively unless they are themselves a learner. In most formal educational establishments, however, the development of the skills of learning-how-to-learn tends to be neglected. Teachers, and not only students, must imbibe such skills before they can impart this to their students. They should be able to help students to develop themselves after they leave the course. This is one of the most important elements in any curriculum. Teachers should also help students in becoming more committed to their own self-development, more confident to make further efforts, more innovative, creative, open to ideas, constructive and experimental, prepared to take risks, etc. Participatory forms of pedagogy (e.g., through active learning groups) are one of the most effective ways of building up commitment and enthusiasm. For the students to have the above skills (active learning), teaching staff will need to serve as role model (Rogers and Taylor, 1998).

## VIb. Teachers as Behavior Modifiers

The ultimate goal of a curriculum is to encourage behavioral changes but transfer from learning programs into behavioral changes are not always automatic. Most of these barriers are external to the training program but a curriculum should try to identify as many of these barriers as possible. This aspect underscores the essentiality of participatory curriculum development process where the contribution of the stakeholders will be particularly valuable (Rogers and Taylor, 1998; Taylor 1999). Behavior modification takes a more careful strategy in teaching. It is more successful if the students are engaged through the heart and not just the intellect or technical skills. Behavioral shifts can be enhanced if the conditions are favorable (Box 15)

## VIc. Molding Students/learners to Become Development Agents

The role of the teacher in a developing country, especially in the field of agriculture or forestry, is necessarily to provide development-oriented education. It would be a type of education that is translated into awakening, understanding one's own situation, her/his role and capability in improving her/his own condition as well as that of others, and thereby contributing to the transformation of the world into a more just and humane one. Development education as it may be called, is the essence of non-formal education, the alternative to a system that promotes the status quo of a society that has problems of inequity among others. Its methodology, developed by NGOs in the Philippines, include the following (Doronila, 1991a):

a. unfreezing,
b. conscientization at different levels,
c. contextualization,
d. planning and
e. implementation.

It utilizes the pedagogy that is evocative, participative, processual, critical and contextualized. The major forms of evaluation for development education are considered more stringent than for formal education because the success of development education is usually defined in the short term, by the development of new forms of consciousness or counter-consciousness, and in the long term, by sustained implementation of whatever plans of action have been evolved by the participants themselves.

## VId. The Need for more Progressive Educators

It is considered a good thing that education work in NGOS doing impressive works in development education was not initiated by professional educators (Doronila, 199 ). These educators have had formal training in education and they are often steeped with the philosophy and practice of formal education. This has been and still is the reality in the Philippines. On the other hand, there are NGOs who attach themselves too much to the formal educators or academicians. Some could be trying to make up for their own deficiency in formal education, while others do not realize that an entirely different paradigm is called for. Still others are constrained by the terms of their funders.

Development educators should aim to de-emphasize "banking" method and over emphasis on intellectual development. Progressive educators aims to engage the heart of people or empower them to (Doronila, 1991a). They realized that the standard components of formal schooling (curriculum, pedagogy and evaluation) could lead to homogenization and abstraction from the concrete milieu of people's lives. This would deprive students of counter-consciousness formation. Students and teachers would also be deprived from being empowered so that they can participate in organized and collective action related, as always, to the national movement for social transformation.

# VII. NEEDED REFORMS IN NON-TEACHING ACADEMIC PROGRAMS

Formal research programs, agricultural extension and various other formally-based training programs for farmers and NGOs suffer the same flaws as teaching. This is understandable since they are conceptualized and implemented by the same academicians who are products of, and are within, the policy and structural bounds of the institution. Critique of agricultural extension and research may also be found from various references given in the Literature Cited section and from other reviews (e.g., Ison, 1990; Fernandez, 1992; MacRae et al, 1989; Albrecht et al, 1989a and b). Considered more effective than formally trained teachers and extensionists are POs and farmers for (Chambers, 1992).

Current strategies in research, extension and development work, if influenced by the alternative education paradigm, also adopts the principles of SA education. They focus even more on farmer and community empowerment. They should be highly participatory (Hagmann et al, 1999) at the level wherein farmers and development partners are in a collegiate type relationship (Biggs 1989). The goal is self and community mobilization. They do away with the technology transfer mode (Ison, 1990).

In the process of academe conversion to SA several elements need to be revisited (Box 16) (Fernandez, 1999). In addition to course contents and teachers' pedagogical approaches, other aspects that need attention are redefinition of institutional goals, ideology and values; reorientation of staff along the same ideals as that of the institution; general funding, policy and operational support; incentive, reward and recognition mechanisms; integration of functions; nurturing of SA initiatives that are sprouting in campus; and networking within and outside the academe.

**Box 16. Elements that need attention in the process of academe conversion to sustainable agriculture:**

1) Goals, values system and ideology of the institution
2) Actual process of curriculum revision and development, especially on how participatory it is
3) Course contents and emphasis, especially on the aspects of IKS, nationalist and mass-oriented scientific education
4) Teachers' knowledge, skills, attitudes and behaviour
5) Evaluation system: of the teacher and the curriculum; of the students
6) Status of learning resources, especially audiovisuals, grey literature and other from the non-formal sector
7) General system of incentives and rewards
8) SA-related initiatives, including an information clearinghouse/learning facilities, entities undertaking alternative education
9) Funding allocation and administrative flexibility and allowances specifically for SA-related initiatives
10) Values and development orientation of research, extension functions
11) Integration of different disciplinary/academic and administrative functions and units
12) Networking mechanism within the academics and also (especially) with the non-formal sector, for better sharing of resources, working together, and more effective advocacy
13) Training opportunities given to both academic and administrative personnel

Adapted from: Fernandez, 1999

In the realignment of the university's various programs, a set of standards or indicators for SA would be very useful to have as guide. Despite the availability of literature on indicators and the many fora spent aiming at reforms not much has changed in the last four years, i.e., since the implementation of the new BSA curriculum. There has been no real push to the direction that the university says it wants to go.

# VIII. NEEDED SHIFTS TOWARD SA-SEED EDUCATION

Previous sections deal with flaws, alternatives and strategies to effect change toward an SA-framed education curriculum. Following sections deal with the seed education curriculum transformation to SA.

## VIIIa. The Role of Seed in Development Education

A revolutionary way of looking at general- or agricultural education parallels that for the seed education paradigm. The seed is undeniably a political entity and manifests a certain kind of science and technology. It embodied the paradigm of the Green Revolution program and has been the instrument in actualizing the program through the so-called HYVs or high yielding varieties. The Seed Tech group has endeavored to seek and promote an alternative paradigm in the various aspects of the seed: education, research, training/ extension, production, economics, distribution, marketing, conservation, development, etc. Most of its activities, however, has mainly been in the area of alternative (development type) seed training and education. Its philosophy in research and extension also follows closely that of education. Their experiences and perspective had been greatly molded by their involvement and interactions with NGOs and POs.

## VIIIb. Goals in Sustainable Seed Education

Seed technology (or seed production) is a discipline framed within the Green Revolution paradigm (Fernandez, 1992). To conduct formal and non-formal seed education, according to the goals of SA would require adopting the framework of development education which upholds an alternative pedagogy, curriculum, content and evaluation strategies. This means a shift in philosophy, principles, activities and format applicable to both formal or non-formal seed endeavor.

A "sustainable" seed system is holistic, involving not just seed multiplication of formally approved varieties but the whole spectrum of production activities. The goals of SA education and production system are also those of the seed system. Goals of seed production can be defined based on the list of Pretty (1996) on goals of SA as a production system (Box 17). The general and specific goals of SA education (Box 5) should also be reflected in a "sustainable" seed training and education, thus, should be participatory, promote networking, build on differences among different actors, ask the right questions, encourage finding answers to these questions, lead to the understanding of flaws of contemporary agriculture, include knowledge and application of concepts in agroecology, and encourage translating action toward improvement of the quality of life (King and Francis, 1994). An SA-framed seed education should seek to address the flaws of general education.

The long term goals for a sustainable food system (Box 18) defined by MacRae et al (1989) could also be used to apply the sustainability aspect of a seed system. An SA-seed system should address broad concerns, i.e., seed adequacy, appropriateness of the seed, cultural management practices, food security and equity.

**Box 17. Goals of SA as a production system (Pretty 1996) and adaptation to seed system.**

| Production system | Seed System |
|---|---|
| 1.Thorough incorporation of natural processes for pest and nutrient management | Use of alternative/appropriate (ecological) pest and nutrient management for seed production/handling, testing, etc. |
| 2. Minimization or elimination of external and non-renewable input | Use of local seed and other inputs or resources that are renewable |
| 3. Conserve, multiply and utilize highly adapted plant varieties and animal breed; *practice alternative crop & livestock breeding and selection* | Genetic conservation/community seedbanking along with seed production of local plants/varieties |
| 4. Practice diversified and integrated farming system; focus on functional diversity in the farm | Seed production system is incorporated into a diversified and integrated farming system; seed and plants should serve many functions and their needs are variously served by other components |
| 5. Full participation of farmers & local and indigenous peoples in all processes: problem analysis, technology development, adaptation, extension | Legitimate participation of local people in all seed related activities like genetic conservation and community seedbanking, genetic improvement, seed production, distribution, marketing, policy, research, etc. |
| 6. More equitable access to productive resources and opportunities | Resource poor farmers control/access not only the seed/varieties but also the land, seed, distribution market, pricing, information, etc. |
| 7. Greater productive use of local knowledge, practices and resources | Incorporation, enhancement and utilization of seed-related IKS concepts, resources, techniques |
| 8. Incorporation of a diversity of natural resources and enterprises within farms | Use of diverse local varieties and species, inputs, management system, and enterprise in a diversified and integrated farm |
| 9. Increase self-reliance among farmers, local and indigenous communities | Farmers do self-seed production and seed saving along with other practices that promote self-reliance |
| 10. Recognize role of women in the development process | Enhance women's role in seed selection, production, handling, marketing, etc. |

**Box 18. Long-term goals for a sustainable food system.**

**Consumption category**

**A.** Adequacy: the food system should give every person access to sufficient food in quantity, quality and degree of choice, to achieve optimal physical and mental health.
**B.** Appropriateness: the food system should be matched, in production, consumption, recycling, thermodynamics, and technology to both the limits and needs of its region and locality.

**Security category**

**C.** Dependability: the food and political system should provide every person with a reliable food supply—free from social, political, economic or environmental disruption.
**D.** Sustainability: the food system should be culturally, environmentally, economically, and technologically sustainable with respect to production and all other aspects of the food system, including resource inputs, cultivation techniques, processing and distribution.
**E.** Safety: the food system should minimize danger to workers, consumers, and the environment.
**F.** Efficiency: the food system should practice resource efficiency by minimizing resource costs (energy, water, soil resources, genetic resources, forests, wildlife, and other non-human life).

**Equity category**

**G.** Wealth: the food system should generate sufficient income to food producers to provide a quality of life (measured by a variety of indicators) equivalent to that of other sectors of the economy, to maintain vigorous rural communities and enable farmers to fulfil their land-stewardship responsibilities.
**H.** Flexibility: the food system should be open to growth, evolution, creativity, and experimentation to deal with climatic, economic, and political stresses and variability.
**I.** Participation: the food system's organization, decision-making and path towards the future should be determined by all sectors of the population that wish to be involved.
**J.** Human development and fulfillment: the food system must provide opportunities for creative and fulfilling paid and unpaid work and social interaction.
**K.** Support: the food system of any one nation should interact with the food systems of other nations in such a way that they are able to achieve sustainable food systems.

Lifted from: MacRae et al, 1989

## VIIIc. Some Concepts in Seed Technology Needing Reorientation for SA

The training curriculum developed by the Seed Tech group is evolving but there are some basic components that are found in all the courses undertaken (e.g., Boxes 19 and 20; Appendix 6). Changes which have been gradually realized have been refined through feedback of participants and suggestions from NGOs and POs in the network. Although the course is primarily technical in nature, it is infused with issues, values, and human resource development aspects to enhance development of counter-consciousness and promote self-mobilization and community growth. Among the concepts that were altered were the following (see also Boxes 17, 21 and 22; Fernandez 1992, Figure 3):

Y Goal of seed production - to make the resource poor farmer an effective seed saver, a developer of variety and associated management system, a genetic resource conservationist, and a multiplier.

Y Standard of seed quality and variety concept - farmers know about and have good control of the quality of their seed because of their close association with them. Seed quality testing in such a situation, therefore, would become not highly necessary. Seed quality would be defined in the context of the farmer's

**Box 19. Suggested topics for a training course with SA framework.**

*The same topics may be used for formal courses.*

a) Historical perspective (situationer)
b) Issues (macro and micro; local and international), trends
c) SA framework, "definition" or attributes
d) Values clarification and reorientation; awareness of self and others; human resource development; accountability
e) Agroecological principles
f) TECHNICAL ASPECTS
g) Indigenous knowledge systems
h) Farmer based endeavors (empowerment) e.g. crop improvement/breeding, seed production, genetic conservation
i) Role of self for SA; for local/community and national development
j) Role of a group in development (collective effort)
k) Application (e.g., project proposal, case study, critiquing, action plan)

Modified from: Briones et al, 1995

**Box 20. Roadmap of the short course on Seed Production and Genetic Conservation for SA.**

| Methodology | Course Roadmap |
|---|---|
| **PRE-TRAINING** | |
| ***Benchmark Questionnaire*** | Training needs assessment<br>Participant selection<br>Preconscientization and sensitization |
| **DURING TRAINING** | |
| *Workshop* | Levelling off of expectations, needs, curriculum validation<br>↓ |
| *Roundtable discussion* | Sharing of experiences (seed, work, self/community)<br>↓ |
| *Lecture-discussion* | Issues (local/community, national, global), trends, recent developments (needs, problems, threats, opportunities, success stories)<br>↓ |
| *Workshop-discussion, lecture* | Revisiting and redefining values, development perspective, science, education, economics (self in relation to the world)<br>↓ |
| *Modified storyboard, group assignment, workshop, discussion, lecture, visits, practicum, videos, soundslides*<br><br>SA | Concepts, principles and techniques (technical)<br>Y SA framework; indicators<br>Y Seed systems and scope of seed tech within SA and genetic conservation<br>Y Seed technology/production; agroecological and perspective<br>Y Indigenous Knowledge systems<br>Y Farmer-based seed production, crop improvement, genetic conservation<br>↓ |
| *Discussion* | Other concerns:<br>Networking, conversion to SA, seed sourcing, fund sourcing, IPR, bioprospecting<br>↓ |
| *Games, workshop, discussion* | Human Resource Development (for self and group development)<br>↓ |
| | Application of learning, knowledge sharing<br>Y modified storyboard<br>Y practicum<br>Y action planning<br>Y project proposal preparation<br>Y training/extension materials production<br>Y topic/activity evaluation<br>Y course evaluation<br>Y reflections, sharing |
| **POST-TRAINING** | |
| | Monitoring, Evaluation, continued communication<br>Y survey to do impact assessment and monitoring of transformation (individual, program)<br>Y survey about training/education needs<br>Y exchange update on issues, trends, recent developments<br>Y answer some needs (information, papers, etc.) |
| | Seed Congress ?? |

**Box 21. Differences between conventional and alternative seed production system.**

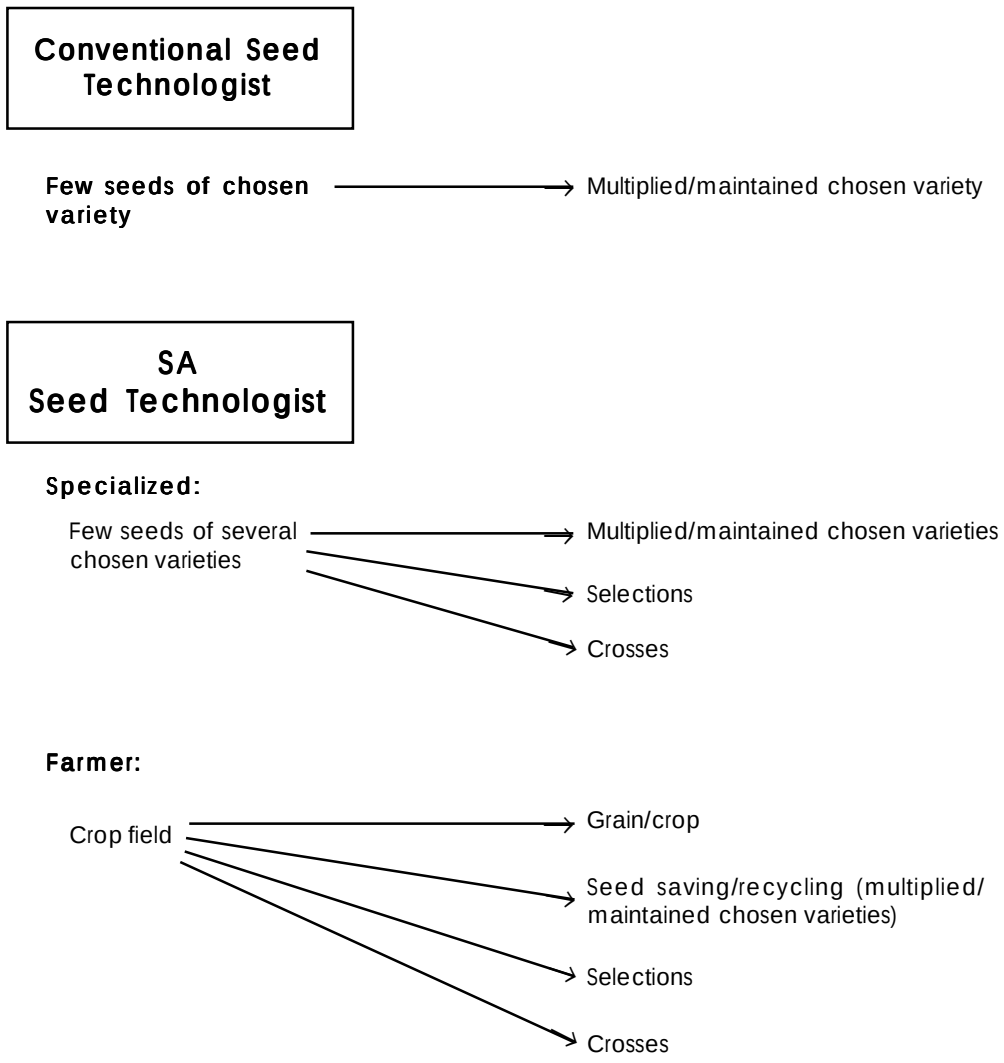
| | CONVENTIONAL/official/formal | ALTERNATIVE/SA/Non-formal |
|---|---|---|
| National seed requirement served | 10% (approx.) | 90% (approx.) |
| Objective/Goal | Produce and multiply quality "true-to-type" seeds | 1. Produce and multiply "true-to-type" seeds<br>2. Improve seed/plant characteristics<br>3. save or conserve varieties<br>4. Experimenting farmers |
| Lead actor | The formal system, the commercial seed industry | The farmer, POs, non-formal and informal sector |
| Regarded role of farmer | End-user of seed | Participant in all aspects from genetic conservation, breeding and evaluation to seed and crop production |
| Planting material of concern | Mainly seed; many are exotics | Seed and other propagules |
| Variety used | Limited number; Seed-Board approved; "improved', HYVs, hybrids; genetically engineered; many are still lines (if locally obtained | Wide array; mostly not SeedBoard approved; may include improved, HYVs; often exclude hybrids; emphasize use of locals, traditional or landraces, farmer- developed; open-pollinated and mixed purelines |
| Crop focus | Staple, cash crops, high value crops | Subsistence as well as some commercial but not industrially controlled ones |
| Scale/goal of operation | Often large-scale, commercial | Subsistence, small-or large-scale; commercial or not, development oriented |
| Type of input | Chemical, high-inputs, sourced off- farm, often mechanized and fossil fuel-based | Non-chemical, low or no external input, often manual, recycle resources, use organic or natural substitutes |
| Cropping System | Monocropping over wide areas | Diversified, multivariety if of one species; sometimes in monocrop but on smaller scale |
| System of harvesting | Simultaneuos | Commonly staggered; simultaneous |
| System of processing | Mostly large-scale, promotes use of big machineries | Often by hand; community or group effort |
| Seed storage | Large-scale, relatively hi-tech | Usually small-scale; techniques that are farm level/indigenous/local |

*continued next page*

*Box 21 continued*

| | CONVENTIONAL/official/formal | ALTERNATIVE/SA/Non-formal |
|---|---|---|
| Seed quality criteria | Generally only for true seed; includes high genetic purity, low seed moisture, high germination and vigor, good health; poor adaptability is compensated by artificial systems | Attempts inclusion of all planting materials; includes same concerns as conventional, but includes heterogenous seed lots; seed moisture concerns include of recalcitants and asexual propagules; emphasizes appropriateness of seed to location and culture |
| Management of seed production, distribution | Wide areas, zoning centralized | Small areas, decentralized |

**Figure 3. Difference between conventional and SA seed technologist.**



cropping system and environment. Poor germination, low genetic purity and poor seed health would not be of much concern since compensation mechanisms are in place in the farm, given for example, a biologically diverse agroecological setting. Besides, farmers' realities require a different set of seed quality standards. Moisture content prescription level must consider that farmer's seed does not necessarily undergo the same fate as the formally produced ones (i.e., in terms of length of storage, user, crop production system), and that there should be reasonable concern for other crops, especially recalcitrant seeds and others that are asexually produced. The formal requirement for a variety (i.e., being distinct, uniform, stable and novel) does not fit well with farmers' seed traits given that theirs are more heterogeneous but perform just as well. Both the national crop testing body and the seed certification system becomes irrelevant unless they modify their procedures and standards according to the reality of farmers.

Y Production technology and cropping system - several concepts that relate to the technology also take on a different level of importance with the SA framework. Examples are the following:

- physiological maturity and maturity index concepts for proper timing of harvesting do not conform well to farmer practice; the concern for maximum viability and vigor is overridden by practicality of harvest, drying need, and market price, etc.;

- input and energy sources should be local and renewable; done away with are large imported and fossil fuel based machines and chemical inputs;

- the formal system of general health maintenance and pest and disease management especially for seed production is not compatible with farmers' practices and realities; that of SA dwells more on prevention and general resistance, such as by maintaining a healthy soil and using local and ecological pest management approaches;

- limited system of generation in seed multiplication (i.e., limiting the number of seed recycling) is de-emphasized since the farmer is encouraged to do own seed saving, thus have more knowledge and control of his seed; the farmer is also encouraged to do selection and improvement of variety thus putting positive value on off-types and any other means of variety modification;

- genetic conservation should be linked with seed production. The widespread use of a variety (general adaptability) is not encouraged to avoid genetic erosion especially of local varieties.

- isolation is not a major concern but farmers' seed, though seemingly heterogeneous, perform just as well as the homogenous formal varieties; farmer varieties are genetically diverse and are products of encouraged plant or seed mixing, cross pollination, introgression and systematic selection.

# IX. EXPERIENCES IN SEED TECHNOLOGY TRAINING AND EDUCATION

## IXa. History and Trends

The Department of Agronomy offers Seed Technology as a field of specialization both in the undergraduate and graduate level. In the late 80's the Division of Seed Science and Technology took on a different route towards achieving its goal of helping farmers in the countryside with regard to their seed needs. This is when the group became involved in the SA movement. Much of what it is now had been catalyzed by the former project on Agroforestry Seed Information Clearinghouse or AFSICH (1989-1994) which adopted SA as its framework (Appendix 7). The group has been involved not only in teaching and research but also in extension, training and other forms of development work. Before and after AFSICH, the activities of the group had been survived by the Seed Research and Development Project (SRDP) although funds have been meager (50-60,000 pa). The SRDP enabled the group to operate, although at much reduced level, the learning resource facility and the informal seed/SA clearinghouse function. Very recently the group was awarded a modest foreign grant (ICRAF) to help step up its education and training activities. This is mainly in recognition of the relevance of its SA and seed initiatives at the local and international front. A yearly major event held every summer since 1991 is a regular short course. The course took on an evolved format, changing titles, methodologies, content, emphasis, and participant profile as a result of the feedback from participants and expressed needs of the network (Box 20, Appendix 6). The course objectives on the other hand, remained basically the same (Box 22).

**Box 22. Objectives of the short course on Seed Production and Genetic Conservation for SA:**

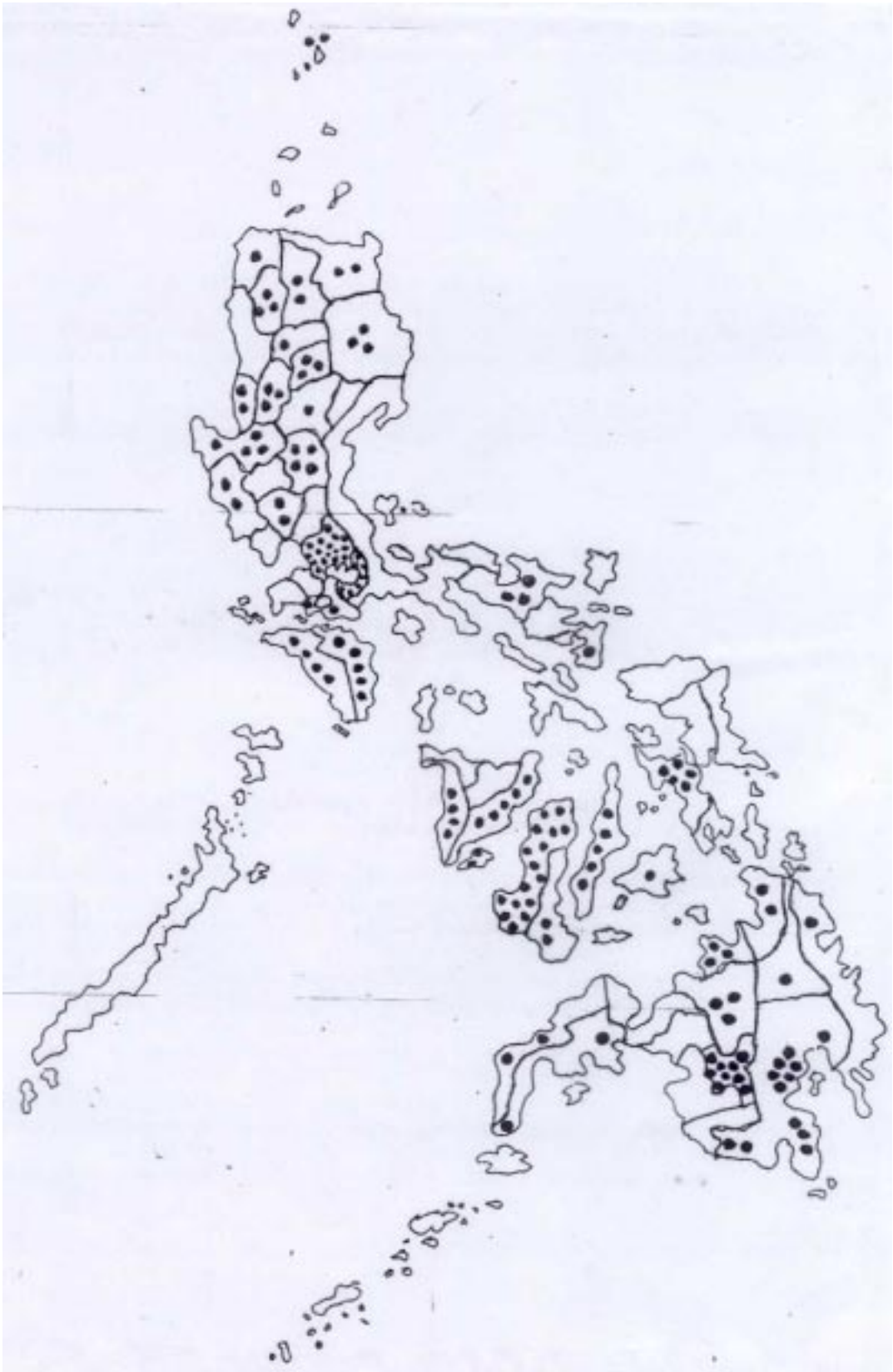
- Acquire skills in "sustainable" seed technology
- Discuss issues & concepts related to seed, seed industry, genetic conservation, sustainable agriculture, overall development
- Describe strengths & weaknesses of the formal & informal seed sector
- Describe & explain the value of some indigenous practices in seed & genetic conservation
- Write up an action plan (conservation)
- Write up an extension/training material reflecting one's strength
- Identify and collect various seed-related resources
- Promote networking on seed, genetic conservation

## IXb. Profile of Participants

Not counting on-site and shorter term training, there had been 152 short course participants coming from all over the country (Figures 4a-d). Women have comprised a third of the total. The NGOs compose the majority but the GOs (GA and LGU) had since been a substantial part of the course. Government representation improved with the devolution of agencies to local government units (ICU). The academe participation has been fluctuating, while the PO representation has started to rise, probably because of the training's greater emphasis on farmer-based initiatives. The nature of work of participants has, from the beginning, been quite diverse. These include teaching, research, extension, production (crop and/or seed), nursery management, SA project management, administration, monitoring and evaluation, training, community

**Figure 4. Profile of participants 1991-1999. Participant distribution throughout the country, proportion of the different sectors represented number of participants and changes in sectoral participation over the years.**

**4 a**



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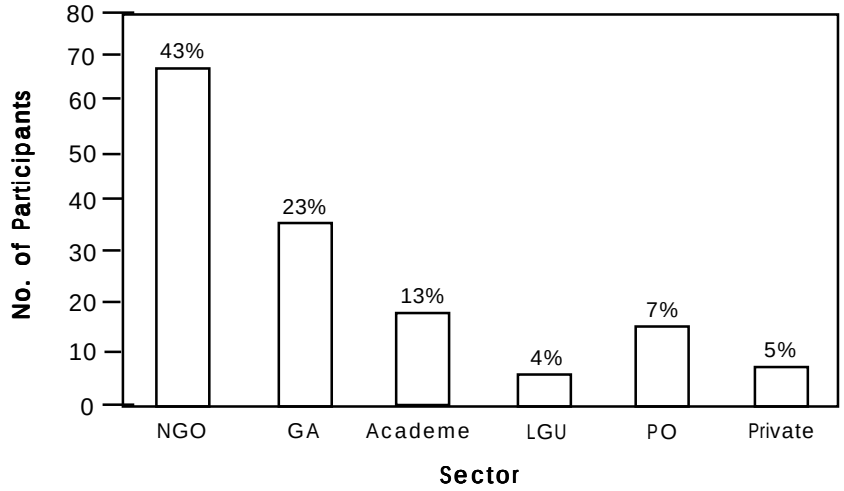
**4 b**

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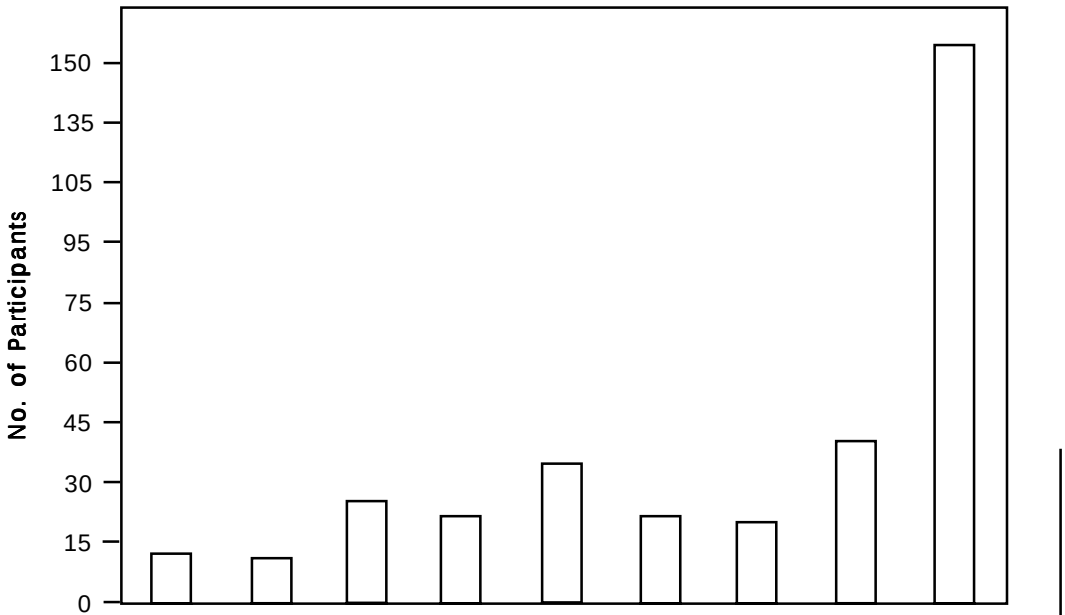


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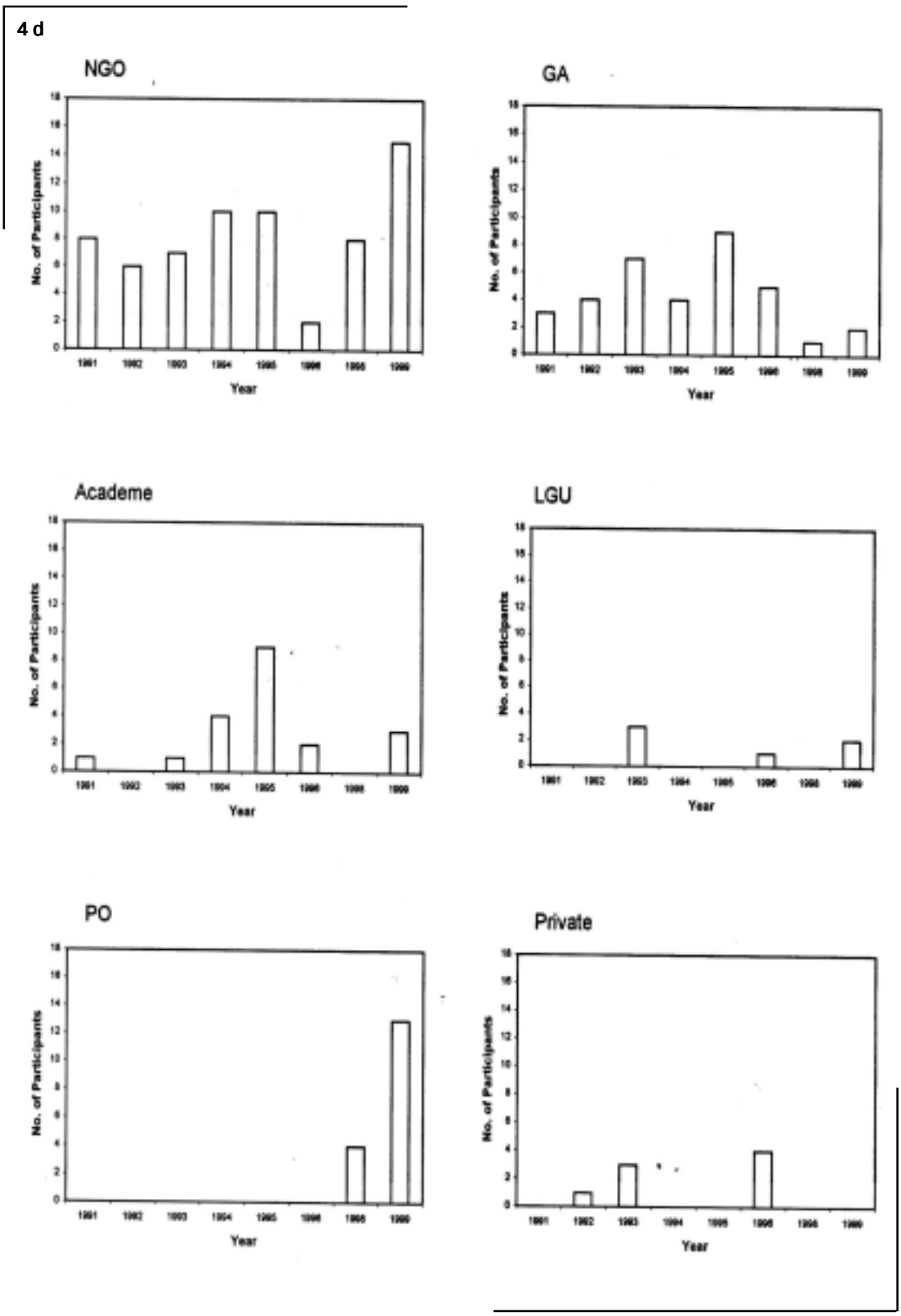


organizing, plant breeding, and non-formal genetic conservation. Most recently the major interest of participants, especially among the NGOs is on community seedbanking. Many network of the NGO's national program are now on community seed banking. This has prompted the group to write a lengthy "technical notes" about the subject.

## IXc. The Training Curriculum

The most current curriculum still generally reflects that when the course began in 1991. However, it has added, or has put more emphasis on, farmer-based approaches and practices i.e., in genetic conservation (community seedbanking), participatory plant breeding, participatory research and farmer-to-farmer extension (Box 20, Appendix 6). Basic elements still are the preconscientization aspect (given during the screening period through benchmark questionnaires (Appendix 8), the actual conscientization (during the training where issues and values are discussed), the alternative (i.e., SA) framed technical content, and the human resource development portion (Boxes 19 and 20; Appendix 6). Other components may be gleaned from the objectives of the course (Box 22).

Aside from project proposal preparation, a new activity has been initiated. This is the production of an extension, training or information material, meant to capture what participants CAN DO or KNOW BEST and share with others (Box 23). The group plans to make the output into a resource book, to be built up yearly and shared with interested parties. Networking has always been a formal agenda although only an informal mechanism is being pursued.

## IXd. The Methodology

Various methods are being used to enhance learning (Box 24; Supplement 2). It varies from lectures, discussions and workshops to games, field visits, practicums and mini-project preparation. Learning is also enhanced by reference materials (Appendix 9) and other "enhancers" given away or put on display in the venue. Lecture-discussion is the most common method used among local resource persons but most of them are dynamic presentors, thus are quite effective in delivery. Others introduce activities that are more participatory [e.g., in demonstrating the concept of food web/chain, Figure 5 (#33)].

**Box 23. Training/Extension/Materials produced by short course participants based on "What They Know or Can Do Best".**

***Seed Production Seed Technology/Genetic Conservation***

- Building farmer-managed forest seed collection/production system at Lantapan, Bukidnon
- Localized corn seed production
- Mga paraan ng pag-punla ng mahogany (*Ways to Sow Mahogany*)
- Tips on seed collection, handling and germination of Mosisi (Maesopsis eminii)
- Genetic conservation through agroforestry farming systems

***Nursery Management; Asexual Propagation***

- Asexual propagation of *Lansium domesticum* (Lansones) using modified crown grafting
- Nursery establishment and management
- Seedling production

***Crop Production/Vegetable Production***

- Ang pagtatanim ng organic rice
- Bio-intensive garden (BIG) as an approach to crop production
- An extension material for coconut-based farming system
- Information collection on the seasonality of agriculture
- Training on how to grow ampalaya (*Momordica charantia*)
- Vegetable container garden: A source of essential nutrients

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*Box 23 continued*

**Soil, Fertility Management**
- Direct composting in rice fields
- Ang likas kayang pagsasaka: sa pamamagitan ng organikong pataba (*Sustainable Agriculture thru Organic Fertilizer*)
- How to make liquid fertilizer
- Vermicomposting
- Paggawa ng sulosyon para sa mataas na uring organikong pataba (*High Quality Production of Organic Fertilizer Solution*)

***Pest Management***
- Vegetable crop protection: Weed control and cultivation
- Understanding plant diseases: a tool in alternative pest management

***Crop Improvement***
- Varietal improvement of corn and seed production for sustainable agriculture
- Crop breeding and plant improvement

***Values-Training***
- Training on VALUES for Sustainable Agriculture

To enhance group learning and sharing, especially in the field of "sustainable" seed technology, a modified storyboard approach has been developed and continuously revised. This is actualized in a workbook that contains principles and evocative questions about the subject (Appendix 10). Publications and other printed materials where some answers could be obtained are also given. Most of these have been produced by the group itself (Appendix 7) while others are articles or clippings from publication (Appendix 9). These materials are meant to be future readings when participants go back to their respective areas. It is emphasized to the participants that their most important resource is themselves and their group members, being a mixture of different backgrounds, experiences and sectors (GO, NGO, PO, LGU, academe, private). Answers of

**Box 24. Activities, sessions and classroom set-ups that enhance SA principles: *Participation, sharing and mutual learning***

**A. Class Activities**

- **Group examination, assignment –** less pressure, enhances cooperativism and can enrich course context with student research and sharing; if given as take home can be a good resource for teachers while students can spend more time thinking and researching about the topics
- **Presentation of IKS from own area** – makes one reflect on wealth/resources of own community and culture
- **Preparation and presentation of information material based on what one KNOWS or CAN DO BEST** – enhances reflection of self worth and gives confidence in realizing ones own ability
- **"Modified storyboard" –** sort of manual that evokes principles in a field and contains question, along with principles that are highly illustrated
- **Plenary sharing of experiences –** stresses listening to others and enhances learning from others; allows self analysis and presentation of own reality to others
- **Levelling off and benchmarking/profiling –**gives an idea of the profile of students, from basic personal information to their background/experiences and expectations
- **Evaluation of self and others** – impacts on critical thinking and allows reflection on own values
- **"Food for the Soul":** Energizers, ice breakers, inspirational sayings, human resource development aspects – for self reflections, touches the HEART in the conversion process

*continued next page*

*Box 24 continued*

**B. Sessions and Room Environment; Learning Enhancers**

Y minilibrary (selected references)
Y posters
Y handouts: own publications, articles, abstracted materials
Y feedback board
Y sayings, food for thought, daily reflections board
Y participants' profile board
Y energizers, ice breakers
Y music (meditative, inspiring, mood setter)
Y IK corner
Y questions for learning board
Y practicums
Y visits

**Figure 5. Some training-related photos shown as transparency during the professorial chair lecture on "Alternative Seed Training and Education for Sustainable Agriculture."**

*Guide/Description*

1. Engaging department staff to participate in the course. A dance number rendered by academic and administrative staff during the opening ceremonies.
2. Engaging student participation, applying their course learning in Seed Technology, e.g. "germinating seeds'.
3. Leveling off of topics most relevant, strongest at, and want to tackle in the course. A training hall "fixture" to serve as reference.

4-5. Profiling participants. Also a training hall "fixture".

6-7. Learning materials are brought into the training hall, for display and browsing

8. An application of participant learning, cooperativism and creativity through a T-shirt design. T-shirts with this design are also given as token (instead of honoraria) to resource persons.
9. Daily reflections, another way to demonstrate learning, cooperativism and creativity.
10. Practicals on asexual propagation. The topic is part of seed technology curriculum.
11. Practicals on nursery establishment (also part of seed technology curriculum).
12. Practicals on seed quality testing – an indigenous way of judging seed moisture level.
13. Practicals on enhancing germination of hard-to-germinate forest seed of "lumbang" (*Aleurites moluccana*).
14. Practicals on seed quality testing – assessing germination. On site training makes use of local materials, e.g., the ground.
15. Processing results of practicals on seed identification. Curiosity level is very high on the subject, and farmers excel in it.
16. Practicals on crop improvement. Farmers appreciate this module the most.
17. A MASIPAG farmer organizer sharing ideas on farmer-scientist-NGO partnership and farmer-based genetic conservation, including plant breeding. These topics are integral part of the seed technology curriculum.

18-19. Visits to formal institutions (Seed Health Unit and Cold Genebank of IRRI). A way to demystify science and "hi-tech" system, and to understand realities of the formal system.

20-21. Visits to "SA farms," e.g. commercial organic vegetable/herb farm in Cavite (Old Cano's) and Biodynamic farm in Diliman (Nicky Perlas).

22. Sharing of experiences, an essential activity, conducted at different times and levels.
23. Mood barometer as a way to monitor status of participants.

24-25. Unfreezers, energizers. Trainors are always encouraged to join to enhance non-deferential relationship between them and the participants.

26-27. Knowing oneself, part of an exercise on human resource development (HRD). It is empha sized that development workers, to be effective, should start knowing self first before they can effectively engage others to self-mobilization.

28-30. Team building exercise as part of HRD session. Building the tallest, nicest, strongest tower, out of materials bought through personal things – the more intimate the effect, the higher the value. (e.g., staples in exchange for underwear).

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*Figure 5 continued*

31-32. The group conducting on-site training using a modification of the short course module.
33. Farmers also come to do "in house" training. NGO's serve as intermediaries.
34-36. The seed curriculum is highly infused with IKS. A demonstration of IK vs modern agriculture in action. Farmers engaged in research see the difference between hybrid (big but full of weevils) and traditional (smaller but "clean") varieties. Local practice of crop protection (decoy? offering?) doesn't seem to work with hybrids.
37-42. Encouraging indigenous practices including seed rituals, water divining, use of symbolic(?) paraphernalia (e.g. double headed penis) to improve crop performance and to serve as protection (amulet).
43. Some resource person conduct activity-oriented sessions to demonstrate certain principles (e.g., effect of modern and ecological agriculture on the food web and food chain. These activities are also useful in formal classes.

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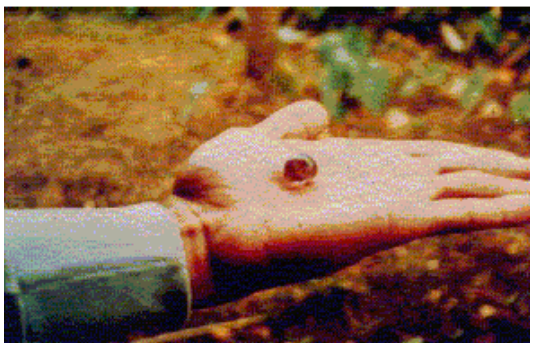

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participants to the questions in the modified storyboard are also valuable new learnings to the facilitators themselves. This is especially true for questions on practical knowledge or indigenous practices. The methodology developed and the storyboard material have been found applicable and are thus used in formal classes. Training participants with different educational backgrounds and students find the material a pleasurable way to learn. A student of Development Communications in fact had as subject for her thesis, trying to see the adaptability of the modified storyboard in high school curriculum (Umali, 1994). Some NGO's and POs have already adapted it together with other learning materials, in their own training programs.

The group's methodology had evolved and much of the alternative approaches were learned through the group's interaction with the NGOs and POs (resource persons and participants) who are considered more progressive in training and

more adept in development education. Other ideas were adaptations from trainings attended abroad. So far, the international trainings attended are still highly conventional in framework though some topics related to SA are dealt with (e.g., Supplement 2).

A lengthy "activity guide" had been prepared to guide each staff to the details of every short course activity. This has been useful for efficient operation, considering that staff should be well coordinated for more efficient and quality facilitation, and since the turnover of the members of the group is quite high. The ideas came from the NGO partner who have been invited in every course to help out in facilitation.

Some of the activities and components of the short course may be gleaned from various photos presented in Figure 5.

## IXe. Trainor/Facilitator Profile

The Division had undergone considerable staff turnover through the years. Yet some basic leveling-off mechanisms had been achieved for those who remain or join, such that the course still had been able to operate according to its goals (Box 25) and objectives. This may have prompted another Development Communication student to do her thesis on the thought processes (knowledge construct) of the group's training team (technical staff) as they relate to SA framework, creativity especially in presenting SA-related issues, and reconciling technical and farmer (indigenous) knowledge (Zamora, 1994).

The group is dominated by women (now 7:1) with all the current technical staff being female. When funds are available, student assistants or interns are hired. The training serves as an orientation and training ground for these students. A staff from the NGO Mag-uugmad Foundation, Inc., based in Cebu City has been with the group for almost all of its short courses, to help in course design and facilitation, and to serve as resource person on topics related to human resource development. He has been a source of the group's major learning in facilitation principles. The local technical staff (i.e., the Seed Tech group), aside from serving as resource persons, also do facilitation, documentation and other administrative work.

The basic characteristics of trainors (or facilitators) recommended in SA (e.g., IIRR, 1998; Box 26) are what the group tries to become. A good facilitator should be skillful in pedagogical techniques (i.e., interactive, dialogic, participative,

**Box 25. Goals of a Seed Course for trainors and participants.**

***A. for Trainors to...***

1. Disseminate/impart sustainable seed technology and genetic conservation concepts, approaches and strategies
2. Continuously improve module for more relevant future training courses
3. Improve and accumulate more training/learning resources
4. Actualize a holistic/integrative and participatory training approach; improve and learn more facilitation skills from the participants and other resource persons
5. Learn more about knowing self and others, on dealing with people and resource persons, on leadership and management skills, etc.
6. Update knowledge on subject matter and related concerns
7. Learn about field/farmer's or participant's realities and needs
8. Expand, widen network; create synergy among different sectors

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*Box 25 continued*

9. Get ideas (content and methodology) to apply to formal teaching curriculum, research and extension
10. Promote IKS; help catalyze community-based efforts that impact on seed or SA
11. Acquire and exchange resources that could not be obtained from formal sources: local seed/ planting materials; farmer-developed varieties, practices, and approaches, local initiatives that impact on SA, learning materials
12. Contribute to the strengthening of the informal seed sector

***B. for Participants...***

Y To have the "sustainable" perspective on development, seed industry and seed program; learn about technical and non technical aspects given an SA framework
Y To link "sustainable" seed production/technology with genetic conservation
Y To be able to actually use the appropriate seed in one's own endeavor as an "agent of change" and an entry point in development work
Y To discover one's role in development, especially thru the seed (self understanding/knowledge, relate to development)
Y To promote, if not able to conduct it himself, a self-seed production, non-chemical and ecological production system
Y To promote farmer- and community-based efforts in seed/variety conservation, improvement, production, distribution and utilization
Y To imbibe the philosophy of participatory and collective seed endeavors (e.g., in seed production, research, extension, education, marketing)
Y To understand and apply development education as a mission by experiencing an example of such through the seed training attended

## Box 26. Characteristics of a trainor with SA perspective.

1. Knowledgeable about the subject matter (technical), as well as on issues, trends and other related concerns
2. Skillful in facilitation
    Y Patient at all times
    Y Not condescending; humble
    Y Tactful; gets message across without hurtful statements
    Y Open to new ideas
    Y Respect other people's ideas
    Y Promotes healthy, open and focused discussion
    Y Able to draw out participant's ideas, knowledge
    Y Able to control group without being autocratic
    Y Identifies and draws on the strength of each participant
    Y Alert to pick up and process key issues, questions raised and learnings shared
3. Works well with other staff
4. Greatly and genuinely interested in the realities of the participants and the successful implementation of the training
5. Engaged in constant self-improvement (always draws lessons from an event)
6. Does not mind working beyond the normal time and days (*does good on the basis of mission, vision and values and on what is fair just and right, rather than to avoid punishment or get reward/ approval or simply follow rules and procedures*)

evocative learning approaches) and have adequate knowledge about the subject matter. He should also have the proper orientation and skills in human relations (Figure 2). Some transformation toward SA in each staff is believed to have been achieved and this is largely accomplished by sitting in and helping out in the module on human resource development.

# X. TRAINING IMPACT

## Xa. Learnings, Gains

After approximately a decade of being involved in alternative seed training and education, a reasonable question expected to be asked would be… so what? What has been the group's impact? An ideal approach to know about its impact on the participants would have been to conduct a structured monitoring and evaluation of their activities involving, for one, actual visits to the participants' respective areas. The group, however, has only been able to assess the short course's impact informally. That is, through participant sharing and actuations during the course, and through the evaluation of each topic and the course (Appendix 11). Impact had also been gauged from the group's continued interaction with the participants after the course (e.g., through correspondence and occasional visits of participants to the group), and through the participants' response to the mail-in surveys (Appendices 12 and 13). The recent survey of past participants and others, whom the group think have seed- or SA-related education activities, revealed that there are indeed program changes, besides individual transformation, occurring among respondents. It also revealed that there is a lot more going on about SA outside than in the academe. The seed production topic of those who do education-related activities is often integrated with the general production or development topics. Some initiatives are quite advanced, having a holistic curriculum and development-oriented pedagogical approaches and actual on-the ground work.

At the trainors' end, the training and education endeavors of the Seed Tech group had provided various gains (Box 27). Such benefits were in terms of learning about human resource development, self discovery, values clarification, concepts revalidation, training facilitation, alternative teaching approaches, collection and development of learning and teaching materials (e.g., videos) and many others. The Department, College and University, as well

**Box 27. Learnings/gains of trainors from the short course on Seed Technology and Genetic Conservation for SA.**

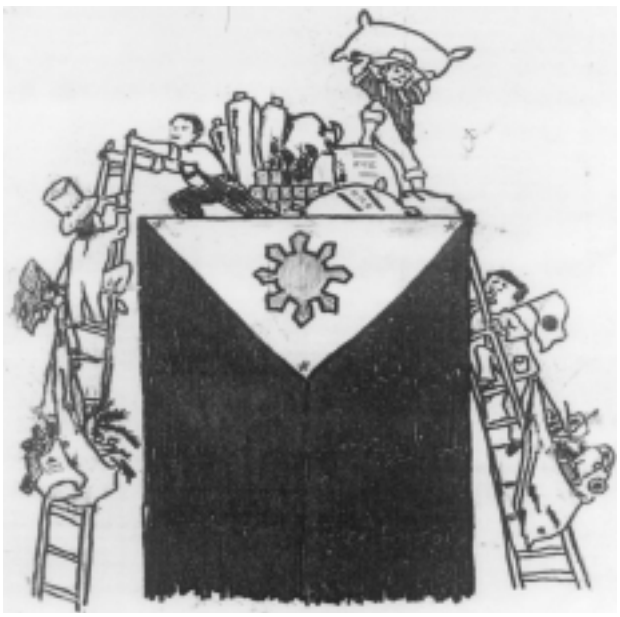
- Constant updating of knowledge in seed tech and related fields
- Enriched collection of indigenous seed practices, local/indigenous seed, herbarium
- Reading/learning materials and tools that had been developed or collected
  - Books, manuals, articles/papers technical notes, circulars/newsletter
  - Soundslides, slides sets, transparency sets
  - handouts
  - IK materials (e.g., water diviner, fire maker)
  - Videos, posters, calendars
  - Inspirational tapes/music, poems, sayings
  - Modified storyboard on seeds
- Information materials about organizations
- Expanded the network, made more friends
- Ideas on potential funders for participants
- Enriched formal courses and research/extension
  - IKS, general subject matter content, examples
  - Approaches
  - Field problems for research and extension
- Improved training/facilitation methodology and pedagogy
- Knowledge and skills in human resource development
- Bring in realities from the field into the academe

as the non-formal sector have, for certain, benefited from these gains in many ways. The formal courses have been infused with learnings from the training. Students, for example, are given activities exemplifying sharing and group learning. They are encouraged to apply their learnings through other avenues such as art (Figure 6). Some activities have been introduced to demonstrate concepts more actively (Figure 5, Appendix 14). Aside from conducting training the group also has been acting as an informal clearinghouse of information and learning resources on SA seed, genetic conservation, and other disciplines that are relevant to SA (Appendix 7). They maintain a mini-library for SA and seed-related subjects. The group's facility and services are extensively used by students, staff of the different units in campus and guests from various sectors, including farmers.

**Figure 6. Student learning expressed through art:**

**Modern agriculture vs. SA**


**Chemical/Factory Farming** **Natural/Organic Farming**



**Modern: Export/commercial and profit-oriented, import liberation, free trade.**

A list of features and/or criteria of a sustainable seed program has been detailed (Appendix 15) and such is considered to capture the group's learning in SA as applied to seed. The group is also able to define its strengths and weaknesses (Box 28). This exercise is important for the group's commitment to constant self-improvement.

**Box 28. Strengths and constraints of the seed short course and the group.**

**Strengths**

1. levelled off and trained core trainers/facilitators/resource persons
2. training facilitation experience (8 years)
3. technical support from other UPLB units, organizations (NGO, PO, GO) individuals
4. developed and accumulated learning and training materials
5. informal but functional network
6. sensitized and serious participants
7. documentation of the course
8. flexible curriculum and not funder-driven
9. good demand
10. put together heterogeneous audience, representing various sectors

**Constraints/limitations and items that can be improved**

1. limited operational expenses
2. high rate of turnover of personnel; small number of staff
3. underutilized documentation
4. resource persons still need more adapted, appropriate, effective learning materials including visual aids
5. resource persons need further improvement in pedagogical approach
6. more active networking especially with ex-participants
7. more active monitoring, evaluation and follow through of ex-participants
8. some participants are not in a position to effect major change in program
9. administrative difficulties e.g., disallowance's/or non-reimbursement of many, often unconventional expenses (photocopies, reprints, tokens, meals, transport)
10. much wider representation of participants, especially POs
11. need more time to deepen and process sharing of experiences
12. stronger commitment of participants to change seed-related endeavors and lifestyle

## Xb. Current Training Needs

The seed tech group hopes to continually improve its offering to be more relevant to current development needs (Box 29). A recent survey of the network which is composed of former participants and other individuals having similar or related interest, and from the feedback of the last short course, revealed varied needs in training, education, seed and SA (Boxes 29 and 30). The group will sort through these needs and come up with "doable" plans for the next few years. Foremost among the needs, however, is the availability of training materials (especially for farmer or on-site training), and SA-related publications (especially the how to's). Methodologies in community seedbanking, along with indigenous seed practices and sourcing are also commonly expressed needs.

## Box 29. Issues/items needed as expressed by the 1999 short course participants.

1. A need for a body that could commit to act as a "clearinghouse" on initiatives and needs related to seed, sustainable agriculture and seedbanking.
2. Sustain and keep active the network developed through the different short courses e.g. through a very loose newsletter.
3. A "reunion" or general assembly of all past participants, 2-3 years from now to keep the network alive, share experiences and sustain interest and initiatives generated through the course. It was considered to be a good and efficient way to assess the relevance and effectiveness of the course as well.
4. More in depth dicussion, and practicum and visits on farmer-based initiatives (training/extension, crop improvement/breeding, seedbanking/genetic conservation, seed production).
5. Filipinize/improve some more reading materials and discussions by resource persons as well as audio-visual materials such as videos and those of some resource persons.
6. Intensify and improve mechanism of seed exchange during the course.
7. More in-depth sharing of realities and experiences, as well as resolving unclear issues and topics.
8. More in-depth discussion of most or all topics, and even of other topics.
9. More focused discussion on only a few.
10. Have more on the ground examples.

## Box 30. Problems, constraints, needs related to seed and SA; to training and education on seed and SA.

*Input from ex-participants (1991-1999) and others in the network, gathered through a survey.*

Y Financial, budget, funding [for travel, implementation, (farmer) training or informal classes]
Y Lack of support from organization, political officials, administration
Y Lack of appreciation of IKS by some agencies
Y Dearth of equipment and materials related to seed and SA; can you provide a list for our procurement?
Y Popularization of training materials and methodologies
Y Limited staff; lack of competent personnel
Y Changeable program, focus
Y Lack of lecturers who are SA practitioners
Y Limited number of farms practicing SA (also SA projects)
Y Non-dedicated colleagues
Y Uncommitted participants
Y Students mostly come from below average bracket
Y Matching training schedule with farmer's availability
Y Decreasing number of NGO participants (because of limited support)
Y Language barrier (technical vs non technical; different dialects; not good in English and Tagalog)
Y SA book in Tagalog (Filipino) for farmers; for elementary school children
Y Farmer's culture, values and attitude (indifference) toward technology innovations
Y Farmer's ingrained belief on conventional system as the way to solve their problem; resistance to shift to MASIPAG varieties and IPM
Y Lack of (knowledge on) areas or sites that are SA
Y Lack of training materials (specimen, visual aids, references, handouts)
Y Lack of opportunity of participants to learn by doing; need more actual learning activities; need project sites for practicum, hands-on, exercise
Y Need to improve on training process
Y Slow adaptation because of other constraints (land, debt)
Y Post-training follow-up and monitoring
Y Projects are often packaged

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*Box 30 continued*

- Update on seed tech/SA national fora, references, materials available (especially those regularly published) initiatives, practices, Filipinized and laymanized documents (e.g., on rice breeding); updated manuals
- Documents/updates pros and cons on hybrid rice; biotech (genetic engineering)
- Reading materials related to SA or seed training/education (also useful for future research)
- Farmer adapted/popularized seed education/training module
- Attractive publications on SA practice/experiences periodically circulated especially to SA seminarians
- Visit our place and give suggestions, recommendation
- Seed samples and more literature handouts during training
- Development of a concise but comprehensive seed education module, popular in form for use by farmer-trainees (and trainor)
- Documentation of farmer's experiences in SA undertaking
- Follow-up training on SA; other activities (continuous SA awareness)
- Conduct a training on informal seed systems in the provinces (e.g. Batanes)
- Conduct a season long training with practicals and field trips
- Other seed propagation and processing techniques
- More IK on seed tech, especially on handling and storing seeds of indigenous species
- Packaging of organic seeds
- Peanut seed storage and protection from rats indigenous species
- Need to expose LGUs to SA
- Need for farmers to be self-sufficient in rice seeds
- Conduct more SA and seed training especially for POs rather than NGOs
- Hope for continued linkage between facilitators and PO participants
- More SA definition with illustrations for explaining to farmers who ask questions
- Follow up seminar for ex-participants for deepening
- Problem with non quality but expensive certified rice seeds
- Facilitating detoxification process of seeds
- Availability of: a) High quality peanut cultivars b) MASIPAG seeds
- What are SA compatible livelihood projects
- Seed health technology; pest and disease control for solanaceous crop
- Storage if oily seeds and recalcitrant seeds
- Wish to participate in the documentation of successful cases of biological conservation
- Conduct survey on new approaches in ethnobiology/biodiversity conservation
- Strengthen SA advocacy
- Give incentives/recognition to SA practitioners
- Balancing and blending formal and non-formal methods of seed conservation
- Stakeholders need to put into action resource conservation and rehabilitation
- Wish that more professors/scientists in UP realize the need for SA
- Open training to farmers; invite more agricultural technicians of LGU
- Have a distance education program
- Government support to SA initiatives
- Adapt SA curriculum in all (nationwide) agricultural schools
- Focused group discussions/sharing on SA and related issues, training and education
- Continue linkages with active SA practitioners, group
- Push through with congress (reunion)
- Seed industry still unable to meet demand for good quality seed
- How modern/hybrid varieties could co-exist with local cultivars when current government policy is to get away from indigenous/native ones in favor of HYVs
- Incompatibility of some government programs with SA
- SA for forestry
- SA supportive policy environment
- Establish a seed exchange activity among farmer groups
- Tie up with donors (NGO, tourism?) that advocate or promote SA

# XI. WHAT OTHERS COULD DO TO PROMOTE SA

While the group continues the pursuit of promoting SA through the seed, it is often confronted with the question "what could others do to help"? Focusing on education, the basic avenue why agriculture has become unsustainable, I would like to offer some insights on where one could possibly come in.

Students could at least realize that they are victims of a flawed education system. If they want to effect change in themselves and in others they should actively seek ways to learn more effectively and learn more relevant things outside the classroom. In the classroom they can develop the habits of questioning and learning how to learn. They should be critical and see how lessons can be applied to their own reality. They can start by reflecting on what the real problem is, their values and how they have been part of the problem. There are materials that detail how to save the earth or how to live ecologically and one could start with these (given in Literature Cited section). It is essential that they try to uncover their talent and interest and not get frustrated when one does not do well in the program one is currently in. For all we know, they may just be in the wrong field or are not sufficiently impassioned by the teacher or the curriculum. They could then try to imagine ways on how they could use their talent to promote SA, and reflect on the ways where they could make a real and positive difference to serve others. Sustainable agriculture is a way of life thus one can change by practicing SA starting with oneself and in one's own home. Students should get involved in activities that help change the world into a more ecological and equitable one. They also need to know what their basic rights are so they can pursue the type of education they want.

Teachers, researchers, extensionists, and administrators should also do what the students ought to do, they should be open to new ideas and reflect on their own values, development concept, framework and lifestyle. Reflecting upon the merits of self and mutual criticism could be helpful in this regard (Boxes 31 and 32). They should understand that the way they are now is a product of lifelong and most likely traditional schooling which is highly reductionist and western in orientation. They should always try to learn about new issues and current trends and try to match these with the goals of SA. They could reflect harder on how they have been part of the problem. They should be constantly engaged in learning because learning is a lifelong process. They should try to learn effective facilitation and alternative pedagogical approaches to effect true and relevant learning on the students. Administrators could allow more flexibility for activities which impact on SA. They should realize that SA is for them too, and that SA is not just a trend but can be given any name and the goals should still hold. They could then reflect how best they can help SA through their respective responsibilities.

Farmers could try to understand and be a bit more tolerant of the shortcomings of formal educators, while they themselves put more trust in their own knowledge, capacity to innovate and solve their own problems. They should feel confident that their practices are just as, or even more scientific (especially in the broader definition of science), and richer than those generated from formal research institutions. They could seek out those farmers or FOs/POs who are quite successful in farmer-to-farmer extension, training and other forms of non-formal education. They could also network with those non-formal organizations doing alternative or farmer-based genetic conservation, breeding, research and seed (and crop) production.

**Box 31. The spirit of self-criticism.**

"(Develop) the spirit of self-criticism; the ability of each person to make a specific analysis o his or her own work, to distinguish in it what is good from what is bad, to acknowledge our own errors and to discover the causes and the effects of these errors. To make self-criticism is not merely to say, 'Yes, I recognize my fault, my error and I ask forgiveness, while remaining ready soon to commit new faults, new errors. It is not pretending to be repentant of the evil one has done, while remaining convinced deep down that it is the others who do not understand. Still less is making self-criticism to make a ceremony so as to go on later with a clear conscience and carry on committing errors.

Self-criticism is an act of frankness, courage, comradeship and awareness of our responsibilities, a proof of our will to accomplish and to accomplish properly…To criticize oneself if to reconstruct oneself within oneself in order to serve better."

**Box 32. Self and mutual criticism.**

Amilcar Cabral, the founder of the PAIGC in Guinea Bissau, writes of the need for self and mutual criticism in any effective movement or political party.

Develop the spirit of criticism between leaders and members. "Give everyone at every level the opportunity to criticize, to give their opinion about the work and the behavior of the action of others. Accept criticism, wherever it comes from, as a contribution to improving the work…"

"Always remember that criticism is not to speak ill nor to engage in intrigues. Criticism is and should be the act of expressing an open, candid opinion in front of those concerned, on the basis of facts and in a spirit of fairness, to assess the thought and action. Criticism is to be constructive, to show proof of sincere interest in the work of others, for the improvement of that work.

"Combat severely the evil tongue, the obsession with intrigues, the 'so-and-so-says', unfair and unfounded criticism. To assess the thought and action of a person is not necessarily to speak ill of it. To speak highly, to praise, to encourage, to stimulate – this is also criticism. While we must always be watchful against conceit and personal pride, we must not stint praise to someone who deserve it…

"Derive a lesson from every mistake we make or which others make, in order to avoid making new mistakes, so that we do not fall into the follies into which others have already fallen. Criticizing a person does not mean putting oneself against the person, making a sacrifice in which the person is the victim: it is to show the person that we are all interested in the work, that we are all one and the same body…we must be capable of criticizing and of accepting criticism."

"But criticism must be complemented by self-criticism proof of our own willingness to help ourselves to improve our thoughts and our actions."

Cabral, Amilar
Unity and Struggle, p. 246

The general public has a role to play as well. They should realize that SA education should start early in life and family values and discipline is very important. More significantly, their contribution could be on "*living simply, so others may simply live*"

# XII. SUMMARY AND CONCLUSION

Alternative or development education philosophy and sustainable agriculture has permeated the psyche of only a few courses, programs, activities and staff in the university. Many of those from the technical field are unaware that there are alternative ways and should seek these for better teaching. They should realize that teachers are development agents themselves. Many have a development perspective that does not truly benefit the country's majority, which is the poor. Yet those who know and want to pursue the alternative route commonly feel at a loss and get uncomfortable dabbling with education principles and methodologies. If teachers are true to their mission, and that is to produce learners who are empowered to pursue their own education and ultimately apply it for national development, then learning alternative education is a must for them. Teachers should be role models and practice what they preach. Anything that they do, off- and in the classroom, always has a bearing on SA. Engaging in continuous learning is a fulfilling process and it becomes even more so if one would reflect on how best to become agents of development and change. Efforts of an educational institution should be directed towards a mass-oriented, nationalistic scientific education. These tasks are not easy given that habits are hard to break; they have been developed over a lifetime. Transformation likely takes time, but the process can also be fun in addition to being highly fulfilling.

Any technical field serves a master. So does science the way it is now. Those who are in the business of teaching such field, doing research towards its deepening or application, or doing extension to promote its product (i.e., technology), should realize the contribution they, or their fields have, to the current problems or solutions. Our group's realization and application of this realization has been in the area of seed. The seed is an instrument of change. We realized that the seed is not neutral and in the past has been highly pro-Green Revolution. The Green Revolution program is no longer defensible by any means. Those who defend or rationalize it could better reflect why they continue to do so.

The whole paradigm of seed technology/production underwent an overhaul with the adoption of SA as framework. The transformation did not happen overnight but the major force that pushed the group to that direction has been their conscience and the discomfort about how some things are. The question that had constantly guided the group is whether their seed program does really serve the resource-poor farmers who comprise the majority in the Philippines, and on how the group's actions, and lifestyle could impact on the ecology.

There is yet a lot to learn and a lot to do. It is hoped that the group's learning and their education initiatives would be translated beyond the knowledge and skills level and lead to attitudinal and behavioral changes in each member and their partners in development. One of the most effective ways the group found to effect conscientization among themselves and for their students and participants is through reflecting on some inspirational sayings. A portion of our group's collection is given in Box 33. These sayings transcend the brain and pierce the heart, the element one should target in transformation, especially for behavioral one, for as the Little Prince says, "***only through the heart one can see clearly; what is essential is invisible to the eye***" (Antoine de Saint Exupery).

**Box 33. Sayings for reflection; food for the soul.** *(Sample taken from the collection of the Seed Tech group)*

Attitudes are more important than facts.

*Karl Menninger*

It is not enough to be busy; so are the ants. The questions is: What are busy about?

*Henry David Thoreau*

The man who graduates today and stops learning tomorrow is uneducated the day after.

*Behold the turtle, he makes progress only when his neck is out.*

*James B. Conant*

YOU can't change the world, neither can I. But you can make a small change so can I. Many small changes make one BIG CHANGE. And the only effective change is from the heart.

Freedom does not give us the right to do as we please, but the liberty to do as we ought.

If you are not big enough to take criticisms, you are too small to be praised.

Education is not received. It is achieved.

Many can teach only a special few can reach.

Change your thoughts and change your world.

*Norman Vincent Peale*

*And the trouble is, if you don't risk anything, you risk even more.*

*Erica Jong*

Facts do not cease to exist because they are ignored.

*Aldous Huxley*

If you believe, no explanation is necessary. If you don't believe, no explanation is enough.

My basic principle is that you don't make decisions because they are easy; you don't make them because they are cheap; you don't make them because they are popular; you make them because they're RIGHT.

*Theodore Hesburgh*

Be the change you want to see in the world.

*Gandhi*

There is only on time when it is essential to awaken. The time is now.

*Buddha*

Don't keep searching for the truth, just let go of your opinions.

*Buddha*

To know the way and not practice is to be soup ladle in the pot and not taste the flavor of the soup.

*Buddha*

# XIII. LITERATURE CITED AND OTHER USEFUL REFERENCES


ADHIKARYA, R., and H. POSAMENTIER. 1987. Motivating farmers for action. How strategic multi-media campaigns can help. Deutsche Gesellschaft für Technikssche Zusammenarbeit (GTZ) GmbH, Federal Republic of Germany. 209 p.

ADRIAN, W., and J. BUKHALA. 1986. Improving university teaching and learning. Report on the evaluation of DSE Activities at Eastern and Southern African Universities, 1981-1985. German Foundation for International Development, Bonn 3. 50 p.

AGROFORESTRY SEEDS CIRCULAR No. 1. 1991; No. 2. 1992. No. 3. 1993. (P.G. Fernandez, ed.). Department of Agronomy, University of the Philippines Los Baños, College, Laguna.

ALBRECHT, H., H. BERGMANN, G. DIEDERICH, E. GROBER, V. HOFFMAN, P.KELLER, G. PAYR, and R.SULZER. 1990a. Rural development series. Agricultural extension. Volume 1. Basic concepts and methods. TZ-Verlagsgesellschaft mbH, Federal Republic of Germany. 267 p.

ALBRECHT, H., H. BERGMANN, G. DIEDERICH, E. GROBER, V. HOFFMAN, P. KELLER, G. PAYR, and R.SULZER. 1990b. Rural development series. Agricultural extension. Volume 2. Examples and background material. TZ-Verlagsgesellschaft mbH, Federal Republic of Germany. 446 p.

ALTIERI, M and C. FRANCIS. 1992. Incorporating agroecology into the conventional agricultural curriculum. American journal of alternative agriculture. 7(1-2): 89-93.

ANDOW, D.A. and K. HIDAKA. 1989. Experimental natural history of sustainable agriculture: syndromes of production. Agriculture, ecosystems and environment. 27: 447-462.

ANONYMOUS. The information implosion. Altars of Unhewn Stone. pp. 11-16.

APPLE, M.W. and L. WIES . 1986. Seeing education relationality: The stratification of culture and people in the sociology of school knowledge. Journal of education. 168(1): 7-33.

ARNOLD, R., K. GEIBLER, and M. PILNEI. 1986. What role does the teacher of professional education play as a mediator of qualifications and as a development worker in his own country? Deutsche Stiftung für International Entwicklung (DSE), or German Foundation for International Development, Food Agriculture Development Centre (ZEL), Mannheim, Germany. 246 p.

BAJAH, S., G. BUNYI, M. KNOTT, B. MATIRU, T. MULUSA, G. MURIUKI, P. MUTUNGA, J. NKUUHE, and D. WOLE. 1993. Teach your best. A handbook for university lecturer's. Deutsche Stiftung für Internationale Entwicklung (DSE). Bonn. Federal republic of Germany. 351 p.

BARKLEY, A.P. 1991. What skills do graduates need? NACTA Journal. March 1991. pp. 53 and 55.

BAUTISTA, O.K., R.R.C. ESPINO, H.L. VALMAYOR and J.B. SANGALANG. 1983. Introduction to tropical horticulture. Department of Horticulture, College of Agriculture, UPLB, Philippines. 348 p.

BERENDT, B., 1981. Improving teaching and learning in higher education. International Conference, 28 September-10 October 1981. Berlin West. German Foundation for International Development (DSE), Bonn 3, Federal Republic of Germany. 138 p.

BERENDT, B.. Improving teaching and learning in universities. Reading materials for staff development workshop in African countries. German Foundation for International Development (DSE). Bonn 3, Federal Republic of Germany. 177 p.

BERRY, W. 1984. The loss of the university. pp. 72-97 *(source untraceable).*

BHASIN, K. 1992. Participatory development demands participatory training. Journal Articles. 24(4): 5-15.

BHOLA, H.S, E. CHEN, D. GACHUHI, J. KAMAU, W. LAASER, B. MATIRU, K. MAZRUI, and J. MÜLLER. 1989. Handbook for designing and writing distance education materials. German Foundation for International Development (DSE), Education, Science and Documentation Centre, Bonn, Federal Republic of Germany. 175 p.

BIGGS, S. 1989. A multiple source of innovation model of agricultural research and technology promotion. Network Papers (new series). Agricultural Administration Unit Research and Extension Network. Overseas Development Institute (odi). Regent's College, Inner Circle, regent's Park, London. 72 p.

BIGGS, S. and J. FARRINGTON. 1991. Agricultural research and the rural poor: A review of social science analysis. Ottawa, Canada. International Development Research Centre. 139 p.

BISHOP, G., 1989. Alternative strategies for education. MACMILLAN Education Ltd., London and Basingstoke. 224 p.

BLATZ, C. V. 1992. The very idea of sustainability. Agriculture and human values. pp. 12-28.

BOHANNAN, P. 1983. The impact of cultural diversity on the spread of knowledge. pp 64-73. In: The optimum utilization of knowledge: making knowledge serve human betterment. Westview Press, Boulder, CO. USA.

BOHART, B., M. MANILOV, and T. SCHWARZ. 1997. Endangered education: how corporate polluters are attacking environmental education. The Center for Commercial-free Public Education, Oakland, CA, USA. 73 p.

BONTUYAN, P. 1980. The participatory moderation method. A primer. SIBAT. Philippines. 4 p.

BRIONES, A.M. 1995. . Farmer-based research and training in sustainable agriculture. Terminal report. U.P. Foundation. 23 p.

BRIONES, A., D. CARANDANG, S. CUEVAS and P.G. FERNANDEZ. 1995. Integration of sustainable agriculture in crop and soil science courses. Prepared for the UPLB-CA Faculty Conference on October 18-19, 1995. Tagaytay City.

BRIONES, A.M., E.B. CAYABAN Jr., P.R. VICENTE and R.B. ASPIRAS. Farmer-based research and training in sustainable agriculture. A project report. 5 p.

BROWN, L.D. and R. TANDON. 1983. Ideology and political economy in inquiry: action research and participatory research. The Journal of Applied Behavioral Science. 19(3): 277-293.

BRUSS, N. and D.P. MACEBO. 1985. Toward a pedagogy of the question: conversations with Paulo Freire. Journal of Education. 167(2): 7-21.

BUNCH, R., 1985. Two ears of corn. A guide to people-centered agricultural improvement. World Neighbors, Oklahoma City, Oklahoma, USA. 241 p.

CABRERA, M. ___. Ethical values related to 'sustainability'. 8 p.

CADI. 1993. Sustainable agriculture. CADI Information Packet. Philippines. 34 p.

CARUNCHO, E.S. 1996. Learn without fear. Sunday Inquirer. pp. 6-7.

CASTILLO, G.T. 1992. Sustainable agriculture "at home". UPLB seminar workshop on sustainable agriculture, National Crop Production Center, College, Laguna.

CECCARELLI, S. 1994. Specific adaptation and breeding for marginal conditions. Euphytica. 00:1-27.

CECCARELLI, S., S. GRANDO and R.H. BOOTH. 1995. International breeding programmes and resource-poor farmers: crop improvement in difficult environments. pp. 99-116. In: Participatory plant breeding. Proccedings of a workshop on participatory plant breeding, 26-69 July 1995. Wageningen. The Netherlands. IPGRI, Rome, Italy. 164 p.

CHAMBERS, R., 1992. Discussion paper 311. Rural appraisal: Rapid, relaxed and participatory. Institute of development studies at the University of Sussex, Brighton BN1 9RE, England. 90 p.

CHAMBERS, R. and B.P. GHILDYAL. 1985. Agricultural research for resource-poor-farmers: the farmer-first-and-last model. Agricultural Administration 8(6): 433-450.

CHATTERJEE, A. 1996. Seed selection and storage (1). Get together of trainers - No. 4. Cambodia. 13 p.

CHATTERJEE, A. 1996. Training and information exchange on sustainable agriculture. Get together of trainers - No. 3. Cambodia. 27 p.

CLAYFIELD, R., and SKYE OF EARTHCARE EDUCATION., 1995. The manual for teaching permaculture creatively. EarthCare Education, Maleny, Australia. 323 p.

COLLION, M. 1995. On building a partnership in Mali between farmers and researchers. Network Paper 54. Agricultural Administration (Research and Extension) Network.

CONACHER, J., 1986. Small-scale farming and horticulture. Some theories and strategies for organic growers. Organic Grower's Association, W.A. (Inc.), Australia. 75 p.

DE VILLA, T.L. 1990. Guro, guro, paano ba tayo nagtuturo? Teacher's Assistance Program (TAP), Vol. 10.

DEUTSCHE STIFTUNG FUR INTERNATIONALE ENTWICKLUNG (DSE). 1992. Report on the international workshop on "Exchange and training activities for the promotion of Self-Help Organizations (SHO)". DSE-Documentation Centre, Bonn 3, Federal Republic of Germany. 110 p.

DEUTSCHE STIFTUNG FUR INTERNATIONALE ENTWICKLUNG (DSE). 1987, 1988, 1989. Designing and writing of distance education materials for basic education and development training programmes. A Report on the 1987 Workshop Series. Deustshe Stiftung für Internationale Entwicklung (DSE)-Documentation Centre, Bonn 3, Federal Republic of Germany.. 56 p., 64 p. and 78 p. respectively.

DEYOUNG, A.J. 1985. Assessing 'Faculty Productivity' in colleges of education: penetration of the technical thesis into the status system of academe. Educational theory. 35(4): 411-421.

DHARMAWARDENA, G. 1997. Reincarnation, is it scientifically acceptable? Theosophical Digest, 4th Quarter. pp. 3-14.

DOLL, J.D. and C.A. FRANCIS. 1991. Participatory research and extension strategies for sustainable agriculture systems. Weed Technology. 6: 473-487.

DORONILA, M.L.C. 1991a. A critique of development education and training among Philippine NGOs. Education Forum 1(2-3): 2-7.

DORONILA, M.L.C. 1991b. Bringing back education to the mainstream of people's lives: the Education Forum Experience. Education Forum 1(1): 1-15.

DORONILA, M.L.C. 1991c. Pedagogy of development education. Curriculum Journal. 1(2-3) April-September 1991.

DORONILA, M.L.C. 1998. The emergence of schools of the people and the transformation of the Philippine education System. UP-CIDS Chronicle 3(1): 63-97.

DUHAYLUNGSOD, L. and I.V.C ONGKIKO. 1995. Integrating sustainable agriculture agenda in the new BSA curriculum: the social dimension. Discussion paper prepared for the UPLB-CA Faculty Conference, October 18-19, 1995, Tagaytay City, Philippines.

DUNN, W. N. Qualitative methodology. In Research in Progress. pp. 590-597.

ECKHARDT, W. 1981. Limits to knowledge. Knowledge creation, diffusion, utilization. 3(1): 61-81.

EDWARDS, M. 1989. The irrelevance of development studies. TWQII(1). pp 116-135.

ELLERBROCK, M.J. 1987. Campus academic reform movement: an analysis of problems, issues and solutions facing agricultural faculty. NACTA Journal. December 1987. pp. 21-24.

ELMORE, R. W. 1996. Our relationship with the ecosystem and its impact on sustainable agriculture. J. Prod. Agric. 9(1): 42-45.

ESTEVA, G. 1992. Development. SACHS, W. (ed.). The development dictionary. Zed. Books, U.K. pp. 1-25.

EYZAGUIRRE, P. and M. IWANAGA. 1996. Participatory plant breeding. Proccedings of a workshop on participatory plant breeding, 26-69 July 1995. Wageningen. The Netherlands. IPGRI, Rome, Italy. 164 p.

FAO. 1993. The integration of environmental and sustainable development themes into agricultural extension study review. 85p.

FAUNDEZ, A. and FREIRE, P., 1989. Learning to question. A pedagogy of liberation. WCC Publications, World Council of Churches, 150 route de Ferney, Switzerland. 142 p.

FERNANDEZ, M.E. 1988. Towards a participatory system approach: new demands on researchers and research methodologies. ILEIA, 4(3): 15-17.

FERNANDEZ, M.E. Participatory research with community–based farmers. Joining Farmer's Experiments. The Netherlands. pp. 77-92.

FERNANDEZ, P.G. 1992. A University seed program to promote sustainable agriculture in the Philippines. The Philippine Agriculturist 75(3-4): 91-118.

FERNANDEZ, P.G. 1994. Indigenous seed practices for sustainable agriculture. Indigenous Knowledge and Development Monitor 2(2): 9-12.

FERNANDEZ, P.G. 1994. Networking and information system for a university-based seed program. Proceedings of a follow-up Seminar/Workshop on Organization and Management of National Seed Programs. November 12-24, 1994, Aleppo Syria. pp. 83-86.

FERNANDEZ, P.G. 1994. Training in seed technology at the university using sustainable agriculture framework. Proceedings of a follow-up Seminar/ Workshop on Organization and Management of National Seed Programs. November 12-24, 1994, Aleppo Syria. pp. 87-90.

FERNANDEZ, P.G. 1999. Critical Elements for transformation of the BSA curriculum to sustainable agriculture. Paper presented at a national seminar-workshop on curriculum revision for the integration of sustainable agriculture concepts. May 26-29, 1999. VISCA, Baybay, Leyte.135 p.

FERNANDEZ, P.G and O.B. ZAMORA. 1995. Farmer-based variety development, maintenance multiplication and genetic conservation in the Philippines. pp. 285-298. In: Integrating Seed Systems for Annual Food Crops; Proceedings of a Workshop Held in Malang, Indonesia October 24-27, 1995. CGPRT Centre. Indonesia. 311 p.

Forest, Trees and People Newsletter No. 18. 1992. pp. 50-51

FRANCIS, C.A et al. 1994. Reshaping undergraduate and graduate education to include a whole systems emphasis. Extension and education materials for sustainable agriculture. 2: 348-352.

FRANCIS, C.A. and R. CRUSE. 1992. Sustainable agriculture: in-service training and classroom materials. ICM Workshop, Lincoln, Nebraska. March 16-18, 1992.

FRANCIS, C.A. 1985. Enough food: achieving food security through regenerating agriculture. Rodale Institute. Main Street, Emmaus, Pa. U.S.A. 20 p.

FRANCIS, C.A. 1990. Keynote presentation in conference: new developments in cropping systems and livestock management systems. Researching, teaching and extending a sustainable agriculture. University of Nebraska, Lincoln, Nebraska.

FRANCIS, C.A. 1990. Sustainable agriculture: myths and realities. Journal of Sustainable Agriculture. Haworth Press, Inc. 1(1): 97-106.

FRANCIS, C.A. 1992. Ethics of education. Bioscience 203: Bioethics. April 3, 1992. Agronomy Department, University of Nebraska, Lincoln, Nebraska.

FRANCIS, C.A. 1993. Designing a sustainable future. March 7, 1993.

FRANCIS, C.A. 1993. On-farm research is part of our education. Energy and sustainable agriculture program. Minnesota Department of Agriculture. pp. 107-109.

FRANCIS, C.A. 1994. Accountability of research and education to Nebraska agriculture. Center for Sustainable Agriculture Systems. University of Nebraska, Lincoln, Nebraska.

FRANCIS, C.A. and J.P. MADDEN. 1993. Designing the future: sustainable agriculture in the US Agriculture, ecosystems and environment, Elsevier Science Publisher B. V., Amsterdam. 46. pp. 123-134

FRANCIS, C.A., D. SANDER and A. MARTIN. 1987. Search for a sustainable agriculture: reduced inputs and increased profits. Crops and Soils Magazine. Cooperative Extension Service. Institute of Agriculture and natural Resources. University of Nebraska - Lincoln. pp.12-14

FRANCIS, C.A., C.A SHAPIRO and R.W. ELMORE 1992. Demystifying research: participatory on-farm validation experiments and demonstrations. Presented in NCR-170 Meeting, Cornhusker Hotel, Lincoln, Nebraska. July 9, 1992.

FRANZLUEBBERS, A.J. and C.A. FRANCIS. 1992. Farmer participation in research and extension: N fertilizer response in crop rotations. Journal of Sustainable Agriculture, 2(2): 9-30.

FREIRE, P., 1984. Pedagogy of the oppressed. The Continuum Publishing Corporation, 370 Lexington Avenue, New York, NY 10017, USA. 186 p.

FREIRE, P. and A. FAUNDEZ. 1989. Learning to question. A pedagogy of Liberation. WCC Publications, World Council of Churches, Switzerland. 142 p.

GUILD, P.B. 1983. How to involve learners in your lectures. Training. April 1983. pp. 43-45.

GUPTA, A.K., K.K PATEL, P.G. VIJAYA SHERRY CHAND, A.R. PASTAKIA, J. SUTHAR, S. SHUKLA, D. KORODIYA, V. CHAUHAN, A. RAVAL, C. SRINIVAS and R. SINHA. 1996. Participatory research: Will Koel hatch the crow's eggs?" New frontiers in participatory research and gender analysis. Proceedings of the International Seminar on participatory Research and Gender Analysis for Technology development. CGIR. pp. 209-243. September 9-14, 1996.

GUTERSON, D. 1990. When schools fail children: an English teacher educates his kids at home. Harper Magazine. November 1990. pp. 58-64.

HAGMANN, J., E. CHUMA., K. MURWIRA and M. CONNOLY. 1999. Putting process into practice: operationalising participatory extension. Network paper 94. Agricultural Research and Extension Network (AgREN). Overseas Development Institute. Portland House, Stag Place., London. 18 p.

HAVERKORT, B., W. HIEMSTRA, C. REIJNTJES and S. ESSERS. 1988. Strengthening farmer's capacity for technology development. ILEIA. 4(3): 3-7.

HEINRICH, G.M. and E. MODIAKGOTLA. 1993. Local institutional linkages in farming systems research and extension. Network paper 39. Agricultural Research and Extension Network. Overseas Development Institute. Regent's College, Inner Circle, Regent's Park, London. 16 p.

HILDERBRAND, M. The character and skills of the effective professor. Journal of Higher Education. pp. 41-50

HOPE, A. and S. TIMMEL. 1984. Training for transformation: A handbook for community workers. Books 1, 2, 3 and 4. Mambo Press. Gweru, Zimbabwe. 147 p., 181 p., 131 p. and 131 p. respectively.

IKERD, J.E. 1993. The question of good science. American Journal of Alternative Agriculture, 8(2): 91-92.

IIRR. 1998. Sustainable agriculture training of trainers July 6-31, 1998. International Institute of Rural Reconstruction. Y. C. James Yen Center. Silang, Cavite. Philippines. 170 p.

ILEIA. 1991. Preliminary project proposal. Comparative analyses of agricultural systems (COMPAS). An agroecological analyses of existing and historical agricultural systems: theory and praxis. November 1991. 15 p.

ILEIA. 1991. Learning for sustainable agriculture. Newsletter for low external input and sustainable agriculture. 7(3): 35 p.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT. 1995. Notes on participatory learning and action (Formerly RRA Notes). Number 24. Critical reflections from practice. PLA Notes. The Sustainable Agriculture Programme, IIED, 3 Endsleigh Street, London WC1H ODD, UK. 85 p.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT. 1998. Number 31. Participatory learning and action. Participatory monitoring and evaluation. PLA Notes. The Sustainable Agriculture Programme, IIED, 3 Endsleigh Street, London WC1H ODD, UK. 90 p.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT. 1998. Number 32. Participation, literacy and empowerment. PLA Notes. The Sustainable Agriculture Programme, IIED, 3 Endsleigh Street, London WC1H ODD, UK. 144 p.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT., 1996. Number 27. Notes on participatory learning and action (Formerly RRA Notes). Participation, Policy and Institutionalisation. PLA Notes. The Sustainable Agriculture Programme, IIED, 3 Endsleigh St., London WC1H ODD, UK. 91 p.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT., 1996. Number 26. Notes on participatory learning and action (Formerly RRA Notes). PLA Notes. The Sustainable Agriculture Programme, IIED, 3 Endsleigh St., London WC1H ODD, UK. 73 p.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT., 1997. A brief guide to training methods and approaches; Tips for trainers. Number 28. Notes on participatory learning and action (Formerly RRA Notes). PLA Notes. Methodological Complementarity. The Sustainable Agriculture Programme, IIED, 3 Endsleigh St., London WC1H ODD, UK. 102 p.

ISON, R.L. 1990. Teaching threatens sustainable agriculture. Gatekeeper Series No. 21. Sustainable Agriculture Programme of the International Institute for Environment and Development. 20 p

JENKINSON, G.M., J.L. EGGENS, S. LEESON, L.J. MARTIN, R.L. THOMAS and T.K. WARLEY. 1989. An integrated approach to teaching agriculture. J. Agron Educ. 18(1): 3-5.

JIGGINS, J., and H. DE ZEEUW. 1990. Participatory technology development for sustainable agriculture. In: Farming for the Future: an introduction to low-external-input and sustainable agriculture. Macmillan, Ileia, Netherlands. pp. 135-162.

KAPP, G.B. 1996. Development-oriented research - peasant rainforest management in the lowland tropics of Central America. Plant Research and Development. 43: 16-30.

KEVENHORSTER, P., 1988. Development through dialogue and training. Nomos Verglagsgesellschaft, Baden-Baden, Germany. 94 p.

KING, J.W. and C.A. FRANCIS. 1994. Extension and education materials for sustainable agriculture: Vol. 1 and 2. A project for the North Central Region Sustainable Agriculture Research and Education Agriculture in concert with the Environment. University of Nebraska. Lincoln, USA.

KNAUFT, D.A. 1998. Changing careers: from teacher to researcher. J. Agron. Educ. 17(2): 131-133.

KOLB, D.A. 1984. Experiential Learning. Experiences as the source of learning and development. Prentice Hall PTR. Englewood Cliffs. New Jersey. pp. 25-26.

KROMA, S. 1995. Popularizing science education in developing countries through indigenous knowledge. Indigenous Knowledge and Development Monitor. 3(3): 13-15, December 1995.

LACY, W.B. 1993. Can agricultural colleges meet the needs of sustainable agriculture? American Journal of Alternative Agriculture. 8(1): 40-45.

LIGHTFOOT, C. and F. OCADO. 1988. A Philippine case on participative technology development. ILEIA. 4(3): 18-19.

LOCKERETZ, W. 1991. Multidisciplinary research and sustainable agriculture. Biological agriculture and horticulture. Great Britain: A B Academic Publishers. 8: 101-122.

LOCKERETZ, W., and M.D. ANDERSON. 1993. Agricultural research alternatives. University of Nebraska Press, Lincoln, USA and London. 39 p.

LONG, D.G. 1990. Learner managed learning: the key to lifelong learning and development. Kogan Page, London/St. Martin's Press, New York, USA. 173 p.

MACRAE, R.J., S.B. HILL, J. HENNING and G.R. MEHUYS. 1989. Agricultural science and sustainable agriculture: a review of the existing scientific barriers to sustainable food production and potential solutions. Biological Agriculture and Horticulture 6:173-219. Academic Press, Great Britain.

MARBACH, W.D. and C. LESLIE. 1986. Why Johnny can't reason: 'critical thinking' displaces rote and drill. Newsweek. January 17, 1986. pp. 59.

MASLANKOWSKI, W., 1986. How can professional education be organized? German Foundation for International Development (DSE), Bonn 3, Federal Republic of Germany. 195 p.

METTRICK, H., 1993. Development oriented research in agriculture: An ICRA Textbook. ICRA- The International Centre for Development oriented Research in Agriculture, Wageningen, The Netherlands. 291 p.

MINNESOTA INSTITUTE FOR SUSTAINABLE AGRICULTURE (MISA). 1998. The monitoring tool box. Land Stewardship Project, 2200 Fourth Street, White Bear Lake, MN 55110. p.

MÖLLER, S., W. SCHLEGEL, B. SCHLEICH, and M. WALLENBORN. 1986. How can one promote the informal sector through vocational training? German Foundation for International Development (DSE), Bonn 3, Federal Republic of Germany. 249 p.

NATPRACHA, P., and A. STEPHENS. 1990. Taking hold of rural life. Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific (RAPA), Bangkok, Thailand. 107 p.

NATURE-INTERNATIONAL SECRETARIAT. 1995. Planning for conservation: Participatory rural appraisal for community based initiatives. World Wide Fund for Nature-International Secretariat, Avenue du Mont-Blanc, CH-1196 Gland, Switzerland. 57 p.

NORMAN, D. and E. MODIAKGOTLA. 1990. Ensuring farmer input into the research process within an institutional setting: The case of semi-arid Botswana. Network Paper 16. Agricultural Research and Extension Network. Overseas Development Institute. Regent's College, Inner Circle, Regent's Park, London. 16 p.

OCCIDENTAL, A.P. 1988. Participatory training scheme in area-based development strategy. Ph.D. Dissertation. UPLB. College, Laguna.

OCKELFORD, J.B. 1995. Partners in creative training: Training of trainer's in Cambodia. PACT Cambodia. March 1995.

OHLMER, B. Understanding farmer's decision making process and improving managerial assistance.

ORR, D.W. 1992. Place and pedagogy. Ecological literacy: education and the transition to a postmodern world. State University of New York Press. New York. U.S.A. pp. 125-131.

ORTNER, G.E., and K. SCHNEIDER. 1986. How do young people learn? How do adults learn? German Foundation for International Development (DSE), Bonn 3, Federal Republic of Germany. 273 p.

PATRIQUIN, D.G. Participatory on-farm research. Biology Department, Dalhousie University, Halifax, Nova Scotia.

PÄTZOLD, G., G. DREES and P. NOLTE. 1986. How do I behave correctly as a teacher? How do students behave? Deutsche Stiftung für International Entwicklung (DSE), German Foundation for International Development (DSE), Food Agriculture Development Centre (ZEL), Mannheim, Germany. 197 p.

PERLAS, N. Fact sheet on the second scientific revolution and the center for alternative development initiatives (CADI).

PICCIOTTO, R., 1992. Participatory development. Myths and dilemmas. The World Bank. 22 p.

PIMBERT, M.P. and J.N. PRETTY. 1995. Discussion Paper. Parks, people and professionals. Putting "participation" into protected area management. United Nations Research Institute for Social Development, Palais des Nations, Switzerland. 60 p.

PRAKASH, M.S. and G. ESTERA. Escaping education. Living as learning within grassroots cultures. 1998. Postfach 277. CH-300 Ben 15. Switzerland. (Published by Peter Lang).

PRETTY, J.N., I. GUIJT, J. THOMPSON, and I. SCOONES. 1995. IIED Participatory methodology series. Participatory learning & action. A trainer's guide. Sustainable Agriculture Programme, International Institute for Environment and Development, 3 Endsleigh St., London WC1H ODD, UK. 267 p.

PRETTY, J.N. 1996. Sustainability works. Our Planet. 8(4):19-22.

RAJASEKARAN, B. R.A. MARTIN, and D.M. WARREN. 1993. A framework for incorporating indigenous knowledge systems into agricultural extension organizations for sustainable agriculture development in India. Journal of international agricultural and extension education. 1(1): 25-31.

RAJASEKARAN, B., R.A. MARTIN, and D.M. WARREN. 1993. A framework for incorporating indigenous knowledge systems into agricultural extension. Indigenous Knowledge and Development Monitor. 1(3): 21-24.

RATHENBERG, E., and A. MIELCK. 1986. How does one develop teaching aids for professional education? Deutsche Stiftung für International Entwicklung (DSE), German Foundation for International Development (DSE), Food Agriculture Development Centre (ZEL), Mannheim, Germany. 199 p.

RICHARDS, G. 1991. The Philosophy of Gandhi: A study of his basic ideas. Billing and Sons LTD. Worcester. 178 p.

RIVERA, F.V. and G.E. SAMBRANO. 1990. Towards effective teaching. Revised ed. Publishers Inc. Philippines. 219 p.

ROGERS, A. and P. TAYLOR. 1998. Participatory curriculum development in agricultural education. A training guide. Food and Agriculture Organization of the United nations (FAO). Rome. 154 p.

ROTTENBURG, R. 1987. New approaches in university staff development. Training for efficiency in teaching, research and management. Deutsche Stiftung Fur Internationale Entwicklung, Bonn, Federal Republic of Germany. 253 p.

RUDEBJER, P.G., R.A. DEL CASTILLO, C.K. LAI, and B. VERBIST. 1998. Regional workshop on agroforestry education in southeast asia. March 23-27, 1998, University of the Philippines Los Baños. International Centre for Research in Agroforesty, Southeast Asia Regional Research Programme, Bogor, Indonesia. 63 p.

RUNKEL, J., 1986. How do I test and examine, and how do I give marks? Deutsche Stiftung für International Entwicklung (DSE), German Foundation for International Development (DSE), Food Agriculture Development Centre (ZEL), Mannheim, Germany. 222 p.

SCHERFF, J.S. 1991. The mother earth handbook: what you need to know and do – at home, in your community, and through your church – to help heal our planet now. Continuum. New York. 320 p.

SCHEIDEGGER, U. et al. 1989. Linking formal R and D to indigenous systems: A User-oriented potato seed programme for Peru. Network Paper 10. Agricultural Administration (Research and Extension) Network.

SCHIRMER, A. 1982. Approaches to problem analysis and decision making. Deutsche Stiftung für International Entwicklung (DSE), German Foundation for International Development (DSE), Food Agriculture Development Centre (ZEL), Mannheim, Germany. 119 p.

SCHOENFELD, E. 1986. How are training institutions to be planned? Deutsche Stiftung für International Entwicklung (DSE), German Foundation for International Development (DSE), Food Agriculture Development Centre (ZEL), Mannheim, Germany. 225 p.

SCHON, D.A. 1983. Education for reflection-in-action: an alternative to the positivist epistemology of practice. The optimum utilization of knowledge: making knowledge serve human betterment. Westview Press, Boulder, CO., USA. pp. 314-331.

SEARCA. 1997. Activity Guide. Sustainable agriculture for the uplands training manual. 39 p.

SEARCA. 1997. Module 1: Issues, trends, concepts and principles of sustainable development and sustainable agriculture. Sustainable agriculture for the uplands training manual. SEARCA. 67 p.

SEARCA. 1997. Module 2: Sustainable agriculture technologies, strategies and approaches for the uplands. Sustainable agriculture for the uplands training manual. SEARCA. 80 p.

SEARCA. 1997. Module 3: Practicum/application of sustainable agriculture technologies, strategies and approaches. Sustainable agriculture for the uplands training manual. SEARCA. 29 p.

SEARCA. 1997. Module 4: Sustainable agriculture project development and diffusion. Sustainable agriculture for the uplands training manual. SEARCA. 78 p.

SPERLING, L., M.E. LOEVINSOHN and B. NTABOMVURAS. 1993. Rethinking the farmer's role in plant breeding: local bean experts and on-station selection in Rwanda. Expl. Agric., Great Britain. 29: 509-519.

STEPHENS, A. and K. PUTMAN. 1990. Participatory monitoring and evaluation: Handbookfor training field workers. Regional Office for Asia and the Pacific (RAPA). Food and Agriculture Organization of the United nations. Craftsman Press. Bangkok.51 p.

STICHTING EUROPEAN HIGHER AGRICULTURAL EDUCATION., 1995. European journal of agricultural education and extension. Vols. 1,2,3 and 5. Stichting European Higher Agricultural Education, The Netherlands.

SUSTAINABLE AGRICULTURE NEWSLETTER 2(3). 1990. Agroforestry seeds. P.G. Fernandez (guest ed.)

TAYLOR, P. 1999. Through the grassroots towards the trees-exploring participatory curriculum development in forestry education in Viet Nam. Paper presented at the First General Meeting of the Southeast Asia Network for Agroforestry Education (SEANAFE). 26-28 April 1999. UPLB, Los Baños. The Philippines. 17 p.

TECHNICAL PANEL FOR AGRICULTURAL EDUCATION. Minimum standards for bachelor of agricultural technology. MEC Order No. 24, S. 1981. Technical panel for agricultural education, Bureau of Higher Education, Ministry of Education and Culture. 33 p.

THE ECONOMIST. Teaching Spires. August 24, 1996. p. 14.

THIAGARAJAN, S. 1978. Games for unlecturing. Educational Lecturing. October, 1978. pp. 44-45.

ULLRICH, G.J., U. KRAAPPITZ, and E. GOHL. 1991. Participatory approaches for cooperative group events. Basic concepts, case study, practical tips. Deutsche Stiftung für International Entwicklung (DSE), German Foundation for International Development (DSE), Food Agriculture Development Centre (ZEL). 77 p.

UMALI, A.A. "Dialogic and participatory approach in conveying information on seed technology at high school students in Quezon province, The modified storyboard technique". Special problem. Institute of Development Communication, UP Los Baños, 1994.

UNIVERSITY OF WISCONSIN CENTER FOR INTEGRATED AGRICULTURAL SYSTEMS. 1991. Toward a sustainable agriculture: A teacher's guide. University of Winsconsin Center for Integrated Agricultural Systems, 240 Ag Hall, Madison, WI., USA. 150 p.

VAN DEN BAN, A.W., and H.S. HAWKINS. 1996. Agricultural extension. Second edition. Blackwell Science Ltd., Commerce Place, 350 Main St., Malden, U.S.A. 291 p.

VERZOLA, R. (ed.). 1999. Society, ecology and transformation; a program for transforming Philippine society based on the green worldview. Philippine Greens. Quezon City, Philippines. 85 p.

VSO, IIRR and PEPE., 1998. Creative training: A user's guide. Voluntary service overseas, Quezon City, Philippines; International Institute of Rural Reconstruction, Silang, Cavite, Philippines; and Popular Education for People's Empowerment, Quezon City, Philippines. 211 p.

Webster's encyclopedic unabridged dictionary of the english language. Portland House – New York. 2078 p.

WEIL, S.W. and I. McGILL. 1989. Making sense of experiential learning: diversity in theory and practice. The Society for Research into Higher Education and Open University Press. Celtic Court, Balmoor, Buckingham. 280 p.

WHITLOCK, B.W. 1986. That college professors are liberal. Educational myths I have known and loved. Schocken Books. New York. pp. 47-50.

WIGGINS, G. 1989. The futility of trying to teach everything of importance. Educational Leadership. November 1989. pp 44-59.

WILD, R. 1993. The earth care annual 1993. National Wildlife Federation. Rodale Press, Emmaus, Pennsylvania. 242 p.

WITCOMBE, J.R. 1995. Farmer participation in varietal selection and breeding in India and Nepal. Rice Research Seminar. April 27, 1995.

WITCOMBE, J., D. VIRK and J. FARRINGTON. 1998. Seeds of choice:making the most of new varieties for small farmers. Intermediate technology Publications.Ltd. London. 271 p.

WORLD WIDE FUND FOR NATURE-INTERNATIONAL SECRETARIAT. 1995. Planning for conservation: Participatory rural appraisal for community based initiatives. World Wide Fund for Nature-International Secretariat, Avenue du Mont-Blanc, Switzerland. 57 p.

ZAMORA, A.G.B. 1994. Raw data collected and analyzed for the research sensitizing trainors to their "personal models" of training in seed technology and sustainable agriculture: the experience of the Seed Science and Technology Division, U.P. Los Baños. Special problem. Institute of Development Communication. UP Los Baños. 1994.

ZAMORA, A.G.B. 1994. Sensitizing trainors to their "personal models" of training in seed technology and sustainable agriculture: the experience of the Seed Science and Technology Division, U.P. Los Baños. Institute of Development Communication. UP Los Baños. 1994.

ZAMORA, O.B and P.G. FERNANDEZ. 1988. Views on the state of seed education. pp. 92-96. In: Proceedings of the seminar workshop on the prospect and development of a national vegetable seed program. UPLB, College, Laguna, Philippines.

ZAMORA, O.B. and B.S. SUMAYAO, 1999. Integrating sustainable agriculture in the BSA Curriculum. The UPLB College of Agriculture Experience. UPLB-CA, SEARCA, SANE-Asia. College, Laguna.

ZAMORA, O. B. 1998. The sustainable agriculture framework for Tabang, Mindanao II. Presented to the Executive committee of the Tabang, Mindanao. Makati. October 1998.

ZAMORA, O.B. (ed.). 1999. Integrating sustainable agriculture in the curriculum of agricultural colleges and universities in the Philippines. Sourcebook. SEARCA, UPLB, SANE, College, Laguna. 51 p.

ZAMORA, O.B. 1999. The sustainable agriculture imperative for food security. Central Bank Professional Chair lecture delivered on July 6, 1999 at the Department of Agronomy, UPLB-CA. 79 p.

ZAMORA, O.B. 1999. Sustainable Agriculture: the framework, misconceptions, myths,and barriers to adoption. Paper presented at the National Seminar-Workshop on "Curriculum Revision for the Integration of Sustainable Agriculture Concept" held at the Convention Center, ViSCA, Baybay, Leyte. 17 p.

## APPENDIX 1. Glossary of terms related to training, education and sustainable agriculture and relevant to the Professorial Chair Lecture on "Alternative Seed Training and Education for Sustainable Agriculture.

**Andragogy -** is a problem-centred education. It is geared to particular developmental cycles through which the individual is passing, what is being sought are solutions to problems currently being faced or about to be faced. Often the person may not look for answers to such problems but rather a way of confronting and dealing with them. They are looking not for content but for process. Andragogic approach deals with the whole concept of learning not from the point of view that says "certain subjects must passed" but from the perspective of saying, "there are certain problems or issues that must be dealt with". It is an applied knowledge, what learner managed learning is all about is encouraging us to seek out the knowledge that we need as we progress through life and to open our minds to the potential of formal and informal learning occurring from every experience (Long,1990).

**Assessment -** a process of measuring, of collecting data rather than valuing. It tends to be quantitative, while evaluation is both quantitative and qualitative. Assessment provides the material on which the value judgements of evaluation can be based (Rogers et al, 1998).

**Contextualized -** in education, when it begins from where the learner is. Furthermore, it also acknowledges that much of the efforts in upland development is deeply rooted in the local context and the local ecology (SEARCA, 1997).

**Development -** (1) improvement of both the quality of life and standard of living by addressing people's basic needs: increasing productivity and ensuring equitable distribution, improving services for the well-being of all, reducing drudgery through appropriate technology, increasing choices and opportunities for the release of creative potential, particularly of the underprivileged; is a process of change. It involves improvement in factors which affect the standard of living and quality of life of the people (Natpracha et al, 1990). (2) in education, it is viewed as a process of human development, a process of social transformation in which man is both the subject and the object, and in which he participates at all levels of decision-making. Self-reliance is both a means and an end in this process. It is a process which starts with the release of creative energy of man, assumes equal access to and a rational use of resources by the poor and vulnerable groups, tends to eliminate the difference between the mental and manual labour and uses the full range of technological choices available from other sources properly adapted. This kind of development is not only more humane but also represents a new man, nature, technology mix. In the participatory process which results in growth, human development and equity are not trade-offs (Doronila, 1998). (3) in plants, it is the process of growth and differentiation of individual cells into recognizable tissues, organs, and organisms (Bautista, 1983). (4) in the North, it is perceived in terms of a high and constant economic growth, high gross national product (GNP) resulting from the exploitation of natural resources for the accumulation of wealth (FOREST, TREES, AND PEOPLE NEWSLETTER NO. 18). (5) in an indigenous culture, means well-being not only of the individual person but also the world around him. For example, agriculture development means the ability to produce enough food. This endeavor becomes the central point around which other complimentary activities are carried out, such as social organization, production organization, religion etc. All of these activities have a reciprocal relationship that implies a constant give and take in the search of harmony of balance for "well-being" (FOREST, TREES, AND PEOPLE NEWSLETTER NO. 18).

**Economic indicators -** are used to measure changes in the economic status of the village community or family. Measurement of financial status: amount of debts, capital investment, amount of cash savings, access to institutional credit; ownership of assets: number of buffaloes, size of land holdings, number of vehicles per farm, amount of capital investment; income: average income, monthly sales of grain or of handicraft of production, wage employment, sale of capital, remittances from children; production: rate of livestock reproduction, productivity per unit, yield per hectare (weight or volume); mechanization: number of tractors, electrical

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appliances (e.g. milking machines) number of employees displaced by mechanization, hours of manual work requirement; new modern technologies: percentage using agricultural credit to purchase modern technology, number of farmers using feed concentrates for livestock production, or using new tree species, amount of mineral fertilizer used per hectare, number of families using chemical pest control methods; labour and employment: number migrated out for work, by gender and age groups, number of hired labourers, number of adults employed, proportion of labour unskilled, agriculture labour wage level, proportion of workers on contract or piece rates, by gender (Natpracha et al, 1990).

**Environment indicators** - are used to measure environmental changes. Measurement of deforestation: ratio of forest and cultivable land, depth of topsoil, incidence of flash floods and desertification; water pollution: amount of oxygen (in water), amount of toxic pollutants; air pollution: amount of lead oxide in the air, rate of respiratory diseases; coastal ecosystem: rate of mangrove destruction, depletion of aquatic resources; environmental awareness and practices: amount and type of material recycled, conservation behavior (e.g. planting trees), making availability and access to environmental education materials, integration of environmental concerns in the local festivals areas of forest encroachment on natural forests; reafforestation: number of land under community reafforestation, number of organizations involved in reafforestation activities, number of villagers planting fruit trees per year (Natpracha et al, 1990).

**Evaluation** - as applied to the curriculum, as its name suggests, examine the "values" of the curriculum being used, including the content of the learning ("what knowledge is worthwhile?") and the aims (" what should this programme of education and training be achieving?"). It attempts to look at what the curriculum is worth to those who are involved in its development, and how well it is working. It is a systematic process of collecting information for and about a training activity, which can then be used for guiding decision making and for assessing the relevance and effectiveness of various training components. It is also used to determine the immediate impact of the activity. It is a part of the process of the transformation of knowledge, skills, and attitudes, which is education and training. There are two main focuses to evaluation. The first (Goal Achievement) asks whether the goals of the curriculum, the learning objectives, have been achieved, and what learning has taken place and how. The second (Impact) asks what difference this has made to the learners and to their lives, their work and to their relationships to others (Rogers et al, 1998).

**Evocative** - creative; in education, when it explores methods that encourage the learners to share their experiences and develop creativity in identifying solutions to the problems they encounter (SEARCA, 1997).

**Experiential** - (1) in sustainable agriculture, it is a process of learning and not the imposition of a simple model or package. As conditions and knowledge change, farmers and local communities must be able to, and allowed to change (Zamora, 1998). (2) in education, it builds on the learner's life experiences or provides the learners with a common set of experiences to start from (SEARCA, 1997). (3) in education and learning as a theory, it rests on a different philosophical and epistemological base from behaviorist theories of learning and idealist educational approaches. It proceeds from a different set of assumptions. Ideas are not fixed and immutable elements of thought but are formed and re-formed through experience. It offers the foundation for an approach to education and learning as a lifelong process that is soundly based in intellectual traditions of social psychology, philosophy, and cognitive psychology. The experiential learning model pursues a framework for examining and strengthening the critical linkages among education, work, and personal development. It offers a system of competencies for describing job demands and corresponding educational objectives and emphasizes the critical linkages that can be developed between the classroom and the "real world" with experiential learning methods. It pictures the workplace as a learning environment that can enhance and supplement formal education and can foster personal development through meaningful work and career-development opportunities. And it stresses the role of formal education in lifelong learning and the development of individuals to their full potential as citizens, family members and human beings (Kolb,1984) (4) learning experience which arises from first of all undergoing a particular experience then, as a result of reflecting upon that experience,

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extrapolating learning from it. (5) is a method involving a reasonable degree of risk. It assumes that the trainer, teacher, or professor is able to operate as a facilitator in the learning process and that, if experience goes other than planned, he or she will be able to cope with changes in the envisaged situation. If the experiential learning is to be used, the facilitator needs extensive training in the process and must be completely familiar with all aspects of the material being used (Long, 1990).

**Flexible** - in sustainable agriculture, it is not prescriptive of a defined set of practices, methods, techniques/technologies or policies that would restrict the options of the farmers. It also recognizes location specificity (Zamora, 1998).

**Formal education** - is basically reproductive in both form and content. It is designed to transmit received and "completed" knowledge so that students can reproduce it in the same form for the maintenance of the existing social order. As such, it makes use of a pedagogy derived mainly from the tradition of John Locke which assumes that the learner's mind is a *tabula rasa*, a blank sheet to be filled with prescribed ideas and orientations. For this to be done with ease and dispatch, existing knowledge must be fragmented into well-defined categories (disciplines or subject areas) and not allowed to come into fresh combinations with one another in order to obviate the possibility of producing new knowledge that could challenge the meanings, explanations and justifications of the status quo. It is mainly concerned with the formal structuring of consciousness (Bernstein, 1975) through the standard components of formal schooling, namely, curriculum, pedagogy and evaluation. Because these components are carried out in the context of formal or planned educational relationships mediated by a central administrative structure, there is always the double tendency of homogenization (standardization) and abstraction from the concrete milieu of people's lives (Doronila, 1991).

**Functional literacy** - a range of skills and competencies – cognitive, affective and behavioral – which enables individuals to live and work as human persons, develop their potential, make critical and informed decisions, and function effectively in society within the context of their environment and that of the wider community (local, regional, national, global) in order to improve the quality of their life and that of society (Doronila, 1998).

**Gender-sensitive** - in education, when it recognizes and challenges the stereotype gender roles and relations in the learning environment and in upland development (SEARCA, 1997).

**Indicators** - provide a standard against which to measure changes brought about by project activities. They are determined on the basis of project objectives (Natpracha et al, 1990).

**Indigenous learning** - the acquisition of knowledge and skills in a way that is part of the culture. This can be knowledge and skills that are: new to the culture concerned and come from outside, new and originate inside the culture, present in and passed on with the culture. It is learning without intervention (ILEIA, 1991).

**Learning** - the process whereby knowledge is created through the transformation of experience (Kolb, 1984).

**Lecture** - an organized verbal presentation of subject matter often augmented by visual aids. According to Bligh (1972), it is a period of more or less uninterrupted talk from a teacher. Percival and Ellington (1984) who state that a lecture is a "didactic instructional method, involving one way communication from the active presenter to the more or less passive audience". Perhaps unkindly we should also include the student who described a lecture as an "occasion to sleep whilst someone talks" (Bajah, 1993).

**Modified storyboard** - perceived as a potential means of making lectures dialogic, participatory and activity-oriented. The modified storyboard is a set of drawings and illustrations, in this study, depicting various farm practices in seed technology. It was prepared based on the information taken from existing literature and actual practices performed by farmers. The modified storyboard is used to set the informal, casual tone of lecture. Through these, the

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audiences are able to relate to their own knowledge and practices and learn new practices as well from existing literature. It is set of visuals and illustration which combined the strength of storytelling and the use of visuals not just to supplement lecture but to make the participants aware of the situation, analyze it and increase participation and not depending solely in the information conveyed by the lecturer. It is in this context that the study assumes significance (Umali, 1994)

**Nationalist education -** fosters in Filipinos an awareness of their own colonial consciousness, an understanding of the concrete Philippine conditions in which the struggle for sovereignty and democracy is being carried out, and a commitment to be deeply involved in the process of chancing these conditions (Doronila, 1991)

**Non-formal education -** takes place within a context of immediate and meaningful action, work, and use. Provides experiences for which there is practical use. Learning is part of normal living, without the apparatus and procedures of formal schools. Learning is so natural one is hardly aware that it is taking place (Bishop, 1989).

**Paradigm -** (1) a coherent and mutually supporting pattern of concepts, values, methods and action (Ison, 1990) (2) a narrative passage in the Gospels that illustrates a saying of Jesus and represents one of the literary patterns distinguished by form of criticism. Also called model of thinking or organization (WEBSTER).

**Participation -** (1) is a process by which people become involved at all stages in their own development, studying their own situation and making decisions in research, planning, implementing and managing, monitoring and evaluating, and deciding on the distribution of benefits to ensure equitable sharing (Natpracha et al, 1990). (2) means different things to different people and in different circumstances. For some projects, participation simply means that people attend the project's activities. In most cases, it means that other people are consulted. In the most fully developed forms of participation, the group of people involved controls some or all of the processes (Rogers et al, 1998).

**Participatory -** (1) in sustainable agriculture, it views farmers as active participants (rather than passive targets, beneficiaries, end-users or clients) in the learning process, planning, implementation and monitoring and evaluation of the development projects. It views that informal innovations by farmers/partners are not haphazard unscientific processes but are results of systematic observation, experimentation and adaption. It incorporates recent innovations that may originate from scientists, farmers, or both. It also relies heavily on the continuous innovation by farmers and local communities (Zamora, 1998). (2) in education, when it recognizes that learning is a two-way process between the learner and the educator, and between the learners themselves. Therefore, the learners need to be involved in creating the educational process and outcomes (SEARCA, 1997).

**Participatory moderation method -** is a way of systematizing the "storm" of ideas and processing them into coherent and easily understandable form. It is based on the general principle of learning by participating. The higher the participation, the greater the learning. It also disregards hierarchical and top to bottom approaches. Democratic as it is, it believes that nobody knows everything but everybody knows something (THE PARTICIPATORY MODERATION METHOD).

**Pedagogy -** (1) method of knowledge transmission (Doronila, 1999). (2) bases itself on a subject oriented approach to learning. In this situation there are certain subjects that must be taught and in which the learner must gain competence. Accordingly results are achieved in relation to subjects studied and either passed or failed. Such an approach is appropriate in early formal learning experiences and in some subject areas. It is futile to seek involvement and participation from any person until they know enough about the subject or task in order to know even what questions to ask. There is a sense in which some form of pedagogic approach is necessary in most educational training situations (Long, 1990).

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**People-oriented education -** based on the needs of the majority and is expressive of their struggles and aspirations. It is one that is democratic, participatory and accessible to the greater majority of people. It reaches out to people in other lands, linking their national struggles with the desire of people everywhere to be free, to be self-sufficient and to live in peace and dignity (Doronila, 1991)

**Political indicators -** are used in measuring political changes or changes in power structures. Measurement of control over factors of production: access to subsidized agricultural inputs, control over irrigated water resources, percentage under various land tenure systems, farmer's representation in political decision making bodies; distribution of benefits: number of families below the poverty line, access to public facilities, by caste and gender; leadership: number of local leaders trained in scientific agriculture, number of government officials per population, representation of women on committees, control over local organizations; social control: number of de-facto marriages per population, number of forced marriages per year, percentage of men in the police/army, number of people in prison (Natpracha et al, 1990).

**Proactive -** in sustainable agriculture, it is forward looking; concern is not only for short-term benefits but also long term sustainability. It is also being dynamic and innovative (Zamora, 1998).

**Scientific -** in education, when it allows the learner to understand and value both indigenous and other forms of knowledge. This includes developing a critical and analytical attitude towards all forms of knowledge and the techniques or practices they encourage (SEARCA, 1997).

**Scientific education -** pursues and encourages creativeness, develops critical thinking, and fosters the development of science and technology in the service of Filipinos (SEARCA, 1997).

**Social indicators -** are used to measure changes in the social status of the village group. Measurement of standard of living: access to potable water supply, transportation, type of house and household sanitation facilities, access to recreation facilities; poverty: percentage of rural landless, unemployment rate, percentage of homeless families, proportion of female headed households, malnutrition rates in children under 5 years; health status: nutritional status (e.g. weight for age), incidence of sickness throughout one year, immunization rate, enforcement of toxic pesticide laws, level of public sanitary facilities; education: percentage of children 5-15 years in school, literacy rate, access to adult education programme, average number of years of formal schooling among adults, ratio of agricultural extension workers to farmers, ratio of teachers to children of school age; gender equality: division of labour by hours of work by gender, mortality rate for female/male children, proportion of women in decision making and management committees, male/female wage differentials, percentage of females in farmer's group or agricultural cooperatives and percentage at decision-making/management levels; attitudes toward new practices: percentage of adopters of family planning among fertile couples, rate of couples who marry outside the caste, percentage of women elected to office (Natpracha et al, 1990)

**Sustainable agriculture -** is a method, practice or philosophy that is economically viable, ecologically sound, socially just and humane, culturally acceptable, and based on w/holistic (integrative) science ( Fernandez ,1992)

**Training -** it may be viewed as a basic human need enabling individuals to acquire essential knowledge, skills and attitudes for effective participation in the implementation of a vast array of development programs. It must be used not merely as a tool for implementation but also as a means to raise the level of participation throughout the entire development process. There is an important conceptual distinction between participatory training and training programs to foster participation in the development process. Participatory training focuses attention on the final outcomes or products of development activities and on the involvement of the trainee in the entire training process. Being process and people-oriented, it is concerned with the on-going growth and improvement individually and collectively; whereas, training for participation enables the trainee to participate in development programs/activities due to his learnings gained from the training (Occidental, 1988).

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**Training system -** is a complex process composed of three interrelated and interdependent subsystems. The interrelationship of the three subsystems: pre-training, during-training, and post-training are operationalized in terms of functions. So that program planning which is the major function of during-training depends on the input of needs identification and assessment of the pre-training. Program implementation, a function of post-training, gets through only after the needs identification and needs assessment of pre-training. Program implementation, a function of post-training, gets through only after the needs identification and needs assessment of pre-training and program planning of the during-training. Evaluation albeit a major function of the post-training is also a critical operation interwoven at every stage of the training system. Evaluation is not just summary activity of successes or failures to be performed upon completion of a course because both process and final outcomes are equally important to maintain and sustain a functional training process. Hence, evaluation results serve again as inputs to the pre-training if the system will have to continue to exist (Occidental, 1988).

## APPENDIX 2. Documentation of the open forum section of the professorial chair lecture on "Alternative Seed Training and Education for Sustainable Agriculture". Additional answers are given herein for further elaboration.

**Question 1:** A semblance of the approach you presented is also done in our IPM training (e.g., being participatory, experiential). Certain assumptions should be in place at the start for this kind of training. Participants should have prior experience, otherwise the process becomes dragging. A lot of time could also be spent on contextualizing (e.g., in processing of learnings according to the realities of the participants, the ecosystem, socio-economic setting). Our experience is that the more educated you are, the less effective you will be in facilititating the process since you would tend to use your own paradigm. It would be better that facilitators are not experienced on the subject matter. How do you go about doing your processing of participant learnings/ knowledge gained? (Dean Rey Velasco, UPLB-CA)

**Answer:** *The processing of learning,, the contextualization or the overall facilitation we do by ourselves but mostly with the assistance of invited NGO partner. We have learned a lot about facilitation over the years but still do not feel very confident to do it on our own. The participants have very varied background: educational attainment, sectoral representation, responsibilities, experiences, values and framework, that it is indeed a tremendous challenge to keep them from fighting with each other. This year we have 34 participants and facilitation and drawing out of leanings had been very challenging. Given our very limited number of staff who are also resource persons themselves, we feel we cannot do everything by ourselves…or we will "malfunction" even before the course is over. We also occasionally request some of the participants, especially if they are NGOs, to help out in facilitation. We use the different feedback mechanisms (e.g., reflection sessions, action planning, mood barometers, "freedom" boards), as well as the daily documentation, to determine whether there is a need for readjustments such as conducting special sessions (one-on-one, sometimes) just to level off again or to draw out more experiences and learnings.. The fine-tuning of the curriculum thus continues up to the end of the program. '*

**Question 2:** A facilitator should not be one with good technical background for other reasons. This will make participants insecure about their own ideas (i.e., being unacceptable to others). This can also make the discussion too technical. Both can lead to inhibited participants Experts are in general poor facilitators. How would you then reconcile this with your model of a good teacher: both as an expert and a good facilitator? (Dean Velasco)

**Answer**: *They are not mutually exclusive. In fact, in situations where resources are limited to get external facilitators, a teacher has to be the facilitator himself. A teacher who is involved in non-formal education can use his experience there to apply in one's formal classes. On the other hand, he could also use his knowledge and skills in formal education in training. There is now a growing recognition of the blurring boundaries between formal and non-formal education. Given the many problems in formal education, shifts in formal pedagogy becomes mandatory. Teachers, therefore, who are supposedly experts in technical field should learn effective facilitation. Facilitating, like teaching, can be learned. In our present system it should be given equal emphasis, since one cannot do without the other. Most of the resources on this are with the NGOs and POs. What is called for now is a teacher who is not only technically competent but also skillful in alternative pedagogy and human relations. The process of learning about facilitation, however, can be a long process. This is especially since the old system is highly ingrained in us, having been subjected to many years of the traditional teaching methodology from teachers who in turn have many years exposure of the same from their own teachers.*

**Question 3:** Farmers look up to the university as source of training, materials, knowledge. Do you observe any attitudinal change in your participants? (Carlos Huelma, IRRI-SHU)

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**Answer:** *We do observe some significant changes among farmers or others who attend our trainings. They also tell us about it. Many would say they learned a lot and many of these learnings they did not realize are important and are integral part of SA. Aside from what they say they have learned, there are other dimensions of change, other than knowledge, that they exhibit. We feel that they become more empowered and confident. One manifestation is when they lose inhibition in sharing what they know, when in the beginning they were so shy to talk. Initially they say they don't know anything/much and that we should be the one to tell them what they should know. Later they share that what they already know is of high value (and scientific) afterall. This is especially the case in the discussion about indigenous knowledge systems where truly the farmers are the experts. They also say that they can handle UP afterall whereas before they were so apprehensive to come for training because they might not cope with its high standards. The change in them is also enhanced with our "one-on-one" sessions with them, especially conducted at night, where facilitators encourage reflections and "processing", to try to resolve certain issues or straighten out some misconceptions. A survey we did to all our ex-participants revealed changes in them, either on a personal level or work-related, but all toward SA conversion. Many say they no longer use chemicals, already diversify, appreciate and promote local varieties and species, do their own breeding work, changed their curriculum to SA, do community seed banking, incorporate genetic conservation principles in their seed production endeavor, etc. Some also say they have changed their lifestyle because of the training. Many participants with formal perspective or who have higher education often start out to be dominant figures. However, at the end they become more understanding of others' realities, accept their own problematic paradigm and appreciate the session in human resource development where they discover who they are, what their values are, and understand what real national development really means. They also understand how limited and reductionist their science is, while farmers are happy to know that they are more holistic in perspective and that many of their indigenous practices are scientific after all, even using the reductionist science as measure.*

**Question 4.** I have observed that some teachers have not yet applied that method of teaching. Theirs are not participatory and mostly spoon feeding and heavy lecturing. What are we students supposed to do if we are uncomfortable with such method? (Abigail Verdillo, Agronomy student)

**Answer:** *Under any situation that is problematic, anyone should apply the principles of proper facilitation. Students, therefore, should be and can be good facilitators. With some knowledge and skills in HRD (human resource development) through training, for example, or simply by being sensitive, one can effectively convey the message and change the situation. It would be unlikely that you can change your teacher, but s/he can be led to the road of conversion. The primary challenge is how to improve the situation and dynamics. You can try sharing some information or some readings with the teacher. If you want to make the teacher to be on your side, it would be more effective to befriend rather than antagonize him/her. Your greatest learning in such kind of class is perhaps on meeting the challenges of facilitation, being tolerant, understanding and accepting of how others think and behave, knowing about their misconceptions. These are useful tools in facilitation and in SA advocacy. For the subject matter, you can just learn this outside the classroom. If you feel you are being short-changed then you could resort to collective but peaceful action. Knowing your rights as students can help lead you to appropriate action.*

**Question 5.** What do you perceive to be the role of computer technology in terms of this process (facilitation?) since with computers it is hard to be dialogic and they do not have a heart? (Prof. Sev Cuevas, Dept. of Horticulture)

**Answer:** *The computer has undeniably helped me a lot with my current lecture. But it can or should remain only as a tool and not replace other dimensions of humanity (e.g., the spiritual, values, emotional). One has to understand what a computer can do to a farmer's or anyone's psyche. One can get addicted to it. It is a technology, which is component of culture, and we know that technology change would definitely lead to changes in other aspects of culture, whether we like it or not. However, it would be useful if farmers are introduced to it if only to*

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*help demystify science and technology. They can for themselves decide, but given proper orientation, whether they would really need or want it or not. Computers can "dehumanize", can be irrelevant if not appropriate to the conditions of the farmers and they certainly cannot replace human interaction. They cannot address very effectively the aspect of practical skills development, and attitudes change. The same decision, i.e., which one to use, should hold true for other technology or endeavors, such as the use of big or small machines for production, or the use of cold storage or the farmer's field in genetic conservation and seed banking. Farmers ought to be guided to the realities of a "high tech" machine or operation and then decide for themselves whatever is appropriate to them.*

**Question 6:** How is the faculty evaluation form to be improved? (Oscar Zamora, Agronomy Department)

**Answer:** *I have initially considered including a discussion on this in my paper, just as I thought a comment on the "professionalization" of agriculture through a national board exam would be useful to present. I eventually decided against dwelling on these in the paper for space reasons. Both the evaluation and professionalization have common weaknesses. They reflect the psyche of conventional education and are highly flawed. The evaluation mostly measures the usual criteria of teaching. It measures the teacher's effectiveness as expert and authority on the subject. It does not measure whether there had been attitudinal and behavioral change demonstrated among students. It also does not evaluate the course as to whether it has effectively incorporated SA concepts or transformed the framework to SA or to a nationalist oriented type education. Many students consider the evaluation process as a joke or a superfluous activity and even use it as a way to get back at the teacher for some kinked dynamics created in the course. The evaluation form should check whether teachers have succeeded in addressing general and specific goals of SA education, whether they used alternative pedagogy and if they incorporated in the course the basic minimum topics for an SA-framed course. It should see whether teachers measured students' ability to answer questions on the subject matter which also had been reoriented. It should gauge whether teachers have encouraged students to ask questions and whether teachers have made students learn how to learn. Also to assess is whether teachers have learned from their students and if there was an active inter-student learning that happened. Reforming the evaluation form to suit the SA framework and making it known that such evaluation will be an instrument of review of teacher performance could also encourage students to be more dedicated in answering the form. It would be important, however, to make students aware of a more appropriate teaching and learning strategy so they would gauge their teachers using the alternative criteria.*

**Question 7:** One of the main things that you advocate in your lecture is change (e.g., at university level, how people view SA, at the level of the individual teacher, how they go about change, how they perceive their role. What I see in this world nowadays, people will more likely change because of incentives rather the amount of preaching done about it. What do you see as the effective incentives that would likely lead to the kind of change you are advocating either at the individual level or with your colleagues here at the university or in the university or more kind of wholesale institutional change towards SA and alternative ways of training and teaching? (Chun K. Lai, ICRAF)

**Answer:** *Incentives for promotion are not supportive of SA. It is mostly based on number of publications, varieties developed, lines collected, identified or selected, technology developed, commercialized or patented, teaching load, seminars attended, previous awards, etc. These criteria need to be quantified or valued differently. It would not be enough to account for one's time and be busy no matter. What is one busy about? It would not be enough to be doing just teaching. Teachers should do research and extension or training to be exposed to realities. They should be constantly updated and thus engage in self-learning through reading. Teachers are change agents and should therefore be informed about current issues. The kind of incentives that I would like to see would be recognition of initiatives in SA and consider as legitimate or official and give support to activities related to SA (e.g., field or exposure trips, maintenance of a learning resource unit or an interactive library). Many of*

*continued next page*▸

*these are unconventional and usually do not fit into the usual expense allowances and credit system. Many SA related publications are conceptual, or require alternative statistical procedures, but are not necessarily inferior. On the other hand, many conventional papers are simply chopped up experiments and scientific papers. Many varieties are farmers' varieties or have only been cosmetically altered by plant breeders. Many technologies developed by researchers have not undergone proper risk-benefit assessment. They do not at all address sustainability issues and systems. They flourish because they are what the evaluation system values more.*

*Extension also suffers much of the same problems. Extensionists are often regarded second class citizens, relative to researchers. In our experience in training and extension, we have encountered many COA (Commission on Audit) expense disallowances (e.g., for tokens T-shirts instead of honoraria, certain travels) and we often end up using personal money just to be able to operate normally. Reforms are certainly called for but it will take time to be institutionalized and internalized. Calls for change are often expressed through professorial chair lectures but unfortunately these documents are not well read nor circulated. Although in my case, I require my own students to read my professorial chair manuscript (which often ends up to be quite lengthy). I use them as a tool in my teaching—a learning material that elaborates what is in my mind and heart about a subject and which my students can access beyond the lecture proper.*

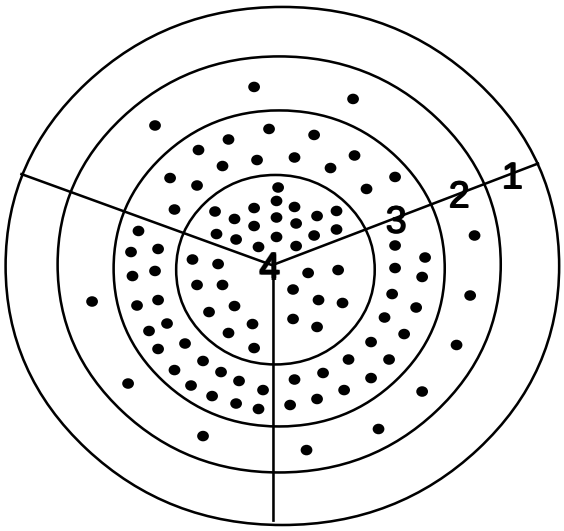
*Incentives for the short term can simply be recognition that what we are doing is something legitimate, relevant and useful. For the long term they should be translated to a different set of recognition and reward system, administrative procedures and allowances, moral, technical, structural and policy support. For the advocates, however, even if there are no tangible incentives there are other things that keep them going. A student (Abigail Verdillo) shares her thoughts on this: "Once one is involved with SA, she tends to see things from a wider perspective. Growth as a person is given value. The welfare of others becomes a concern. I think even if there is no tangible incentive, knowing that you have made a difference in the lives of people and realize that thru SA you have extended the habitability of this planet for those who have not yet been born is enough to feel good about yourself and keep at it. There are no internal conflicts - and you become at peace. It's actually for one's own good".*

**Comment:** I am very interested in attending this professorial chair so I have to travel all the way from Nueva Viscaya just to be here. I attended the seed short course three years ago. From that time on my institution has already engaged in SA. I have applied my learning from that course on my students, I have integrated SA in my lessons and in the syllabus. Specifically, we deal with the production of indigenous vegetables. Now I am inviting my students and colleagues to see our indigenous plants and seed. My Dean and the President of NVSIT allowed me to come here because they are also interested in the lecture and they can see that there is already something going on in my area. In the area are crops that are useful or needed by the locals, grown organically or without chemicals. (Irene Galate, teacher, NVSIT; ex-short course participant).

***See Appendix 3 for results of the feedback questionnaire.***

## APPENDIX 3. Written feedback from the audience of the Professorial Chair Lecture on "Alternative Seed Training and Education for Sustainable Agriculture", and the lecturer's response/comments and the evaluation form.

### A. Summary of the evaluation result gathered from the feedback sheets:




**1 – low** **2 – fair** **3 – high** **4 – very high**

Relevance (%): 1 = 0 %, 2 = 9 %, 3 = 40 %, 4 = 51%
weighted average: 3.42

Significant learning: 1 = 0 %, 2 = 10 %, 3 = 70 %, 4 = 30 %
weighted average: 3.19

Effectiveness: 1 = 0 %, 2 = 20 %, 3 = 60 %, 4 = 20 %
weighted average: 3.03

*Note: Other listeners did not turn in their evaluation form.*

### B. Comments, questions and answers:

1. You presented a very "ideal" education system for sustainable agriculture. As a teacher, are you ready to implement that very "complicated system"? Why have most of the professors not implemented the system that you presented? (Rusthamrin H. Akuba, Horticulture graduate student; Horticulture, UPLB)

*We are trying to do some of the principles I mentioned. Our system is evolving, improved on each semester and every time the course is offered. It takes quite a while to get comfortable with alternative approaches. In our case we started only as learners as we watched and participated in various activities conducted by our invited NGO partners. Many professors have not implemented such approach for many reasons detailed in the paper but foremost I believe are that 1) they do not know where to start and how to start, 2) they are not convinced that there is really a need for such approaches, 3) they have benefited so much from the old system so that they feel disloyal if they change course or are afraid to be cut off from the wellspring of resources and other rewards they already enjoy. In our case, reforms adapted in the pedagogical approach has automatically led us to other realms of transformation, e.g., in content, frame of mind, values, etc.*

*continued next page*

2. The delivery is timely (Anonymous); Good visuals, nice presentation (Anonymous); Skillful in giving lecture; appropriate behavior (Yu Xai, Agroforestry Diploma Program; CFNR, China); Very impressive and relevant! (Emmanuel Samson, Agronomy Graduate Student; staff-La Granja); Well-organized and well-presented; very stimulating lecture! Great job! (Chun Lai, Senior Capacity Building Specialist, ICRAF,College,Laguna)

3. Great visual aides! Good presentation! Very inspiring for SA advocates and students. *Paano nafeed-back sa participants ang documentation ng buong process (sa training)?* (How did you feedback the documentation of the process (training) to the participants?) (Anonymous)

*We try to do documentation of every training. Some participants ask us to provide them a copy of the documentation (which is completed only much later) at their own expense. For daily feedbacking and at the end of the course, evaluation and assessment sessions are held and results are fed back to participants. We also encourage participants to be observant of our training methodology because it is part of what we want to impart to them (i.e., training facilitation).*

4. Does the size of landholding and educational level of farmer affect the adaptability of the sustainable agriculture framework? (Carlos Huelma, Research Specialist, SHU-IRRI, College, Laguna)

*Sustainable agriculture and its adaptability is scale-and educational attainment-neutral. It is not determined by size of landholding and educational level. There are large, commercial farms doing SA. Practitioners of SA also range from those who have not gone to formal school to the ones who spent most of their life in formal schooling. Adaptability of SA requires, among others, supportive policies and structure of institutions, as well as understanding that SA is contextual, a framework and not just concepts or alternative practices, and needs collective action. What is needed most of all, is the commitment to do SA, which goes with the realization that one has to change not only for oneself but for others and the whole ecosystem. Such realization should, foremost, come from change in values and change of heart.*

5. To make SA stronger, it should try to network among Universities in the country and the Region. Also, linkage between the university and extension agency should be upgraded to help and support the farmer. (Anonymous)

*I strongly agree. Networking is one of the goals of SA. This should be done among all sectors. The benefit of networking cannot be overemphasized. However, we should try not to get too entangled in formalizing the network. The most successful networks are mostly informal but composed of highly committed and self-less individuals. Without such element, a very formal network will not function well. It could instead be a disservice to SA.*

6. Sustainable agriculture education is very much applicable in non-formal education because of participatory approach. However, it seems to be not so applicable in formal education like in college education. In college education, courses are taught for 1-3 hours. Will this number of hours be enough to implement the teaching of sustainable agriculture education? (Jaime R. Quilantang, UPLB Graduate student? CLSU, Munoz, Nueva Ecija)

The approaches mentioned (i.e., non-formal teaching methods) can be more difficult to apply in basic courses (Anonymous).

*Sustainable agriculture education (or development education) should and can be very well applied in formal education. However, it can be really challenging, given that the current paradigm is highly traditional and conventional. A teacher has to be very creative and thus spend time planning and preparing for an activity. This can, on the other hand, be a highly fulfilling and rewarding endeavor for a teacher who likes to innovate things. Seeing how students get motivated/inspired is often enough reward. A one-hour course can be infused with participatory approaches but this requires students that are sensitized to the idea that their learning depends on themselves, on the questions they ask and how they go about*

*continued next page*▸

*searching for answers. If the answers are not in the classroom, they should be ready and willing to do some searching outside the session. A teacher engaged in this method should, however, be prepared to accept and develop alternative evaluation system.*

*We have been applying this same approach in our basic and advanced courses. Some adjustments are, of course, made according to factors like number of students, background, aptitudes, readiness and student needs, and the course itself. What had been useful are various group dynamics or activities we learned from NGO's, PO's or literature. Some students also suggest innovations. Doing this approach in basic courses had been more fulfilling than in the more advanced ones because of the number and diversity of ideas as well as the further learnings gathered in the process.*

7. Lecture has its place especially in short sessions. But one can have participatory method if classrooms (venue) are designed for such. Our classrooms are not set-up for participatory lecture. Short lectures also need visual aids for faster transmission of ideas and more effective learning (Ted Mendoza, Dept. of Agronomy, UPLB).

*That has been one of our difficulties. Lecture rooms and audio-visual facilities should be supportive of such method. There are already audio-visual aids collected or developed by some professors and what is needed is concerted effort to have them made known and shared.*

8. If a professor wants to infuse a course with SA perspective, he should make sure that the basic minimum (mostly conventional) of the course is still covered. Otherwise, students will suffer in succeeding courses especially if those courses put emphasis on conventional system. My experience is that one really has to be creative and innovative so that both paradigms are given sufficient attention given limited time. Laboratory and lecture should also be linked (e.g., by having teachers with similar perspective) to be more effective in teaching SA. Some of your transparencies have prints too small to be seen from the back of the room (Oscar Zamora, Faculty, Dept. of Agronomy, UPLB)

*This indeed calls for closer attention in course revision and teaching assignment. Unfortunately many professors/instructors do not see the need for such. This is an indicator of non-acceptance or non-internalization of what SA is. As to my transparencies being small, my apologies but my intention is explained in items # 12 and 13.*

9. Why use "pedagogy"? vs. "andragogy"? Emphasize a striking contrast to the conventional approach. You presented impacts of seed technology training in terms of resources gained; how about SA indicators? KAP change on training? (Celia Medina, NCPC, UPLB)

*I did not make a distinction between pedagogy and andragogy in my paper although these do differ in the strict sense (readers are encouraged to refer to the glossary of terms in the appendix of the paper for their meaning). Pedagogy is being used here in a generic sense to refer to teaching methodology. If the question refers to our impact according to SA indicators, I would refer those interested to the list of features or indicators of an SA training. It includes, among others, a process that is participatory, interactive, dialogic, etc., and SA concepts. Our training attempts as much as it could to include all that are given in that list. Our other gains and realizations (as measure of impact) are presented in the paper. We learned some facilitation skills, some more alternatives to formal/conventional seed technology, some other pedagogical techniques, and many others. We also realized our constraints and difficulties while discovering at the same time our strengths as individuals and as a group. At the very least we hope that our participants have undergone change beyond knowledge and skills thus exhibit transformation in attitude and behavior tendencies appropriate for SA.*

10. I assumed that the recommendations for SA were based on the experience in the span of 8 years of conducting the training. I do commend your group that you came up with these recommendations. Even some private schools have now started on the participatory/integrative style of teaching. This style of learning should start as early as the elementary level. In my case

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the formal education came first. More learning and knowledge were gained after I graduated and got to work in a genebank. As I've said, formal and non-formal systems can be integrated (Lea Villavicencio, Researcher, NPGRL, IPB).

*Our transformation actually dates back earlier to the times when we were feeling uncomfortable with the way things were, though we didn't know why then. Only when we met like-minded people did the idea finally "gel" and we realized then where our niche was going to be. That discomfort and the effort to try to be open to new things were the key to our transformation yet I believe that our sensitization started way back our very early years. So I agree that indeed such type of education start at very young age, in the elementary level or even before. The role of the family in such education is surely very critical.*

11. I agree that the university has succeeded in making good teachers, that is, they lecture well and present the class with loads of both old and new information. What they have neglected perhaps is to do this in an appropriate atmosphere of learning. Learning, simply put is a change of attitude or action. Without this change, knowing information is just that - new information. How much is retained after the encounter and what it can accomplish afterwards is no longer given prime importance. I believe that teaching is still the noblest of professions because educators have the opportunity to mold minds into becoming the persons they will be in the future. Being a part of students' lives is essential, it is recognizing their strengths and playing up on that while identifying weaknesses and letting them improve. I guess a few things which need to be thought about is:

- Y Providing constructive feedback to encourage students to participate or study.
- Y Develop in them the ability not only to answer questions but form their own instead.
- Y Provide opportunities for self-learning (lectures are good if the student can become interested enough to follow-up on them and read after the class is over).
- Y Creative approaches in lesson presentation
- Y Having a form of feedbacking on the topics discussed/teacher's method of presentation etc.
- Y Working in-groups for sharing of knowledge/experiences/reflection/action plan in connection with the activity.
- Y Instilling a sense of respect for the ideas of others but also maintaining a firm conviction on important issues.
- Y Emphasize involvement and awareness - it is also their duty to inform others of what they know.
- Y Values/personal growth/HRD. (Abby Verdillo, Agronomy student; UPLB)

*Wish such profound thoughts could reach these key actors in curriculum development, the teachers and students themselves. How about considering teaching (formal or non-formal) as a profession or vocation for you?*

12. Thanks for the native snack. Yummy. More!!! The lecture was loaded with information. This is both good and defective. The lecture presents a comprehensive topic but I absorbed less of the significant part of the lecture. The lecture's scope could already contain an entire manual or book. Why not publish one? A lot of agricultural colleges and universities can learn from it, and they can use it to affect changes in their own schools (Joy N. Jamago, Agronomy student, UPLB).

Very fast lecture. Some transparencies were not explained more fully. However presentation was good (Timi Mercado, Faculty, Dept. of Agronomy, UPLB).

*The manuscript is hoped to serve as reference for students taking my subject. My plan is to disseminate it through various medium (including the web?) and give feedback especially to ex-participants and other survey respondents (the survey was sent out to selected individuals whom we thought are doing activities related to seed, SA, development, non-formal education, training). Some of those who attended the lecture will also receive a copy of the summary and this feedback section. Sorry about feeling distressed by absorbing less of the significant parts of the lecture. Some of those flashed quickly were meant to be so – just to introduce them. Those who feel they want to see them in more detail are encouraged to seek*

*continued next page*

*the manuscript. The whole paper will be available at the Seed Tech library and Agronomy reading room.*

13. Lecturer has a nice, powerful voice and good sense of humor. These help in getting audience's attention. However, there was too much lecturing from transparencies. It is hard to follow and relate to. It'll be more effective if there are more examples for every concept/principle to make them more concrete and understandable (Benz Galang, BSDC/CDC student, UPLB).

*My challenge during the presentation was to reach the majority, given the limited time, heterogeneous audience and constricting venue and equipment. For some of the listeners, the concept is totally new. Others were quite advanced, probably looking only for added learnings on the subject. A more detailed presentation would have been ideal and preferred by many, but a presentation can only do so much given the time and the wide scope of the topic. I'm glad however, that the lecture seems to have evoked in some listeners a "thirst" for more. It is an indication that some doors in the audience' minds have been opened for them to look much farther.*

14. I want to receive a copy of the synthesis and the summary of the paper presented. Thank you and more power (Wilfredo. D. Bunda, Agroforestry Diploma Program, UPLB; Staff Dingle, Iloilo).

*You will.*

15. Very informative. Hope that professors will adapt the strategy of teaching through participatory approach-Experiential Learning, especially in the graduate level (J. D. Ortuoste, Horticulture student, UPLB);

*Some professors in this university and in other formal schools have already adapted participatory approaches. In Siliman University is quite advanced as it has already a program on Experiential Learning.*

16. Now I can start thinking about conducting training on sustainable sugarcane production. Good insights in SA education and for future directions in our research (Dory delos Santos, Agronomy graduate student; staff-PHILSURIN)

17. This lecture is very interesting. The change in the educational system is a great challenge in colleges and universities because most administrators and teachers are not supportive with the strategy. But I believe that they will realize the need for change if your group could convince them (Anonymous).

*I believe we should dwell less now on trying to convince them, using the usual approach. We tried for more than 10 years already. Hopefully, the initiative of SEARCA and the SCUs (State Colleges and Universities) to convert to SA materializes. At the moment many think that incorporation of technical concepts would be sufficient or priority. Pedagogical transformation will hopefully be given due attention soon.*

18. Who should be involved in curriculum development? What would be the required or ideal qualification of a teaching staff or trainor? An activity that would enhance learning is practicum in the farm. Wouldn't it be good to have a BS in Sustainable Agriculture? (Edna Vida, Horticulture graduate student; staff of Cavite State University).

*Ideally all stakeholders should be involved in curriculum development. However, given limited budget, where some stakeholders are missed out, those who do get involved should possess a wide perspective, and with deep grassroots orientation. The paper presents some qualities of an ideal teacher or trainer. Most critical to have is skills in facilitating. A teacher should be a good facilitator. This is also what the alternative teaching paradigm requires. The teacher should be competent in three aspects: in the pedagogy, content and human relations.*

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*Farm practicums can indeed tremendously enhance learning. But there is still a dearth of nearby farms doing SA. The university structures and policy are also not very supportive of this kind of activity given financial constraints and an archaic set-up.*

*To have a BS in Sustainable Agriculture can incite intense debate at many angles. BS Agriculture should be "sustainable agriculture" for no one could like to say they are for inequity, economic unfeasibility, ecological problems, etc. One does not want to be said to be in an unsustainable agriculture program. Many people object to the term sustainable agriculture, especially if they consider it simply as a fad. That's sad indeed. A faster strategy to push SA would be to change paradigm in any current course or curriculum (there's nothing unsustainable about the current name anyway). However, some schools, such as Xavier University in Cagayan de Oro, does have a BS in Sustainable Agriculture. More needed in a reformed program, however, would be a systems orientation, where various disciplines and agroecological concepts are integrated.*

19. I am glad to know that the concept of sustainable agriculture is not only confined in the boundaries of science of farming. Most of the people I know, view SA just as one of the methods/techniques of farming, the real concept or principle is neglected - this commonly occur. I hope this lecture will be conducted in many places for others to know/understand the other side of SA. As an approach for teaching, I am very much disappointed with the way the instructors of UPLB handle their classes – too formal. Most of the teachers are not suited to this profession, I hope this approach (the one you discussed) will be known to many teachers in this university (Johnny Y. Danganan, Agronomy student, UPLB)

*There's so much to learn, yes, but to us the learning process has been enjoyable. We started out wanting to reform agriculture and later realized that such reform would entail overall change in self and lifestyle. I plan to share this lecture with the organizers of the current initiative to transform SCU's to SA. We could also learn much from other schools already doing alternative education.*

20. The presentation was fast, but you were able to deliver your message effectively. I agree with you regarding the role of farmers in education because they know a lot of things that the graduates/academicians do not know or fully understand. They should really be involved in the formal education so that they could share what's really happening in the field. In effect, the students would also learn not only those under "controlled conditions". As a student/graduate of the old curriculum, I guess, there is a need to include more of the "practicals", not only concepts of agriculture. More fieldworks/field visits and interaction with the farmers. After graduation, I felt that I am not "fully equipped" to face the farmers. Its good that SA is now included in the curriculum. There should really be a change (on ecological principle) in the university and its people. As well as in the different agricultural agencies (e. g. DA). The extensionists and agricultural technicians should also be part of the change. I realized that I need to "upgrade and update" my knowledge about SA. I admit, I've only know a little, but it's in my heart. I really missed a lot when I left AFSICH. But thanks to you, who sowed the seed in me. Hindi naman dormant don't worry. Regarding the trainings/short courses your division is conducting, congratulations for the continuous positive changes and the improvements (as I told TIMI, parang marami nang nabago sa training). How I wish I could attend one (pero laging walang pondo ang government, mag-ipon muna ako!) Sana mas maraming mag-attend na extensionists/ technicians. I wish that the "proposals" from your lecture would be highly regarded by the university and its people (Marivic B. Abinsay, CE Management Student, UPLB; Staff-DA, Calauan, Laguna).

*The challenge is how to follow through with submitted or expressed proposals (e.g. program transformation to SA). Sometimes it would seem like a test of endurance and energy level. But if we are sufficiently impassioned, the journey becomes more enjoyable. Inspiration and high energy level often go together. I guess what drives us to move on is the belief that change is needed, that we can effect change and that we do it for resource-poor farmer empowerment and for service, above anything else.*

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## C. The evaluation form:

Alternative Seed Training and Education for Sustainable Agriculture
Professorial Chair Lecture

***Feedback Sheet***

Name (Optional):_____ Mailing or Contact Address:_____

*Please use the space below to write any (more) questions, suggestions, comments or general reaction to the lecture. Your input herein and the points raised during the discussion will be collated. A copy will be sent to you, if you wish. The material will be part of the overall lecture document. I hope to use your input to define future direction and fine-tune our activities and the final copy of the paper. Please also make sure that you sign on the attendance sheet, for our future reference. Thank you very much for your interest and input.*

**PAM G. FERNANDEZ, Dept. of Agronomy, UP Los Baños, College, Laguna. Tel. Nos.: (049) 536-2468; 536-2466; 536-2217; Fax No.: (049) 536-2468; E-mail pgf@mudspring.uplb.edu.ph**

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☐ I wish to receive a copy of the synthesis of the discussions. (Please check)

☐ I wish to receive a copy of the summary of the papaper. (Please check)

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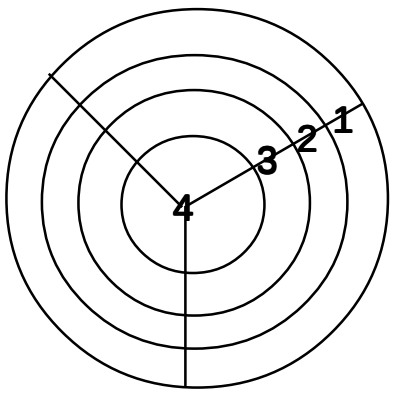
Feedback/Assessment

This part would serve as a generala assessment of this lecture. Please put a mark on the pie area (triangle section) that best represents what you think of the lecture in terms of degrees of a) relevance to you b) effectiveness c) significant learnings.




**1 – low 2 – fair 3 – high 4 – very high**

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Your Comment:

## APPENDIX 4. Survey questionnaire and letter sent to past short course participants (1991-1999) and other network partners re: SA, seed and education (training) initiatives and possible reunion.

### A. The accompanying letter.

UNIVERSITY OF THE PHILIPPINES AT LOS BAÑOS
COLLEGE OF AGRICULTURE
College, Laguna, Philippines 4031
Tel. Nos.: (049) 536-2466; 536-2468; 536-2217
Fax No.: (049) 536-2468

DEPARTMENT OF AGRONOMY

14 June 1999

_____
_____

Dear

How are things? Hope this letter finds you well. My writing you now is for a survey which aims to know 2 things:

1. about your initiative and realities pertaining to training/education (formal or non-formal) in seed or sustainable agriculture (SA) and
2. how you feel about the idea of having a "congress" or "reunion" of our past seed short course participants and with others having similar interest.

The reason for item 1 is that I am going to present a professorial chair lecture at UPLB in mid-July (likely July 20) on "Alternative Seed Training and Education for Sustainable Agriculture (SA)". Your input will certainly help enrich my talk. The lecture is a kind of grant awarded to selected professors who then are expected to develop or research on a certain topic and present insights or findings in a lecture attended by interested parties. My past professorial chair lectures (1992, 1993) have been used as reference in some courses and published (and cited) in both local and international journals. Likely you have a copy of them, esp. if you attended our short course. For the current lecture, my focus would be something about my experiences and insights on alternative education using seed as the subject. Your input could help make it more comprehensive, relevant and up-to-date. As with the other lectures, I plan to come up with a publication out of this presentation and hopefully provide another resource material to help advance SA.

The "congress" is an idea constantly forward by short course participants. I know it should happen very soon, if not next year, maybe the year after. Funds, of course, could be a fundamental concern but we are hoping that if there is a definite and noble goal, enough will, ideas to share, and interest to attend, resources will flow in from wherever.

So I hope you could be obliged to spend a few minutes answering attached questionnaire and return to me as soon as you can, preferably before the end of the month. I shall share with you the outcome of this survey and/or the paper. You are also most welcome to attend. Maraming maraming salamat.

In the name of sustainability,

**PAMELA G. FERNANDEZ**
Associate Professor and Head, Seed Science and Technology Division

*continued next page*

## A. The questionnaire.

**Seed Training/Education Questionnaire**

*Part A.* *I would really appreciate it if you could answer all or as many questions as you can. Language other than English is fine. Thank you. Pam Fernandez.*

1. Name _____
2. Address (Home) _____
   _____
   (Work) _____
   _____
3. Contact no(s) telephone: _____ fax: _____
   Email: _____ others: _____
4. Current position/job description _____

5. Please describe your SA-related or seed-related activity or interest.

6. Do you conduct any of the following SA-related activities (please check)?

   _____a) teaching
   _____b) extension
   _____c) training (non-formal)
   _____d) research
   _____e) crop production
   _____f) others (pls. specify)
   _____

   If yes, a) what is/are common title or description of such activity?

   b) who attend or participate in this activity?

7. Do you conduct any of the following seed-related activities (please check)?

   _____a) teaching (formal)
   _____b) extension
   _____c) training (non-formal)
   _____d) research
   _____e) seed production
   _____f) seed improvement
   _____g) nursery
   _____h) genetic conservation
   _____i) others (pls. specify)
   _____

   If yes, a) what is/are common title or description of such activity?

   b) who attend or participate in this activity?

8. Please check which aspects/topics you normally include in your course/training:
   _____a) Historical perspective of seed science and technology along with agriculture and development (situationer)
   _____b) Issues (macro and micro; local and international)
   _____c) SA framework, "definition" or attributes
   _____d) Values clarification and reorientation; self awareness; human resource development
   _____e) Agroecological principles

*continued next page*

_____f) Technical aspects (seed production, seed handling and storage, asexual propagation, genetic conservation)
  _____1) conventional/modern system
  _____2) alternative system
  _____3) indigenous/local systems
_____g) Farmer based crop improvement/breeding, seed production
_____h) Role of self for SA; for local and national development
_____i) Role of a group in development (collective effort)
_____j) Application (e.g., project proposal, case study, critiquing, action plan)
_____k) Others, pls. specify: _____

9. How is alternative education philosophy and approaches (e.g., participatory, experiential, dialogic, etc.) incorporated in your curriculum?

_____only now or recently _____since long time ago _____not yet
_____not sure _____don't have an idea what these are
Comment:

10. What do you think are your strengths or unique with you (as individual) or your program in the field of training/education?

11. What are your constraints or problems related to training/education?

12. Please write any wish/needs relevant to SA or seed training/education.

13. Any questions, comments, suggestions, added information?

**Please proceed to Part B**

*continued next page*

**Seed Congress Questionnaire**

Part B. This questionnaire is mainly for our short course participants. However those who had been with us in other forum (e.g., formal courses, seminars, short term trainings) and wish to participate in the survey and perhaps in the congress may also fill in the questionnaire. This survey is only a "feeler" to help us conceptualize the seed congress. You may please disregard questions 1-4 if you also filled in the same items (1-4) in Part A. Thank you. Pam Fernandez.

1. Name _____
2. Address (Home) _____
   _____
   (Work) _____
   _____
3. Contact no(s) telephone: _____ fax: _____
   Email: _____ others: _____
4. Current position/job description _____

5. When do you believe you would be ready or the best time is for a congress (reunion)?

   _____2000 _____2001 _____others (pls. specify) _____

6. Which time of the year do you prefer it to be?

   _____March _____April _____May _____October

   Reason:

7. What are reasons/basis for your interest to attend?

   _____I have something significant to share (pls. specify, if you could, what this could be)

   _____I want to learn more from others (pls. specify, if you could, what this could be)

   _____I want to be updated of current developments (pls. specify, if you could, what this could be)

   _____I want to network with others

   _____Others (pls. specify) _____

8. Do you believe it may be possible to get funds from your organization for this kind of activity?
   _____Yes _____No _____Unsure

   Your reason?

9. If "external" funds/support does not come by, do you think you could use your own financial resources?
   _____Yes _____No _____Maybe
   Please explain.

*continued next page*

10. Please write potential funders of this kind of activity.

11. What potential problems do you foresee in such an activity?

12. If the venue will be held outside UPLB…

    a) would you be encouraged to attend if we go to an area where you find on the ground seed-related initiatives and various levels of SA conversion?
    _____Yes _____No _____Uncertain

    Comments:

    b) any suggestions/ideas on good places to hold it? people to be involved?

    Comments:

13. Please give suggestions, comments, questions that could potentially help shape up the planned congress.

***- End -***

## APPENDIX 5. Different levels of learning and learning methods.

| Level of learning | Description | Learning methods | |
|---|---|---|---|
| 1. Memory (knowledge) | Learner can recall facts, definitions, procedures, actions, behaviours. She/he can identify, define and describe. | Lectures<br>Talks<br>Programmed learning<br>Demonstrations<br>Reading | Algorithms<br>Checklists<br>Information maps<br>Laboratory work<br>Directed study |
| 2. Understanding | Learner has grasp of concepts, ideas, procedures and techniques. She/he can explain, compare, justify and give examples. | Explanations<br>Discussions<br>Case studies<br>Group feedback analysis<br>Seminars | Assignments<br>Projects<br>Business games<br>Tutorial<br>Quizzes |
| 3. Application | Learner can use the concepts, ideas and techniques in standard situations. She/he can use or apply things in the 'correct' prescribed way. | Demonstration and practice<br>Role play<br>Simulations<br>Discussions | Syndicates<br>Coaching<br>Assignments<br>Projects<br>Field trips |
| 4. Transfer (analysis, synthesis and evaluation) | From all the concepts, ideas, procedures and techniques ever learned, the student can select the one most appropriate to a new non-standard situation. She/he can modify or create new hypotheses, ideas or tools to cope with unique situations where there are no 'right' or established answers. | Brainstorming<br>Discussions<br>Dialogue<br>Group exercises<br>Sensitivity training<br>Problem solving | Counselling<br>Secondment<br>Assignments<br>Diagnostic Instruments and feedback projects |

Source: Adapted from Huczynski, 1983

## APPENDIX 6. Most recent seed short course curriculum and resource persons, as well as former topics and activities.

| Resource Person | Topic/Activities |
|---|---|
| | Y *Pre course sensitization and conscientization* |
| | Y *Course opening, introductions* |
| *SSTD, NGO*$_1$ | Y Levelling off of needs, expectations and concerns |
| *UPLB-CF*$_1$ | Y Perspectives in development and science, culture and values; their relation to Sustainable Agriculture (SA) |
| *SSTD* | Y House rules, creation of participant management committee and host teams |
| *SSTD, NGO*$_1$ | Y Sharing of experiences |
| *Agron*$_1$ | Y Sustainable Agriculture: Framework, related local international issues, trends and recent developments |
| *NGO*$_2$ | Y Global issues in seed and genetic conservation |
| *SSTD, SESAM, Agron*$_2$, *SSTD* | Y Agroecological seed production principles: Appropriate/ alternative pest management, diversity and appropriate seed, recycling, living soil, soil water conservation, multistorey cropping |
| *Agron*$_2$, *UPLB-CF*$_3$ | Y *Integration, diversification and agroforestry as linked to seed systems* |
| *SSTD* | Y Issues in IKS, seed systems, genetic conservation and SA |
| *Agron*$_3$, *SSTD* | Y Genetic conservation systems; linking seed technology with genetic conservation |
| *SSTD,UPLB-CF*$_4$ | Y Plant classification and identification; seed biology and dissemination; variety types and multiplication; informal characterization system for seedbanking |
| *SSTD* | Y Principles and practices of seed production; link with genetic conservation (Group learning approach) |
| *SSTD* | Y Seed collection, harvesting, drying & processing for seed production and genetic conservation (Group learning approach) |
| *SSTD* | Y Seed quality testing and seed storage systems (with practicum); link to genetic conservation (Group learning approach) |
| *SSTD* | Y Handling of perishables and asexual propagules for variety multiplication and genetic conservation (Group learning approach) |
| *UPLB-CF*$_3$, *IPB*$_1$ | Y Nursery management and asexual propagation (with practicum) |
| *SSTD, Agron*$_1$ | Y Special concerns (e.g., seed sourcing, distribution and marketing, fund sourcing, learning resources available, bioprospecting, IPR, SA indicators, community seedbanking; conversion to SA, etc.) |
| *SSTD* | Y Production of extension/training/information materials ("What I can do best") |
| *UPLB-CF*$_6$, *IPB*$_2$ | Y Indigenous forest and fruit tree species: use, sourcing, adaptation & identification |
| *NGO*$_1$ | Y Farmer-to-Farmer Extension |
| *PO, SSTD, NGO*$_3$, *PO*$_1$ | Y Informal initiatives in seedbanking (Community seedbanking) |
| *NGO*$_3$, *PO*$_1$ | Y MASIPAG experiences on farmer-based genetic conservation & breeding |
| *PO*$_1$, *Agron*$_1$, *SSTD* | Y Farmer-breeding techniques and variety/seed maintenance; Considerations in informal breeding system and a strategy (with Practicum) |
| NGO$_1$ | Y Human resource development (HRD): awareness of self and of others; values clarification, basic leadership, team building and conflict management; community organizing and communication effectiveness; training facilitation |
| SSTD, NGO$_1$ | Y Action plan presentation |

***SSTD -*** *Seed Science and Technology Division Staff* ***Agron -*** *Department colleague* ***CF -*** *College of Forestry* ***SESAM -*** *School of Environmental and Science Management; Numbers are meant to different individuals involved*

*continued next page*

## Films/Soundslide

| | |
|---|---|
| Y Films: | Seed wars (25 min) |
| | Patent pending (30 min) |
| Y Films: | Journey of Life (40 min) |
| | Prior Claim (25 min) |
| Y Film: | Treasures of Ethiopia (70 min) |
| Y Film: | Lease of Life-Kew Garden (18 min) |
| Y Film: | Fukuoka & Natural Farming (52 min) |
| | The Global Gardener with Bill Mollison (22 min) |
| Y Film: | The Goddess and the computer (56 min) |
| Y Films: | Nursery Raising (19 min) |
| | Plant/Asexual propagation (40 min) |
| Y Other films: | |
| | Lucia ( 1:30 min) |
| | EM Nature Farming (1:30 min) |
| | Risky Business (25 min) |
| Y Soundslide: | Sustainable Seed Production (Fil.) |

## Visits

Y Commercial organic vegetable farm (Silang, Cavite)
Y Integrated farm (Pila, Laguna)
Y Integrated farm (Calauan, Laguna)
Y National Seed Foundation (UPLB)
Y SA field learning laboratory (UPLB)
Y BPI, Economic Garden Seed Production and other initiatives (Los Banos, Laguna)
Y Indigenous fruit tree farm (Los Banos, Laguna)
Y Nat'l Plant Genetic Resources Lab (tissue culture, cold storage), field genebank and nursery
Y IRRI Genebank, INGER (processing facilities) and Seed Health Unit (College, Laguna)
Y Container vegetable gardening (UPLB)
Y Greenbelt organic market (OPTA, AVF, Makati, MM)

## Topics/activities formerly included

| *Resource Person* | *Topics/Activities* |
|---|---|
| Individual | Y Indigenous soil classification |
| NGO | Y Alternative/household/associative economics |
| IBS | Y Plant taxonomy and identification (with practicum) |
| UPLB-CF | Y Forest seed technology and quality testing (with practicum) |
| UPLB-CF | Y Forest nursery management |
| IAF; UPLB-CF | Y Agroforestry systems; visit to agroforestry demo farm and the UPLB-CF Research Station and Bamboo Genebank |
| Inst. of Biotech | Y Microbes for seed performance enhancement |
| Farmer (Victoria, Laguna) | Y Visit Pesticide free rice farm |
| NGO-PO (College, Laguna) | Y Visit MASIPAG central rice and vegetable research station |
| NGO (Diliman, Quezon City) | Y Visit Biodynamic/Kapati farm |
| Industry (Manila) | Y Visit Manila Seedling Bank |
| GO (Manila) | Y Visit DENR and DA Nurseries |

# APPENDIX 7. Information (description, activities, services and resources) about the Seed Science and Technology Division of the Department of Agronomy, UPLB.

## I. Description of The Seed Science and Technology Division

### Objectives

Y *general*: help promote develop the local seed industry using the sustainable agriculture framework through seed education research and extension
Y *specific 1*: make the general public, seed producers, farmers, institutions and organizations (both formal and informal) aware of the value of use of quality and appropriate seed, locally developed (indigenous) seed practices and farming systems
Y *specific 2*: provide a venue for dissemination and exchange of information on seed sources, availability, technology and related matters among practitioners, development workers, Gos, NGOs and People's Organizations (POs)
Y *specific 3*: encourage farmer-based or community-based seed production and genetic conservation endeavors
Y *specific 4*: generate data and produce information/learning materials to answer seed-related information gaps through primary and secondary research

### Activities

Y collect, disseminate and exchange information related to seed, genetic resources and biodiversity, agroforestry, sustainable agriculture (through correspondence, visits, seminars, etc.)
Y maintain relevant databases on 1) seed sources and availability, 2) seed production/handling technologies, 3) seed/plant characteristics 4) other seed-related information
Y develop databases and produce extension materials/publications on seeds and related issues
Y conduct practical and basic research on seed production/technology and genetic conservations
Y conduct training at the university and on-site for farmers, GOs, NGOs and Pos; also offer a yearly short course (summer) on seed production, handling and genetic conservation using sustainable agriculture as framework
Y maintain a learning resource facility (which contains references, videos, posters, slides, etc.)
Y network with different sectors involved in seed matters

### Extension materials/publications

1. Agroforestry Seeds. Sustainable Agriculture Newsletter vol.2 no.3 (1990); Supplement on Agroforestry Seed Sources; Index on Agroforestry Species.
2. Agroforestry Seeds Circular no.1 (1991), no.2 (1992) and no.3 (1993).
3. Supplement to Agroforestry Seeds Circular no.1. Philippine agroforestry species scientific name, official, common and local names, uses, sources/location; Index of Agroforestry Seeds Sources (Philippines).
4. Supplement to Agroforestry Seeds Circular no. 2. Philippine agroforestry species scientific name, official, common and local names, uses, sources/location and uses; Index of Agroforestry Seeds Sources (Phil.).
5. Supplement to Agroforestry Seeds Circular no.3. (Agroforestry Species in the Philippines: Common Names, Scientific Name and Growth Requirement; Index of Agroforestry Seeds Sources (Philippines).
6. Some chapters in the Resource Book on Sustainable Agriculture in the Uplands. 1990. IIRR, MBRLC and Mag-uugmad Foundation, Inc. Philippines.
7. Some chapters in the Low-external Input Rice Production Kit, 1990. IIRR, Philippines.
8. Manwal sa Pagpaparami at Pangangalaga ng Binhi (Manual on Seed Production and Handling). 1992. Joint publication of the Department of Agronomy, UP Los Baños and International Institute of Rural Reconstruction (IIRR), Silang, Cavite, Philippines.
9. Seeds and Plant Propagation. 1992. Agroforestry Technology Information Kit No. 5. IIRR, Silang,

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Cavite, Philippines.
10. Discussion/conference papers on seeds and sustainable agriculture.
11. Training Aid/Manual on Sustainable Seed Production/Technology . 1994.
12. Intellectual Property Rights (IPR) Sourcebook Philippines With Emphasis on Intellectual Property Rights in Agriculture and Food. UPLB and MODE, Philippines. 1994.
13. Soundslide on "sustainable" seed production, technology and genetic conservation (in Filipino)

### Databases

14. The "Dirty Dozen" Pesticides.
15. Storage and Longevity of Recalcitrant Seeds.
16. Asexual Propagation Techniques.
17. Agricultural Crop Seed Production Data.
18. Natural Crop and Seed Protection Substances, Techniques/Practices.
19. Agroforestry Pests and Diseases in the Philippines.
20. Glossary of Terms Related to Agroforestry, Development, Genetic Conservation, Indigenous Knowledge System, Seed Production Handling Technology, Sustainable Agriculture & related fields/ issues.
21. Indigenous Seed Practices.
22. Agencies/organizations/individuals doing seed-related work (seed education extension, research, production, conservation/seed banking, exchange, trading, etc.).
23. Pregermination Treatments of Selected Agroforestry Species.
24. Rapid Viability Testing Using Tetrazolium for Some Agroforestry Species.
25. Abstract/Bibliography of seed technology research in the Philippines.

## II. Seed Information and Learning Resources and Services

The AFSICH (Agroforestry Seed Information Clearinghouse) Project ended in June 1994. However, the resources that have been developed or collected through the project will continue to be available to the network. The facilities are maintained by the Seed Science and Technology Division, Department of Agronomy. Activities of the Division is supported by the Seed Research and Development Project of UPLB. Copies of some learning materials can be made available, but a minimum fee will be asked to cover the cost of printing/copying, handling and mailing. Below are some of these resources and services:

### Resources:

**1. Seed production and handling manual** (*Pagpaparami at Pangangalaga ng Binhi*). 1992. A collaborative effort between the Department of Agronomy, University of the Philippines Los Banos (UPLB) and the International Institute of Rural Reconstruction (IIRR). 34 pp. (available only in Tagalog; richly illustrated; based on sustainable agriculture framework; translation to appropriate languages, especially by NGOs or POs, is welcome).

**2. "Agroforestry Seeds" issue, Sustainable Agriculture Newsletter** 2(3), 1990. A collaborative effort of CUSO, IDRC, IIRR, SIBAT, UPLB through AFSICH and CADI. 36 pp. Includes topics on farm level technologies on various aspects of seed production and handling; a list of resource persons in sustainable agriculture, as well as agencies/organizations, projects doing agroforestry seed-related activities; includes a supplement on local and international agroforestry seed sources.

**3. Agroforestry Seeds Circular and Supplement.** (AFSICH, Department of Agronomy, UPLB).

Y Issue 1, 1991 (10 pp.). Includes seed research results; training notes; reader feedback; references and a calendar of activities on seeds, agroforestry and sustainable agriculture. The **supplement** (26 pp.) lists scientific name, common names and seed sources of 276 Philippine agroforestry species; also contains an index of Philippine agroforestry seed sources.

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Y Issue 2, 1992 (24 pp.). Features an NGO-farmer based seed collection and reforestation using indigenous species in Mindanao, Philippines; includes topics or short articles on quality of seeds from various sources; upgrading seed quality through invigoration; pests and diseases in agroforestry; seed-related matters in multipurpose cover crops and green manure species; training notes; tips on handling seeds for transport; also includes reader feedback, useful references and calendar of activities on seeds, agroforestry and sustainable agriculture. The **supplement** (43 pp.) lists 385 agroforestry species in the Philippines with their official name, common names, seed sources and uses; also includes index of agroforestry seed sources (Philippines).

Y Issue 3, 1993 (60 pp.). Features an article on entrusting seed production to farmers; also includes topics or articles on seed germination of indigenous Philippine trees; seeds and fruit as medicine; recalcitrant seeds and intermediates; training and network notes; agroforestry seed procurement tips; endangered Philippine forestry and agroforestry species; species identification; and reader feedback of previous issues; also includes useful references and a calendar of activities on seeds, agroforestry and sustainable agriculture. The **supplement** (24 pp.) lists agroforestry species in the Philippines classified according to family and provided with common names, scientific name and growth requirements; also includes index of agroforestry seed sources (Philippines).

**4. "Seeds and Plant Propagation"**, 106 pp. Booklet No. 5 of the Agroforestry Technology Information Kit (ATIK) 1992. This is a revision of a portion of the ATIK (published in 1989 by IIRR, Ford Foundation, and DENR in cooperation with UPLB) and of the Agroforestry Seeds Handling, 1990 (AFSICH, Department of Agronomy, UPLB).

**5. Sound-slides on "sustainable seed production and handling"** (in Tagalog/ Filipino; comes with a photo-text guide booklet which may be obtained separately). 1992.

**6. IPR Sourcebook** Philippines With Emphasis on Intellectual Property Rights in Agriculture and Food. 1994. UPLB and MODE. College, Laguna, Philippines. 173 pp. This is a compilation of materials that were presented during a conference on IPR issues in GATT, held last August at the Agricultural College of the University of the Philippines, Los Baños, (UPLB). Scientists, farmers, NGOs and government came together during the conference to exchange views on how IPRs on life will affect Philippine society. The papers included discussions on problems created by the current push to patent life from all sorts of angles: legislative, transnational corporations and trade, research, seed conservation, ethics, and international perspectives. It illustrates the hot debate going on in the Philippines.

**7. Training aid/manual on sustainable seed production/technology** (in Tagalog/ Filipino). 1994. Presents seed production and sustainable agriculture principles through questions which are based mostly on illustrations. Also included are an answer guide and instructions for the preparation of various set ups for demonstration and practical exercises. Active discussion and sharing are encouraged through group work.

**8. Glossary of terms** related to agroforestry, seeds, sustainable agriculture, genetic resources, etc.

**9. Books, articles, theses, magazines, video tapes.** Topics include seed biology, seed production technology, quality testing, nursery management, alternative crop production and protection systems (including indigenous systems), agroforestry, genetic conservation, sustainable agriculture, current issues, etc.

**10. Posters** on seeds, genetic diversity, and environmental issues (obtained from various sources; useful for training and formal instruction).

**11. Documentation** of training/short courses on seed technology/seed production, nursery management and sustainable agriculture conducted by the staff.

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**12. Database/listing** on:

- Y agroforestry seed sources, local and some international traders or organizations (species, prices and volume available are not necessarily updated and may be provided only under certain situations)
- Y agencies, organizations, individuals doing seed-related work (seed education, extension, research, production, conservation/seedbanking, exchange, trading, etc.)
- Y agroforestry pests and diseases in the Philippines
- Y botanical pesticides and other natural means of crop/seed protection and pest management
- Y indigenous seed/crop production and protection practices
- Y seed storability of agroforestry, recalcitrant and agricultural crops species
- Y multiplication/production techniques of asexually propagated crops
- Y agronomic data for seed production of agricultural crops, including a number of indigenous vegetables
- Y pregermination treatments of selected agroforestry species
- Y rapid viability testing using tetrazolium for some agroforestry species
- Y recalcitrant seed storage techniques

**13. Compendium of dangerous or banned pesticides and their ill effects**

**14. Seed herbarium** of some indigenous agroforestry, forestry and agricultural species including a number of indigenous rice seeds.

**Services:**

1. conduct a training on seed production handling-technology, nursery management, genetic conservation, sustainable agriculture and community seed-banking upon request.
2. conduct a regular two-week short course on "Seed Production, Handling and Genetic Conservation for Sustainable Agriculture"
3. provide information/sourcing on seed availability, seed technology, agroforestry, sustainable agriculture and other related topics.
4. provide assistance to farmers, POs and NGOs in setting-up seed production or seed banking programs.
5. conduct (to a limited extent) seed quality tests for the network.
6. conduct practical research on some seed aspect as identified by farmers/practitioners or rural development workers.

## APPENDIX 8. Announcement/invitation, communications and benchmark questionnaires sent out to prospective participants of the seeds short course.

**A. ANNOUNCEMENT / INVITATION**

**Seed Technology and Genetic Conservation for Sustainable Agriculture - Short Course**

**Venue**: University of the Philippines Los Baños (Department of Agronomy)

**Date**: March 15-30, 1999 **Time**: 7:30 a.m. to 5:30 p.m. (Monday to Saturday)

**Course Description**: Techniques, concepts and issues surrounding the seed and genetic conservation, framed against sustainable agriculture.

**Course Coordinator**: Pamela G. Fernandez
Department of Agronomy, UPLB, College, Laguna 4031
Tel: (049)536-2466, -2468, -2217; Fax: (049)536-2468, -3912
Other fax nos.: (049)536-3472, -3551 or -2914
Email: pgf@mudspring.uplb.edu.ph, 110022.555@compuserve.com

**Other Information and Requirements**:

The course is designed for NGO and GO development workers implementing projects related to seed production, genetic conservation, farmer-based conservation and improvement or sustainable agriculture in general. It would also be highly suitable for trainors. Covered in the course are agricultural, agroforestry, and forestry species. Medium of instruction is mixed Filipino and English. Participants should have an undergraduate degree or equivalent experience or training and should be reasonably competent in the use of English and Filipino. Full attendance/ participation is required. This invitation should apply only to those who have not attended a previous short course offered by our group. Some sessions, esp. group activities are scheduled in the evenings. Thus, it is appreciated that participants agree to be booked in the same lodging facility.

Participants are expected to manage to come to Los Baños on their own on March 14th at the latest. If not familiar with the area please communicate with us for directions. Full session will start on the 15th and last up to March 30th. It is thus expected that all participants are already in by March 14th. Walk-in participants are not encouraged.
Participants are also expected to handle their own finances for lodging, food, learning materials not covered by the course and other incidentals.

**Rationale**:

Sustainable agriculture (SA) has become the official program of many organizations, both formal and non-formal. Adopting SA in the area of seed and genetic conservation requires shifts in more than just one or two aspects in the system. It does not only mean adopting appropriate inputs and technology but also giving due attention to developing human resources. The SEED being a basic production input, a unit in genetic conservation and diversity, an “agent” of change, and one that largely determines the system of production, can be a powerful tool to promote SA. A seed training curriculum with an SA perspective is viewed as one that places great value on indigenous knowledge systems, promotes strengthening of the informal seed sector, ensures understanding of various development perspectives, creates synergy among different sectors, and utilizes a holistic/integrative and participatory training approach.

*continued next page*

**Course Approach**:

The course shall consist of "sessions" with various resource persons from formal and informal institutions, group discussions, workshops, self-reflections, group examinations, practicums, project proposal preparation, and visits to various offices, laboratories and sites relevant to the course. Input or feedback from participants are constantly elicited through various means.

**Objectives**: *Participants should be able to*:

1. identify and acquire skills in basic seed technology which are framed within the sustainable agriculture,
2. discuss issues and concepts that relate to seed, the seed industry and overall development,
3. describe strengths and weaknesses of both the formal and informal seed systems,
4. describe and explain the value of some indigenous seed and genetic conservation practices
5. write up an action plan related to seed undertaking and relevant to one's line of work, using the sustainable agriculture framework,
6. identify various seed-related resources, and
7. promote networking for advancing a sustainable seed or genetic conservation undertaking.

**Costs**:

*Tuition fee* - 4,000.00, payable to the **"University of the Philippines Los Baños"**. This would help cover writing materials, basic references and handouts, and transportation during field trips. *Procurement/copying of other reading/learning resources are to be shouldered by the participants themselves.*

*Lodging* - Dormitories costing approximately 90.00-130/day (inclusive of beddings) will be prearranged. It is preferred that all participants take the same accommodation for optimum interaction and to facilitate some activities and overall conduct of training.

*Food* - meals may be taken from various fast-food establishments in the vicinity. Basic cost is approximately 35-45/meal. Snacks, normally preferred and shouldered by participants but managed by the facilitators for operation efficiency, would cost approximately 20/day or a total of 280 for the whole duration.

*Learning materials* - considerable number of publications and other forms of learning materials are available. They may be copied, subject to a fee, copyright terms, volume and time.

**Procedure**:

1. Fill in attached application form (Benchmark 1) as thoroughly as you can and send back to us making sure it reaches us by January 30th.

2. Applicants are then informed within a week of receipt of application about their acceptance. We aim to have at least 15 and not more than 25 participants selected on a first come first served basis.

3. Selected paricipants will hear from us again around the first week of February for further instructions.

*Please pass this invitation/announcement to those who you believe would benefit most and actively participate in the course.*

*continued next page*

**B. Application Form/Benchmark Information 1**

(Please answer as completely as possible)

**I. Profile:**

Name: _____ Preferred Nickname: _____
Home Address: _____
Date of Birth: _____ Age: _____ Sex: _____ Civil Status: _____

**Highest Educational Attainment (specify major field) or training background:**

_____

Name of Organization: _____
Office Address: _____
Designation/Position: _____
Contact Nos. Phone(s): _____
Fax: _____ Email: _____ Others: _____
Please indicate your possible funding source: _____

Please check if you have attended any training course, seminars, workshops related to: (please use separate sheet if necessary)

| | Place Held | Sponsoring Agency | Approximate Dates and/or duration |
|---|---|---|---|
| ___a) Sustainable agriculture | | | |
| ___b) Nursery management/ asexual propagation | | | |
| ___c) Soil, water, nutrient conservation/management | | | |
| ___d) Seed technology/ production | | | |
| ___e) Crop protection/IPM/ APM | | | |
| ___f) Genetic conservation or community seedbanking | | | |
| ___g) Agroforestry or related subjects | | | |
| ___h) Others (please specify): | | | |

1. General job description/responsibilities:

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2. Please indicate specific seed- or genetic conservation related activities/responsibilities that you are, or will be, involved in.

3. What problems or limitations related to seed (planting materials) and/or genetic conservation or your job in general have you encountered? What approach(es) and strategy(ies) do you believe or have made to solve these problems?

**III. Course Module and Levelling off**

The course will consist of some basic topics included in the following list. It shall however and to some extent be tailored to needs and a profile of participants. Please indicate which of the topics are most relevant to you, using a scale of 1 to 5 (5 being highest), encircling the number corresponding to your rating. Also please check topics which are your priority in terms of subject to be discussed. Your answer will help finetune the currriculum.

| PRIORITY | TOPICS | RATING | | | | |
|---|---|---|---|---|---|---|
| _____ | 1. Sustainable Agriculture | 1 | 2 | 3 | 4 | 5 |
| _____ | 2. Development Issues | 1 | 2 | 3 | 4 | 5 |
| _____ | 3. Community Organizing | 1 | 2 | 3 | 4 | 5 |
| _____ | 4. Human Resource Development | 1 | 2 | 3 | 4 | 5 |
| _____ | 5. Training Facilitation | 1 | 2 | 3 | 4 | 5 |
| _____ | 6. Farmer-based Extension | 1 | 2 | 3 | 4 | 5 |
| _____ | 7. Genetic Diversity and Conservation | 1 | 2 | 3 | 4 | 5 |
| _____ | 8. Community Seedbanking | 1 | 2 | 3 | 4 | 5 |
| _____ | 9. Seed Production/Multiplication | 1 | 2 | 3 | 4 | 5 |
| _____ | 10. Seed Handling and Storage; Seed Quality Testing; Seed Certification | 1 | 2 | 3 | 4 | 5 |
| _____ | 11. Alternative Crop and Seed Protection | 1 | 2 | 3 | 4 | 5 |
| _____ | 12. Soil, Water, Nutrient Management and Recycling | 1 | 2 | 3 | 4 | 5 |
| _____ | 13. Nursery Management | 1 | 2 | 3 | 4 | 5 |
| _____ | 14. Propagation and Multiplication and Handling of Asexual Propagules | 1 | 2 | 3 | 4 | 5 |
| _____ | 15. Farmer-based Crop Improvement | 1 | 2 | 3 | 4 | 5 |
| _____ | 16. Indigenous Knowledge Systems | 1 | 2 | 3 | 4 | 5 |
| _____ | 17. Networking, Fund Sourcing | 1 | 2 | 3 | 4 | 5 |
| _____ | 18. Area Rehabilitation | 1 | 2 | 3 | 4 | 5 |
| _____ | 19. Procurement | 1 | 2 | 3 | 4 | 5 |
| _____ | 20. Seed Extension/Education | 1 | 2 | 3 | 4 | 5 |
| _____ | 21. Seed Research | 1 | 2 | 3 | 4 | 5 |
| _____ | 22. Project Proposal Preparation/Monitoring | 1 | 2 | 3 | 4 | 5 |
| _____ | 23. Plant Identification and Taxonomy | 1 | 2 | 3 | 4 | 5 |
| _____ | 24. Indigenous Trees Identification and Propagation | 1 | 2 | 3 | 4 | 5 |
| _____ | 25. Indigenous Fruit Species Propagation | 1 | 2 | 3 | 4 | 5 |
| _____ | 26. Agroforestry System | 1 | 2 | 3 | 4 | 5 |
| _____ | 27. Conversion to Organic Agriculture | 1 | 2 | 3 | 4 | 5 |
| _____ | 28. Biodynamic Farming | 1 | 2 | 3 | 4 | 5 |
| _____ | 29. Alternative/Household Economics | 1 | 2 | 3 | 4 | 5 |
| _____ | 30. Water Management in Marginal Environments | 1 | 2 | 3 | 4 | 5 |
| _____ | 31. Indigenous Soil Classification | 1 | 2 | 3 | 4 | 5 |

Please list any other topics and activities you wish could be addressed in the course.

*continued next page*▸

What are some questions you wish to pose or tackle through the course or through other means?

Any other comments you wish to convey to us?

- ***Please send this application form as soon as you can so it would reach us by January 30.***
- ***Make sure you have seen the announcement/invitation to which this form is attached for more specific information and other details.***

**C. Benchmark Information 2**

***Your ideas about questions below are highly needed to fully achieve the objectives of the course, so please try to answer all items****. This questionnaire aims to introduce to the selected applicants various issues related to seed, as well as to provide us a gauge of their base knowledge and awareness. It will also help further finetune the course module. Answer to some questions are designed to guide resource persons who will be involved in the course. It would help us very much if you could send this back to us on or before February 15, 1999.*

Name:

Full name of organization:

Organization goals (related to sustainable agriculture or seed system):

Type of organization *(please check)*: GO ___ NGO ___ PO___ Others (specify)_____

1. To enhance mutual learning you are requested to bring along seeds or other plant material that are curious, unique or indigenous. Others listed below are also very highly desirable. Please specify what you are bringing for each.

- seed or plant material (unique, curious, indigenous…
- printed learning/reading materials…
- posters…
- video tapes…
- slides…
- other "curious" objects related to seed technology, genetic conservation or IKS…
- information materials about your institution (if possible, please have enough to give to all participants)…
- others…

2. Please explain the specific type of seed project or program which your institution or yourself is involved in or wants to do (i.e., related to seed production, genetic conservation or seedbanking; seed marketing/distribution, research, education, extension/ training, advocacy, etc.).

3. Please enumerate highly significant seed-related problems (technical or otherwise) that you have encountered or are aware of and which you feel would be good to address in the course.

*continued next page*

4. Please enumerate at least 5 criteria or characteristics of a developed or "sustainable" seed industry.

5. For each of the following items please encircle the number corresponding to how much you believe it could contribute to sustainability.

| | *increasing SUSTAINABILITY* ----------> | | | | | | *Comments or questions for any* |
|---|---|---|---|---|---|---|---|
| a) Local/folk knowledge; IKS | 0 | 1 | 2 | 3 | 4 | 5 | |
| b) Integrated Pest Management (IPM) | 0 | 1 | 2 | 3 | 4 | 5 | |
| c) Botanical pesticides and biological control agent | 0 | 1 | 2 | 3 | 4 | 5 | |
| d) $F_1$ hybrids | 0 | 1 | 2 | 3 | 4 | 5 | |
| e) Monocropping | 0 | 1 | 2 | 3 | 4 | 5 | |
| f) Aquaculture | 0 | 1 | 2 | 3 | 4 | 5 | |
| g) Sloping Area Land Technology (SALT) | 0 | 1 | 2 | 3 | 4 | 5 | |
| h) *Trichoderma harzianum* (rapid composting) | 0 | 1 | 2 | 3 | 4 | 5 | |
| i) Trichogramma | 0 | 1 | 2 | 3 | 4 | 5 | |
| j) General Agreement on Tariffs and Trade (GATT)/World Trade Organization (WTO) | 0 | 1 | 2 | 3 | 4 | 5 | |
| k) Intellectual Property Rights (IPR)/ patenting | 0 | 1 | 2 | 3 | 4 | 5 | |
| l) Plant Breeder's Rights (PBR) | 0 | 1 | 2 | 3 | 4 | 5 | |
| m) Chemical fertilizers | 0 | 1 | 2 | 3 | 4 | 5 | |
| n) Green manuring and cover cropping | 0 | 1 | 2 | 3 | 4 | 5 | |
| o) Gintong Ani of the Medium Term Agric'l Development Plan (MTADP-DA) | 0 | 1 | 2 | 3 | 4 | 5 | |
| p) Science and Technology Agenda for National Development (STAND) 2000-DOST | 0 | 1 | 2 | 3 | 4 | 5 | |
| q) Reductionist science | 0 | 1 | 2 | 3 | 4 | 5 | |
| r) Package of technology (POT) | 0 | 1 | 2 | 3 | 4 | 5 | |
| s) Biotechnology/genetic engineering | 0 | 1 | 2 | 3 | 4 | 5 | |
| t) Systems yield | 0 | 1 | 2 | 3 | 4 | 5 | |
| u) Foreign loans | 0 | 1 | 2 | 3 | 4 | 5 | |
| v) Transfer of technology | 0 | 1 | 2 | 3 | 4 | 5 | |
| w) Agroforestry | 0 | 1 | 2 | 3 | 4 | 5 | |
| x) Farmers' Rights | 0 | 1 | 2 | 3 | 4 | 5 | |
| y) Factoring in (including) "externalities" in economic analysis | 0 | 1 | 2 | 3 | 4 | 5 | |
| z) Regional Industrialized Centers (RICs) | 0 | 1 | 2 | 3 | 4 | 5 | |
| a1) Transnational or Multinational Corporations (TNCs, MNCs) | 0 | 1 | 2 | 3 | 4 | 5 | |
| a2) Bioprospecting (Exec. Order 247) | 0 | 1 | 2 | 3 | 4 | 5 | |
| a3) Farmer-based breeding, seed production and genetic conservation | 0 | 1 | 2 | 3 | 4 | 5 | |

*continued next page*

6. Please describe your impression of the strengths and weaknesses of formal seed systems [i.e., government organizations (GO) or private companies, research institutions] and informal seed systems [i.e., non-government organizations (NGO), peoples' organizations (PO), farmers' organizations (FOs)]. This will help us level off with each other and come up with a scheme for possible complementation.

| | Strengths | Weaknesses |
|---|---|---|
| Formal- | | |
| Informal- | | |

7. What policies, measures, programs, situations or realities IN YOUR AREA do you know of that...

a) …threaten food security, self reliance, farmer empowerment, and people-centered development or can weaken a seed industry?

b) ….is a showcase (example) or an illustration of a strength or an opportunity to promote a "sustainable" agricultural or seed system (ecological, community – or farmer-based, etc.)?

8. a. What do you expect to gain from the course?

b. How can you help attain the objectives of the course?

c. What can possibly prevent you from actively participating in the course?

d. How can the following people help facilitate your learning?

participants:

resource persons:

facilitators:

*continued next page*

9. Suppose you were asked to serve as a resource person in a development endeavour, concretizing your strength/potential or experience through a 2-page information sheet to serve as training or extension material, what topic or subject matter do you think you could do best?

10. Please write any questions, suggestions, general comments that you wish to make.

*continued next page*

**D.** First response to the candidates

UNIVERSITY OF THE PHILIPPINES AT LOS BAÑOS
COLLEGE OF AGRICULTURE
College, Laguna, Philippines 4031
Tel. Nos.: (049) 536-2466; 536-2468; 536-2217
Fax No.: (049) 536-2468

**DEPARTMENT OF AGRONOMY**

_____

_____
_____
_____

Dear _____:

We would like to confirm your acceptance to the short course on "Seed Technology and Genetic Conservation for Sustainable Agriculture" on March 15-30, 1999. This is assuming that you were able to obtain the needed financial support. For your guidance please take note of the following matters:

1. The schedule is tight with sessions running as early as 7:30am and as late as 5:30pm daily (sometimes even later), as well as on Saturdays. Full attendance is deemed essential to fully achieve the objectives of the course. Participants are expected to already be in UPLB by Sunday (March 14) for registration and so that the morning session on the first day (March 15) won't be missed. We will have a full session on the 15th and your input would be critical. For the last day which is March 30th, the program ends late afternoon, thus, please plan to depart only the day after or even later, especially if you wish to do other business here at UPLB.

2. Should you need to visit some university staff or other institutions in campus or nearby places, you may please arrange to do this outside the course schedule, i.e., a working day before or after the short course.

3. You are encouraged to bring learning/reading materials [as specified in the enclosed questionnaire (benchmark 2)] for sharing or display. Moreover, you are also expected to bring with you indigenous or curious seeds for sharing, discussion or exchange. Other indigenous materials which you think are worth sharing would be good to have too. You may also wish to bring some native products or souvenir for promotion or general awareness making.

4. You are booked for 17 days, from Sunday, March 14 to Wednesday morning, March 31, 1999 at the Continuing Education Center (CEC) Dormitory which gave us a special rate of P150/day/person (4-per room). The place is also the venue of the course. Previous venue and accommodations can not be used because classes will still be going on at that time. Though the price is a bit higher than before (i.e., P20 more) the place is so much better, thus so we hope you wouldn't mind the extra expense for lodging. In the event that you will have to stay elsewhere, please let us know as soon as possible so we can make necessary adjustments from our end, or you would have to meet some cancellation charges (50% of the total as per the hostel policy) yourself. However, we do hope you would consider our suggestion, as this is considered to be a better arrangement to enhance interaction among participants and to facilitate some group-oriented activities outside regular sessions.

*continued next page*

5. Upon reaching Los Baños it would be better that you get off at the Caltex gasoline station (right side of the National highway). This in front of Olivarez Plaza. This is also a block before Mercury Drug Store and Jollibee, which are landmarks of Crossing (junction of road going to College and the National Highway). Right where you get off ride a jeep that goes to "College/ UP Los Baños". Ask the driver to drop you off at the YMCA. The CEC Hostel is a few meters left of YMCA. Should you have problems, please call our office (Tel: 536-2468 or 536-2466 or 536-2217), my home 536-3912 or the hostel ( 536-2286).

6. Please be informed that the participants have varied interest and come from various affiliations and backgrounds. Such heterogeneity and the sheer number can be a challenge for all of us. Hopefully, we can help each other tap the strength of this diversity for a smooth training and to forward sustainable agriculture. Your understanding, patience and full cooperation, therefore, would be highly solicited.

7. If you plan to copy or purchase some learning materials, make sure to have sufficient funds for the purpose as the course provides only basic references. Just to reiterate, board and lodging and other incidental expenses including local jeepney fares, air/sea or land transport are to be borne by the participants themselves. The University, through the tuition fee (P4,000.00, payable to the "University of the Philippines Los Baños"), provides only transportation for local field trips and some readings, as well as the basic reading and writing materials. The fee for the course venue (not normally an expense) will be charged elsewhere. It might be of interest for you to know also that honoraria are not given to resource persons. We do this for sustainability reasons.

8. It has become the tradition of the course that the participants to develop a logo for a T-shirt for their batch. You may, therefore, want to include the possibility of a T-shirt expense in your budget (P200.00-250.00) and a tentative design for the participants to deliberate upon.

9. Please accomplish the enclosed form to further help us finetune the appropriate module for this batch. We should receive this form by March 4 for us to consider you to be definitely coming for the course.

Looking forward to hearing from you and meeting you soon . Regards.

Sincerely,

**PAMELA G. FERNANDEZ**
Short Course Coordinator

*continued next page*

**E.** Second response to the candidates

UNIVERSITY OF THE PHILIPPINES AT LOS BAÑOS
COLLEGE OF AGRICULTURE
College, Laguna, Philippines 4031
Tel. Nos.: (049) 536-2466; 536-2468; 536-2217
Fax No.: (049) 536-2468

**DEPARTMENT OF AGRONOMY**

March 14, 1999

_____
_____
_____

Dear Participants:

Welcome to Los Baños. Hope you had a good travel. We have made arrangement for your room with three others. Hope you won't mind the heterogenous and multiple arrangement. We do this as an application of sustainability principle (as you will see later). Some arrangement (but to a limited extent ) can be done later if there's a need. On where to get your meals, you will please inquire from the reception/counter for more details. There are many cafeterias around that you could choose from. For example: YMCA – beside CEC, Student Union (3 cafeterias) – across the field from Women's Dorm which is 3 buildings to the left of CEC, Grove area-take a jeep (P2.50) or walk up to the UPLB gate. The reception can also fill you in on some of your quesries.

Some of us will drop in at CEC today sometime before lunch, after lunch and in the evening. Registration is from 3-5 p.m. today (Sunday) and at 7:30–8:30 a.m. tomorrow (Monday). The program will start at 9:00 a.m. tomorrow. Pam's home phone number is 536-3912 if you have any specific concern. You may try our office number also (536-2468) in case we are there.

See you later!

PAM FERNANDEZ & STAFF

## APPENDIX 9. List of handouts for distribution and additional references for photocopying by participants themselves (Short course 1999).

### DEVELOPMENT/CULTURE/VALUES

1. Esteva, G. 1992. **Development**. Sachs, W. (ed.). The Development Dictionary. Zed Books, U.K. pp. 1-25.
2. **Factors influencing farmers' decision-making**. 1 p.
3. **Minimum basic needs of man**. 1 p.
4. **The paradox of our age**. 1p.
5. **Real Aid / Advances in Agriculture / The Real Causes of Hunger**. 1 p.
6. **Real help**. 1 p.
7. **Sayings related to sustainable agriculture**. Collated by the Seed Science and Technology Division, UPLB, 1999. 8 p.
8. Verzola, R. 1994. **Types of economies**. p. 11. In: IPR Sourcebook: Philippines. UPLBCA-MODE.
9. **133 Ways to Save the Earth**. Excerpted from two pamphlets: 101 Ways to Save the Earth and Personal Action Guide for the Earth, plus the bimonthly publication of the Sun Mountain Center (March/April 1989). 2 p.

### SCIENCE

1. Dharmawardena, G. 1997. **Reincarnation, Is it Scientifically Acceptable?**. In: Theosophical Digest. 4th Quarter. 9(4):3-14.
2. Rist, S. 1995. **Diversity in knowledge systems: Science is not universal**. In: ILEIA Newsletter. July. 11(2): 23.

### SUSTAINABLE AGRICULTURE – CONCEPT/GENERAL

1. **External inputs to agriculture vs. internal resources to farms**. 1 p.
2. **Features/attributes/dimensions of sustainable agriculture**. 1 p.
3. Fernandez, P.G. 1992. **A University seed program to promote sustainable agriculture in the Philippines**. In: The Philippine Agriculturist. 75(3&4):91-118. *(Contains **Comparison between the conventional and an "SA" University seed program**. 2 p.)*
4. Hatfield and Karlene. 1993. **Three systems of agriculture compared**. 1 p.
5. **Likas kayang pagsasaka ay buhay**. A poem by a short course participant (1999). 1 p.
6. **Misconceptions about Sustainable Agriculture**. 1 p.
7. **Modern and sustainable agriculture: Features and differences**. 2 p.
8. **SACRA**. Maiden issue. April 1995. CADI. 12 p.
9. Perlas, Nicanor. 1993. **The seven dimensions of sustainable agriculture**. Excerpts of paper presented at the Second Asian Development Forum, 22-27 February, 1993. Xavier University, Cagayan de Oro City. Center for Alternative Development. Quezon City. pp. 159-175.
10. Reganold, John P., Robert I. Papendick and James F. Parr. 1990. **Sustainable agriculture**. In: Scientific American. Vol. 262, No. 6. pp. 112-120.
11. **Seven principles of sustainable agriculture**. 1 p.
12. Shiva, V. **Three models of agriculture**. In: Globalisation of Agriculture and the Growth of Food Insecurity. 1 p.
13. **Spectrum of sustainable agriculture approaches and philosophies**. 1 p.
14. **Some distinctions between different traditions of knowledge and knowing which may aid curriculum development**. In: Ison, R. L. Teaching threatens sustainable agriculture. IIED Gatekeeper Series No. 21. p. 11.
15. Zamora, Oscar B. **Sustainable agriculture: concepts, concerns and practices**. 8 p.
16. Zamora, Oscar B. **Towards sustainable agriculture in the Philippines**. 2 p.

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## SUSTAINABLE AGRICULTURE – RELATED ISSUES

1. Bantiles, R. 1998. **Certification, standards and labeling**. An excerpt of this paper was delivered during the Consultation-workshop on Organic Agriculture, 15 December 1998, PCARRD, Los Baños, Laguna. 4 p.
2. **The framework: The problem, the solution, the problems generated, solutions proposed**. 1 p.
3. **The Problems with HYV, Hybrids (F1) and Purchased Seeds**. Lessons from Nature. pp. 86-87.
4. **Some agricultural technology approaches to reduce energy inputs into food production systems**. 1 p.
5. **Sustainable agriculture: farmers and biotech approaches** (After Hobbelink, H. 1991. Biotechnology and the future of the world). 1 p.
6. **The vicious cycle of chemical agriculture (Diagram of Effects of Modern Agriculture)**. Lessons from Nature. p 31.

## SUSTAINABLE AGRICULTURE – INDICATORS

1. **Checklist of farm/farmer/organizational features indicating sustainability**. 1 p.
2. **Consolidated farm/community/watershed/national level sustainability indicators**. 1 p.
3. **Framework for SA indicators**. 1 p.
4. Makarabhirom, P. 1995. **Indicators of sustainability**. In: FAO and IIRR. Resource management for upland areas in Southeast Asia. FARM Field Document 2. Food and Agriculture Organization of the United Nations, Bangkok, Thailand and International Institute of Rural Reconstruction, Silang Cavite, Philippines. pp. 162-164.

## Sustainable Agriculture – CONVERSION

1. Altieri. 1995. **Obstacles to organic farming**.1 p.
2. Hill. 1992. **Characteristics of farmers before and after transition to sustainable agriculture**. 1 p.
3. McRae, R.J., et al. 11990. **Farm-scale agronomic and economic conversion from conventional to sustainable agriculture**. Ecological agriculture projects research paper No9. pp. 155-198.

## MODELS OF SA FARMS

Y **ORGANIC AGRICULTURE**
Y **LEISA;LISA**
Y **BIODYNAMIC**

1. **Ikapati farm: Factsheet on Biodynamic vegetables and biodynamic farming**. 2 p.
2. Koeft, H. 1990. **Bio-dynamics: More things...than are dreamt of in your philisophy. The principles of bio-dynamic farming**. In: New Farmer & Grower. Spring Issue. 2 p.

Y **PERMACULTURE**
Y **INTEGRATED NATURE FARMING**
Y **NATURAL FARMING**

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## AGROECOLOGY/ECOLOGICAL AGRICULTURE PRINCIPLES

### Y DIVERSITY

1. **Comparison between green revolution and agroecological technologies**. In: UNDP. 1995. Agrocelogy: Creating synergism for a sustainable agriculture. UNDP Guidebook Series. UNDP. New York, USA. 1 p.
2. **Objectives and processes in the design of a model sustainable agroecosystem**. In: Altieri, M.A. 1995. Agroecology: The science of sustainable agriculture. 2nd edition. Westview Press, Boulder, Colorado, USA. p. 93.
3. **A schematic outline of biological agriculture**. In: Altieri, M.A. 1995. Agroecology: The science of sustainable agriculture. 2nd edition. Westview Press, Boulder, Colorado, USA. p. 180.
4. **The system properties of agroecosystems and indices of performance**. 1 p.

### Y APPROPRIATE SEED

1. IIRR. 1993. **Traditional or indigenous seed**. In: Bio-intensive Gardening KIT. IIRR, Silang, Cavite. 1 p. (*together with "Why producing your own vegetable seeds is important" handout)*

### Y RECYCLING

1. **Green manure crops: nitrohenong timbang/ Dumi ng hayop na kinakailangan upang makapagbigay ng pataba sa lupa**. 1 p.

### Y LIVING SOIL

1. Niemeijar, D. 1995. **Indigenous soil classifications: Complications and considerations**. In: Indigenous Knowledge and Development Monitor. Volume 1. January. pp. 20-21.
2. Sikana, P. 1993. **How farmers and scientists see soils: Mismatched models**. In: ILEIA Newsletter 9(1):15-16.

### Y SOIL-WATER CONSERVATION

1. **Some examples of soil, space, water and vegetation management systems used by traditional agriculturists throughout the world**. In: UNDP. 1995. Agrocelogy: Creating synergism for a sustainable agriculture. UNDP Guidebook Series. UNDP. New York, USA. 1 p.
2. **Soil nutrient gains and losses and some interventions**. 1 p.

### Y APPROPRIATE/ALTERNATIVE PEST MANAGEMENT

1. **A list of non-chemical methods of managing weeds and the ecological principles upon which each is based.** In: Altieri, M.A. 1995. Agroecology: The science of sustainable agriculture. 2nd edition. Westview Press, Boulder, Colorado, USA. p. 295.
2. Altieri, M. 1995. **Escaping the pesticide treadmill: Agro-ecology puts synergy to work to create self-sustaining "agro-ecosystems"**. In: Ceres. July-August. pp. 15-23.
3. **Approaches to pest management**. 1 p.
4. **Basic processes in pest/disease development**. 1 p.
5. **Demise of dirty dozen**. 2 p.
6. Medina, C. 1996. **Alternatibong pamamahala ng peste para sa maliliit na magbubukid sa Pilipinas**. In: Suhay. February. Pp. 12-18.
7. **Methods of crop protection with some specific examples**. 1 p.
8. **Natural pest management**. Lessons from Nature. pp. 79-81
9. **Possible effects of intercropping on insect pest population**. In: Altieri, M.A. 1995. Agroecology: The science of sustainable agriculture. 2nd edition. Westview Press, Boulder, Colorado, USA. p. 274.

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10. **Selected examples of multiple cropping systems that effectively prevent pest outbreaks**. In: Altieri, M.A. 1995. Agroecology: The science of sustainable agriculture. 2nd edition. Westview Press, Boulder, Colorado, USA. p. 277.
11. **Summary of conceptual approaches for preventing weed emergence with crops**. In: Altieri, M.A. 1995. Agroecology: The science of sustainable agriculture. 2nd edition. Westview Press, Boulder, Colorado, USA. p. 294.
12. **Summary of conceptual approaches for reducing numbers of propagules in the weed seed bank**. In: Altieri, M.A. 1995. Agroecology: The science of sustainable agriculture. 2nd edition. Westview Press, Boulder, Colorado, USA. p. 293.

### Y DIVERSIFICATION, INTEGRATION

### Y AGROFORESTRY

1. Dalmacio, R.1995. **Agroforestry systems in the Phlippines**. In: FAO and IIRR. Resource management for upland areas in Southeast Asia. FARM Field Document 2. Food and Agriculture Organization of the United Nations, Bangkok, Thailand and International Institute of Rural Reconstruction, Silang Cavite, Philippines. pp. 56-63.
2. **Fruits and nuts grown at the RC Farm, Mabacan, Calauan, Laguna**. 5 p.
3. Lai, C.K. 1995.**Overview of agroforestry systems in Southeast Asia**. In: FAO and IIRR. Resource management for upland areas in Southeast Asia. FARM Field Document 2. Food and Agriculture Organization of the United Nations, Bangkok, Thailand and International Institute of Rural Reconstruction, Silang Cavite, Philippines. pp. 25-33.
4. **Multiplication, that's the name of the game: Guidelines for seed production of agroforestry trees**. In: Agroforestry Today. October-December 1998. 10(4):19-22.

## INDIGENOUS KNOWLEDGE SYSTEMS

1. De Guzman, L.E.P. 1998. **Indigenous knowledge systems (IKS): Some considerations in their study**. A paper abstracted from the MSc Agronomy thesis outline entitled Indigenous seed practices of a Lumad community in Mindanao. July 1998. 5 p.
2. Fernandez, Pamela G. 1994. **Indigenous seed practices for sustainable agriculture**. In: Indigenous Knowledge & Development Monitor. Volume 2/No. 2. pp. 9-12.
3. Mathias, E. 1995. **Recording Indigenous Knowledge – An Overview**. In: Schneider, J. (Ed). Indigenous knowledge in conservation of crop genetic resources: Proceedings of an International Workshop held in Cisarua, Bogor, Indonesia. January 20 – February 3, 1995. pp. 19-25.
4. Maundu, P. 1995. **Methodology for collecting and sharing indigenous knowledge: A case study**. In: Indigenous Knowledge and Development Monitor. 3(2):3-5.
5. **Suggested information or features to include in the documentation of indigenous knowledge systems** (excerpted by ILEA Newsletter 6(2):29:1990, from A.K. Gupta, J. Capoor and R. Shah. Inventory of peasant innovations for sustainable development, an annotated bibliography). 1 p.
6. "**This Earth is Precious**". 1 p.

## GENETIC CONSERVATION –CONCEPTS; GENERAL

1. Altoveros, N.C. **Genetic resources conservation: importance and strategies**. 3 p.
2. Borromeo, T.H. 1999. **Plant genetic resources conservation systems**. Transparencies used during the module on PGR, Short course 1999. 21 p.
3. Fernandez, P.G. 1995. **International Developments in Biotechnology and Genetic Resources Conservation**. Paper presented at the Workshop on Germplasm Conservation Perspectives held at the Biotechnology Research Institute for Food Crops (RIFCB), Bogor, Indonesia on November 3, 1995. 12p.
4. **Formal genebanking**. 2 p.
5. Ira, G. **Biodiversity: A synthesis**. In: Biodiversity in the Western Ghats. 4 p.

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6. RAFI. **The biodiversity balance sheet: The geopolitical structure of biodiversity**. 1 p.
7. Te-Tzu Chang. **Plant genetic resources and utilization**. Encyclopedia of agricultural science, vol 3. 10p.

## INFORMAL INITIATIVES IN SEEDBANKING/COMMUNITY SEED BANKING

1. Fernandez, P.G. 1999. **Community seed banking and "sustainable" seed production: Technical Notes**. 18 p.
2. **Steps and elements in community seed banking**. 1 p.
3. Zamora, O.B. 1994. **Agricultural genetic resources management by the informal sector in Southeast Asia: Challenges and needs**. In: Einarsson, P. (Ed). Growing diversity in farmer's fields: Proceedings of a Regional Seminar for Nordic Development Cooperation Agencies. Lidingo, Sweden. 26-28 September 1993. Naturskyddsforeningen and GRAIN. Stockholm. pp. 18-31.

## INFORMAL GENETIC CONSERVATION – TECHNICAL

## GLOBAL ISSUES IN SEED AND GENETIC CONSERVATION

1. **APEC: Agenda for action in agricultural technology**. 1 p.
2. **Comparison: AFTA, APEC, WTO**. 1 p.
3. **Comparison between the UNCED Rio Declaration and GATT**. In: Pesticide Monitor 1(4):6
4. **Globalization vs. Localization**. In: Eat smart, healthy, local: Safe and secure food for tomorrow. 1 p.
5. **The "Life" industry** (excerpted from Hobbelink, 1991). 1 p.
6. **The privatization of the IARCs and related institutions**. In: Biotechnology and the future of world agriculture. pp. 125-126.
7. **Protectionist provisions of the Constitution**. 1 p.
8. **Threats to food security**. 1 p.
9. Tables/Figures/Boxes from Biotechnology and the Future of the World book:
   - Top ag-biotechology companies' agricultural biotechnology spending in 1988 ($US million)
   - Top ten pesticide houses (1988 sales, US$ billion, adapted for recent take-overs)
   - The top ten pharmaceutical corporations (1987 sales in US$ billion, adapted for recent take-overs)
   - Top ten seed corporations (1988 sales, US$ million, adapted for recent take-overs)
   - The top ten processing corporations (US$ billion)
   - Figure of integrated system of plant breeding (formal sector)
   - Five laws of genetic conservation
   - Twelve Reasons to say no to life patents

## BIOPROSPECTING

1. Zamora, O.B. 1997. **The Philippines: A Briddle on Bioprospecting?**. In: Seedling. June. 14(2):11-19.

## IPR

1. **Processes falling within the definition of "Microbiological Processes"**. 1 p.
2. SEARICE. 1991. **Microtechnological processes of Third World farm communities: A sampling of patentable processes or products under Folklore Provisions should the US TRIPS proposals be adopted in GATT**. 4 p.

*continued next page*

3. Zamora, O.B. **Karapatan sa pagmamay-ari ng kaalaman sa pagsasaka sa ilalim ng General Agreement on Trade and Tariffs (GATT)**. 5 p.
4. **13 reasons to say no to life patents**. In: SUHAY. Espesyal na isyu. Abril-July 1998. pp. 9-10.

## SEED SYSTEMS/TECHNOLOGY: CONCEPTS & GENERAL CONCERNS

1. Fernandez. P.G. 1994. **Seed Systems, Indigenous Knowledge Systems and Genetic Diversity**. In: Schneider, J. (Ed). Indigenous knowledge in conservation of crop genetic resources: Proceedings of an International Workshop held in Cisarua, Bogor, Indonesia. January 20–February 3, 1995. pp. 11-17.
2. **Sustainable Agriculture Newsletter (SAN) vol 2, no. 3. 199_. 46 p.***
3. **Agroforestry Seeds Circular 1. 199_. 38 p.***
4. **Agroforestry Seeds Circular 2. 199_. 70 p.***
5. **Agroforestry Seeds Circular 3. 199_. 84 p.***
6. Pagpaparami at Pangangalaga ng Binhi (Tagalog Manual). 1992. 42 p.*
7. **ATIK 5. 199_. 123 p.***

## LINKING SEED TECH WITH GENETIC CONSERVATION = SEED BIOLOGY, VARIETY TYPES AND DISSEMINATION = SEED/VARIETY TYPES AND MULTIPLICATION

1. Fernandez, P.G. 1999. **Seed Technology Module: (A) Plant Classification, Identification, Seed Biology, and Dissemination; (B) Variety Types, Development, Maintenance, and Multiplication; (C) Informal Characterization System for Seedbanking; (D) Seed System**. 15 p.

## SEED PRODUCTION

1. **Advantages of Self-seed Production/The Process of Self-seed Production**. Lessons from Nature. pp. 88-91.
2. **Comparison of features among the conventional (formal), indigenous (traditional) and sustainable agriculture (SA) crop and seed production**. 1 p.
3. IIRR. 1993. **Seed production/Site selection and timing of seed production**. In: Bio-intensive Gardening KIT. IIRR, Silang, Cavite. 6 p.
4. IIRR. 1993. **Why producing your own vegetable seeds is important?**. In: Bio-intensive Gardening KIT. IIRR, Silang, Cavite. 1 p.
5. **Mode of pollination, viability period, minimum isolation requirements and seed count of different vegetable crops**. 1 p.
6. **Maturity indices of some vegetable crops**. 1 p.
7. Rasco, E.T. Jr. **Classification of some vegetable crops according to pollination**. 1 p.
8. RBF/IIRR. **Producing rice seeds in a farmer's field**. Low-external input Rice production (LIRP): A technology information kit. 2 p.

## SEED PRODUCTION AND GENETIC CONSERVATION

1. RBF/IIRR. **Managing traditional cultivars for optimum output**. Low-external input rice production (LIRP): A technology information kit. 2 p.

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** Contained inside each participant's kit/bag*

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## SEED COLLECTION

1. RBF/IIRR. **Rice seed collection and handling**. Low-external input rice production (LIRP): A technology information kit. 4 p.

## SEED HARVESTING

1. IIRR. 1993. **Seed harvesting and seed extraction**. In: Bio-intensive Gardening KIT. IIRR, Silang, Cavite. 2 p.

## SEED DRYING

1. IIRR. 1993. **Seed drying**. In: Bio-intensive Gardening KIT. IIRR, Silang, Cavite. 2 p.

## SEED QUALITY TESTING

1. Dayan, M.P. 1993. **Seed quality testing of forest tree species**. Lecture presented in the 3rd Training Course in Agroforestry Seed Production, Handling Technology and Nursery Management held at Agronomy Department UPLB-CA on April 19-30, 1993. 7 p.
2. IIRR. 1993. **Testing seed quality** In: Bio-intensive Gardening KIT. IIRR, Silang, Cavite. 3 p.
3. Seed Technology Staff. 1999. **Modified storyboard**. 36 p.
4. RBF/IIRR. **Rice seed dormancy**. Low-external input rice production (LIRP): A technology information kit. 2 p.
5. RBF/IIRR. **Determination of rice seed quality**. Low-external input rice production (LIRP): A technology information kit. 3 p.

## SEED STORAGE

1. Cleveland, D.A. and D. Soleiri. 1991. **Saving seeds for planting**. In: Food from dryland gardens: An ecological, nutritional, and social approach to small-scale household food production. Center for People, Food and Environment. Tucson, Arizona. pp. 285-306.
2. **Equilibrium moisture content of vegetables seed at various relative humidities and approximately 25 C**. 1 p.
3. Gonzalves, J. 1990. **Saving seeds**. ILEIA Newsletter. pp. 27-28.
4. **Half-life of Seed (Time to 50% germination) under uncontrolled storage at College, Laguna, Philippines**. Collated by Mamicpic, 1978. 1 p.
5. IIRR. 1993. **Seed storage**. In: Bio-intensive Gardening KIT. IIRR, Silang, Cavite. 2 p.
6. RAFI. **Seed saving table**. Building the bank. pp. 13-15.
7. RBF/IIRR. **On-farm grain storage**. Low-external input rice production (LIRP): A technology information kit. 2 p.
8. **Seed MC: Effect on Seed**. 1 p.
9. **Seed longevity and deterioration figure**. 1 p.
10. **Time and rate of sorption to EMC of 8 kinds of seed stored with low and high initial seed moisture under 2 room conditions**. 1 p.

## SEED HEALTH

## SEED SOURCING

## SEED DISTRIBUTION

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## SEED MARKETING

## SEED ECONOMICS

## SEED EDUCATION

## SEED RESEARCH

## INDIGENOUS FOREST TREE SPECIES

1. Baguinon, N.T. 199_. **Using indigenous tree species**. 4 p.
2. **Country of origin of select plants within the Indochinese-Indonesian Region**. 1 p.
3. **Pointers on how to handle miracle tree seeds**. In: Permafor Forests & Farms. pp. 6-7.

## INDIGENOUS FRUIT TREES

## PLANT CLASSIFICATION

### Nursery Management

1. Carandang, W.M. 1991. **Forest Nurseries**. Training material used during the training course on Agroforestry Seed Production Technology and Nursery Management held at the Dept. of Agronomy, College of Agriculture, UPLB, College, Laguna, Philippines. April 15, 1991. 21 p.
2. IIRR. 1993. **Nursery techniques for seedlings**. In: Bio-intensive Gardening KIT. IIRR, Silang, Cavite. 4 p.
3. Tolentino, E.L. 1999. **A Short Note on Forest Nurseries and Seedling Culture**. Training Material for the 8th Short Course on Seed Technology and Genetic Conservation for Sustainable Agriculture, March 23, 1999 held at CEC, UPLB, College, Laguna. 13 p.

## ASEXUAL PROPAGATION

1. RBF/IIRR. **Clonal propagation: A method of seed multiplication**. Low-external input rice production (LIRP): A technology information kit. 2 p.

## HANDLING OF PERISHABLES

## HANDLING OF ASEXUAL PROPAGULES

## VEGETABLE CONTAINER GARDENING

1. Aquino, A.T. n.d. **Mga gabay sa pag-aalaga ng gulay sa sisidlan**. Isang papel na inihanda para sa Seminar na “Container Vegetable Production”. 7 p.

*continued next page*▸

## INFORMAL BREEDING/CROP IMPROVEMENT, VARIETY MAINTENANCE AND SEED MULTIPLICATION

1. Cordeiro, A. et al. 1994. **Corn community seed production** (English translation by Renee Vellve of GRAIN, Philippines). Advice and Service for Projects in Alternative Agriculture. Brazil. 19 p.
2. Fernandez, P.G. and O.B. Zamora. 1995. **Farmer-based Variety Development, Maintenance, Multiplication and Genetic Conservation in the Philippines**. Paper presented at the Workshop on "Integrated Seed Systems for Low-Input Agriculture", October 24-27, 1995, MARIF, Malang, Indonesia. 12 p.
3. Grain. 1992. **Why farmer-based conservation and improvement of plant genetic resources?**. Cooper, D., et al (eds). Growing diversity: genetic resources and local food security. Intermediate technology publications. UK. pp. 1-16.
4. Mendoza, T.C. n.d. **Mga mahalagang isyu tungkol sa rice breeding at seed conservation**. 4 p.
5. Silva, B.M. and O. Santanta. n.d. **Corn seed production and selection farm** (English translation by Renee Vellve of GRAIN, Philippines). Center for Alternative Technologies. Brazil. 12 p.
6. Vicente, P.R. 1996. **Farmer-based crop improvement for sustainable agriculture**. Inihanda para sa Short Course on Seed Production, Handling and Technology for Sustainable Agriculture. April 1996. UPLB. 10 p.

## *MASIPAG* ORGANIZATION, etc.

1. Ho, M.W. n.d. **Genetically engineered foods: The hazards are inherent in the technology**. In: Third World Resurgence # 79. 2 p.
2. **Ilang mahalagang polisiya ng MASIPAG**. 2 p.
3. Raghavan, C. n.d. **New patent aims to prevent farmers from saving seed**. In: Third World Resurgence # 92. Pp. 20-21.
4. Vicente, P.R. n.d. **Ang kasaysayan ng MASIPAG**. 3 p.
5. Vicente, P.R. 1994. **The MASIPAG Program: An integrated approach to genetic conservation and use**. In: Einarsson, P. (Ed). Growing diversity in farmer's fields: Proceedings of a Regional Seminar for Nordic Development Cooperation Agencies. Lidingo, Sweden. 26-28 September 1993. Naturskyddsforeningen and GRAIN. Stockholm. pp.32-55.
6. Vicente, P.R. n.d. **The trial farm strategy**. 6 p.
7. Yap, E.A. 1999. **Rescue of rice variety: enhancing biodiversity and the struggle for land**. A paper prepared for the International Meeting: Food and Agriculture in North-South Relations". March 4-7, 1999. Universitat Pompeu Fabra, Barcelona. 9 p.

## EXTENSION/TRAINING/INFORMATION MATERIALS PRODUCTION

1. **Training/Extension/Information material production**. 1 p.

## ACTION PLANNING

1. **Action Plan on Seed or Sustainable Agriculture**. 1 p.

## Farmer to farmer extension approach

1. Moneva, L.A. 1998. **Farmer-based extension: The Mag-uugmad experience**. Paper presented to International Course on Farmer-led Extension. November 9-December 4, 1998. 9 p.

*continued next page*

## AWARENESS OF SELF

1. **Flow of discussion for knowing self and others: The self; "Who am I"**. 1 p.
2. **Maslow's hierarchy of needs**. 4 p.
3. **The spirit of self-criticism**. 1 p.

## AWARENESS OF OTHERS

1. **Self and mutual criticism**. 1 p.

## VALUES CLARIFICATION

### LEADERSHIP

1. Adnan, et al. 1992. **A typology of participation: how people participate in development programmes and projects**. Pretty, 1994. p. 173.
2. **Basic leadership and team effectiveness**. 1 p.
3. **Managing people: A test of leadership**. pp. 24-31.
4. **Qualities of a good leader**. 1 p.
5. **Skills of a good supervisor**. 1 p.

### TEAM BUILDING

1. **The nine roles required for a "perfect team"**. 1 p.
2. **Systematic model of team building**. pp. 18-23.
3. **Where are you in the organization? A questionnaire**. 1 p.

### CONFLICT MANAGEMENT

1. **Input on listening techniques**. In: Training for transformation. pp. 29-33.
2. **Four prerequisites for behavioral change**. 1 p.
3. **Myers-Briggs type indicator**. 2 p.
4. **Opposition**. 2 p.
5. **Parent-adult-child theory: "I'm okay, you're okay" (Transactional analysis)**. 6 p.
6. **Transactional analysis**. pp. 32-35.
7. **Types of people**. 1 p.

## COMMUNITY ORGANIZING

## TRAINING FACILITATION

## ADDITIONAL REFERENCES GIVEN TO PARTICIPANTS

1. Given by PLAN, INTERNATIONAL

Y UPLB Agroforestry Program (UAP) and Kapwa Upliftment Foundation, Inc. 1994. **Agroforestry Project Planning and Management (APPM)**. 257 p. (14 copies only)
Y SIBAT. 1998. SIBOL Techno-Series (1) **Mapangalagang Paghahayupan**; (2) **Producksyon ng Pananim sa Bulubunduking Lugar**; (3) **Wastong Pangangalaga sa Lupa**; and (4) **Alternatibong Pamamahala ng Peste**. (14 sets only)
Y PLAN Comics. 1997. **Sustainable Agriculture**.
Y 2 issues of PLAN newsletters
Y PLAN 1999 calendar: **Ang Pamilya at and Likas-Kayang Pagsasaka sa 1999**.

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2. Given by GRAIN, PHILIPPINES (10 copies each)

- **Patenting, Piracy, and Perverted Promises: Patenting Life: The Last Assault on the Commons**. 12 p.
- **Global Trade and Biodiversity in Conflict**. Issue No. 1. April 1998
- **Global Trade and Biodiversity in Conflict**. Issue No. 3. October 1998
- **Seedling**. June 1997 14(2).

3. Given by SEARICE

- **Si Mang Gimo at ang GMOs** . Comics. 1998. 22 p. (37 copies)
- **A Primer on Bioprospecting**. 1998. 15 p. (50 copies)

## FOR DISPLAY ONLY

1. Baguinon, N.T. **Key to the families and some genera of tree species encountered in Paranas, Samar**. 17p.
2. Camara, P.G. 1991. **The community and ecosystem as the economic unit: A sustainable economic development framework**. 6 p.
3. Cerna, L., et al. **The impact of soil and water conservation practices promoted through farmer-based extension system on the development of a farmed watershed area**. Mag-uugmad Foundation, Inc. Cebu City, Philippines. 15 p.
4. Chleq, J.L. and H. Dupriez. 1988. Some articles on **Soil and water conservation in dry lands.** MacMillan Publishers, Ltd. London. pp. 30-111.
5. Coronel, R.E. 1997. **On-Farm Conservation of Fruits and Nuts**. In: Tropical Fruit News. 31(4):8-10.
6. Coronel, R.E. 1995. **Ang kontribusyon ng Tropikong Amerika sa mga kayamanang prutas ng Pilipinas**. Second Professorial Chair Lecture. National Plant Genetic Resources Laboratory, Institute of Plant Breeding, College of Agriculture, UP Los Baños, College, Laguna. December 7, 1995. 26 pp.
7. Coronel, R.E. **Economic fruits of the Philippines, Current classification of Philippine fruits, Proposed classification of Philippine fruits, Proposed major fruits of the new decade**. 9 pp.
8. De la Cruz, R.E. and R. Hautea. 1999. **Philippine Experience and Views on Implementing *sui generis* Systems for Plant Variety Protection**. Lecture presented at UPOV-WIPO-WTO Joint Symposium on the Protection of Plant Varieties under Article 27.3 (b) of the TRIPS Agreement. Geneva. February 15, 1999. 12 p.
9. **Endocrine Disruption** Papers
10. Gruezo, W.Sm. 1993. **Agroforestry species identification**. Lecture topic delivered during the "Third Short Course on Agroforestry Seed Production – Handling Technology and Nursery Management", held at the Department of Agronomy, U.P. Los Baños on April 26, 1993.
11. ICRAF. 1999. **Papers contributed to the International Training of Trainors Course**. Chiang Mai, Thailand. March 1999.
12. Ison, R.L. **Teaching threatens sustainable agriculture**. IIED Gatekeeper Series No. 21. 11/20 p.
13. Lasco, R.D. and H.D. Lasco. 1990. **Agroforestry syetems in the Philippines: Inventory and assessment**. In: BIOTROP Spec. Publ. No. 39. pp. 45-55.
14. Mendoza, T.C. 1997. **Analyzing the impacts and implications of El Niño and raising some action points**. Paper discussed during the NGO/PO Forum "The El Niño Phenomenon: Issues and Action Points." held at the Philippine Social Science Center, Diliman, Quezon City. Ocotber 8, 1997. 14 pp.
15. Myers, I.B. 1991. **Introduction to Type: A Description of the Theory and Applications of the Myers-Briggs Type Indicator**. Consulting Psychologists Press, Inc., Palo Alto, CA. 32 p.

*continued next page*

16. Obordo, J.A.S. 1996. **Diversified/Integrated farming and nutrient management**. Transparencies used during the Short Course on Seed Production, Handling and Genetic Conservation for Sustainable Agriculture held at the Department of Agronomy, UPLB, College, Laguna on April 19, 1996. 40 pp.
17. Perlas, N. 1996. **Associative economics: Responding to the challenge of elite globalization**. CADI monograph. Center for Alternative Development Initiatives, Quezon City. 18 pp.
18. **PRA methods and their applications**. 4 p.
19. Tansey, G. 1998. **Trade, Intellectual Property, Food and biodiversity: Key issues and options for the 1999 review of Article 27.3(b) of the TRIPS Agreement.** A discussion paper commissioned by Quaker Peace & Service, London in association with Quaker United Nations Office, Geneva with final assisstance from the Department of International Development (DFID), UK. 22 p.
20. **Using rainfall, runoff and floodwater, fog, mist and dew**. In: Barrow, C. 1987. Water resources and agricultural development in the Tropic. Longman Scientific and Technical, UK. pp. 147-197.
21. Vicente, P. 1996. **Magsasaka at Siyentipiko para sa Ikakaunlad ng Agham Pang-agrikultura (MASIPAG)**. Transparencies used during the Short Course on Seed Production, Handling and Genetic Conservation for Sustainable Agriculture held at the Department of Agronomy, UPLB, College, Laguna on April 19, 1996. 41 p.
22. Villano, M.G. n.d. **Water management under marginal environment: An entry point in advancing sustainable agriculture**. 17 p.
23. Zamora, O.B. 1998. **Preparing for the WTO/TRIPs review in 1999/2000: Some insights to protect rights of farmers and local communities**. Central Bank Professorial chair Lecture delivered at the Department of Agronomy, UPLB-CA on July 7, 1998. 33 p.

## SSTD DATABASES for DISPLAY

1. **The "Dirty Dozen" Pesticides**. 1998.
2. **Natural Crop and Seed Protection**. 1994.
3. **Pregermination Treatments**. 1998.
4. **Rapid Viability Test**. 1998.
5. **Storage of Recalcitrant Species**. 1998.
6. **Asexual Propagation**. 1998.
7. **Pests and Diseases in Agroforestry**.1994.
8. **Agricultural Crop Seed Production**. 1998.

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## APPENDIX 10. Questionnaire for group learning; Modified storyboard approach (with selected illustrations corresponding to questions with *).

Seed Systems, Seed Production and Handling and Genetic Conservation for Sustainable Agriculture

### Rationale

This material is continuously being updated by the Seed Science and Technology Division of the Department of Agronomy with the aim to:

a. enhance sharing of experiences, knowledge, information and concerns among participants and resource persons,
b. illustrate the scope of practices and issues related to seed and genetic conservation, and
c. provide participants with materials that they could use for echo training or for further and more independent study when they go back to their respective areas of assignment.

Your input will be highly valued to constantly improve this material for future trainings. Please bear in mind that the scope of concepts and questions covered herein is by no means comprehensive but the material should serve as an aid in stimulating further questions and sharing and elicit other concepts. Have fun……

### Instructions for Answering

1. You will be divided into six (6) groups (note: only one grouping will be made for this particular activity, which is also tagged the "modified storyboard approach").
2. Each member of the group will be given a copy of all questions but the different topics (indicated in the headings of this questionnaire) will be discussed separately according to the schedule given in the program.
3. You may obtain your answers from your stock knowledge, your groupmates and references (e.g., what's been given to you, and those on display).
4. To answer the questions, discuss among yourselves at anytime convenient for your group (e.g., breaks, before and after the day's sessions, evenings). We encourage that your discussions be as participatory as possible. This means allowing maximum interaction and non-domination of ideas.
5. Write your answers legibly on manila paper. Make sure that pentel pen is used and the characters are big enough to be visible from a distance. Group discussions and writing down of answers should be done way ahead of the scheduled formal discussion.
6. Answers of all the groups will be posted on boards and discussed at the appropriate schedule.
7. All answers will be scored. Some awards will be given to groups demonstrating excellence in certain areas.
8. This material is not copyrighted. However, it will be appreciated if those of you who wish to adapt this material to your own program inform the Seed Science and Technology Division of the Department of Agronomy, UPLB.

### QUESTIONNAIRE FOR GROUP LEARNING

#### Exercise on Seed Systems, Seed Multiplication and Genetic Conservation

1. Give at least three traits you believe a quality seed should have.

2. Describe at least two ways by which seeds from the formal (government agencies, research institutions, seed companies) and informal sector (farmers, NGOs, POs, local or indigenous communities) may differ.

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3. Based on your experiences give two or more characteristics by which the formal and informal seed production systems and formal and informal genetic conservation may differ.

4. For the following forms or types of variety and forms of propagule, indicate whether they are genetically variable or uniform (V/U) and if they breed true-to-type (hence are recyclable) or not (Y/N):

| V/U | Y/N | |
|---|---|---|
| _____ | _____ | $F_1$ hybrids |
| _____ | _____ | inbred/pureline |
| _____ | _____ | open pollinated (synthetics, composites) |
| _____ | _____ | landraces |
| _____ | _____ | seedling from apomictic embryo |
| _____ | _____ | seed from sweet potato flower |
| _____ | _____ | seedling from grafted mango |
| _____ | _____ | cuttings |
| _____ | _____ | farmer's seed |
| _____ | _____ | seed with terminator gene |

5. Which of the following are common characteristics of $F_1$ hybrids? (check appropriate answer)

___ a) lower price than open-pollinated varieties
___ b) have uniform plants
___ c) better growth and yield than open-pollinated varieties
___ d) requires high chemical inputs
___ e) can be recycled or can produce seeds of the same characteristics as the parent or original plants
___ f) usually imported
___ g) promoted by private companies, especially TNCs

6. A variety is produced by (check appropriate answer)

___ a) plant breeder
___ b) nature
___ c) farmer
___ d) seed collector/gatherer
___ e) seed producer/grower/propagator
___ f) biotechnologist (genetic engineer)

7. Give at least two advantages and two disadvantages of keeping seeds in:

a) genebanks (cold storage)
b) field genebank (live collection of varieties/genes of a species)
c) community seedbanks

8. Enumerate at least three indigenous or local practices that you think enhances genetic diversity and/or genetic conservation.

9. Enumerate at least three indigenous or local practices that you think leads to crop improvement.

**Exercise on Seed Quality Testing (SQT); Handling of Perishables and Asexual Propagules for Variety Multiplication and Genetic Conservation**

*(Please refer to attached figures for the illustrations/charts etc.)*

1. Give at least two consequences if the illustrated sampling procedures for seed quality testing is practiced.

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2. In a germination test it is important to give the seed the necessary conditions for it to express its full germination capacity and to standardize procedure for comparison across different testing laboratories. Select the materials that are not recommended to be used as germination medium for seed germination test. Give a brief reason(s) why.

___ a) beach sand
___ b) river sand
___ c) previously infected soil
___ d) newspaper
___ e) plastic sheet
___ f) tissue paper
___ g) cotton cloth

3. Describe what is wrong (or what principles are not followed) with the different illustrated germination set-ups.

4. Enumerate three or more practices that you know of ***to assess*** the seed germination potential or capacity (other than actual germination testing and the usual materials used).

5. Seed germination can be improved on a seedlot basis (i.e., thru processing) or seed basis (i.e., thru invigoration and other treatments appropriately done). Which of the illustrated figures would likely lead to improved germination capacity of seeds? Explain why.

6. Enumerate three or more practices that you know of or that you practice aside from those illustrated in question no. 5 ***to improve*** the germination capacity of a seedlot.

7. a) Seed vigor is the vitality or strength of germination, especially under unfavorable conditions. Give at least two reasons why assessment of seed vigor, in addition to germination percentage, may be useful.

b) Give at least three ways to describe or express seed vigor.

8. How do you store the following asexual planting materials to improve their storability:

a) garlic cloves
b) potato tubers
c) cassava stem cuttings
d) sweet potato modified root

9. List at least three indigenous/farm level techniques to make fruits, vegetables and flowers keep longer.

10. Give a relevance or use of the following practices in seed technology and genetic conservation.

a) seed quality testing
b) asexual propagation
c) handling of asexual propagules

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## Exercise on Seed Storage System (SS)

1. Peanut (unshelled) commonly has a half-life (time when seed germination has dropped to 50%) of 6 months when stored under ambient condition (30 C, 12% moisture content). Indicate the degree of improvement in longevity (no. of times life span is improved) of the same seed if stored at 25 C with 10% moisture given the following rules and conditions:

- life span or longevity doubles for every 1% drop in moisture (rule applies within 5-14% moisture range)
- life span doubles for every 5 C drop in temperature (rule applies within 0-50 C temperature range)
- the combined effect of moisture and temperature follows the formula:

$$L = 2^m \times 2^t$$

where: L = no. of times life span is improved
m = no. of times moisture dropped (by 1% level)
t = no. of times temperature dropped (by 5 C)

2. Using the chart provided [moisture-relative humidity or RH-temperature relations with seed germination, pest and pathogens] locate the temperatures, RH, and seed moisture contents when some storage insects and fungi may start to become active and become problematic.

3. Rank the following in terms of approximate storability (1-shortest, 8-longest).

___ a) freshly extracted tomato seeds in the freezer
___ b) dried unshelled peanut in sack at room condition
___ c) dried, shelled peanut in sack at room condition
___ d) dried rice grains in sack at room condition
___ e) freshly harvested rice grains immediately kept in well sealed plastic bag in ordinary room condition
___ f) dried rice grains in the freezer
___ g) air-dried mango seed kept in ordinary room condition
___ h) freshly extracted mango seed in the freezer

4. Give three or more indigenous/farm level techniques in keeping or storing seeds for longer life and quality maintenance.

5. For each of the given illustrations, discuss what aspect(s) contribute(s) to the enhancement of seed storability.

6. Describe how each of the illustrated seed storage practice would promote seed longevity or seed deterioration.

## Exercise on Seed Collection, Harvesting, Drying and Processing for Seed Production and Genetic Conservation (SH)

1. At physiological maturity seeds attain maximum germination and vigor but moisture content at this point is still relatively high, especially for those type that do not dry out on the mother plant. Rates of attaining physiological maturity vary and is partly determined by whether plant is determinate (seeds/fruits mature uniformly) or indeterminate (fruits do not mature simultaneously). Seed quality is also dependent on age of plant within the reproductive period. Choose which age of the plant as illustrated is best to harvest seeds from. Give a brief explanation for your answer.

2. For the fruits illustrated, choose the stage or level of maturity where the best quality seeds may be obtained. Give a brief explanation for your answer.

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3. a) Give at least two plants, trees or crops where each of the illustrated techniques of determining maturity may be used.

b) Mention at least two other unique techniques that you could use in determining seed maturity for certain crops/plants.

4. Given the mature fruit in the illustration, select the part from where we could most likely get seeds that are more uniform and of optimum quality. Give a brief explanation for your answer.

5. Shade or mark the part of the field in the illustration from where you would harvest seeds so that you would have a greater chance of maintaining genetic purity and getting quality seedlot from. Give a brief explanation for your answer.

6. Environmental conditions, especially temperature and relative humidity, have profound effect on seed quality. Give at least two reasons why the illustrated seed harvesting practices are not recommended.

7. Which of the two figures illustrated could be a more appropriate practice of seed collection to maintain genetic purity (authenticity or trueness-to-type of the population or variety), and thus preserve it and the inherent diversity of the population?

8. Give two examples of crops whose seeds are extracted using the illustrated techniques. Give at least two other unique/unusual/curious techniques of seed extraction that you know of.

9. Which of the crops illustrated have seeds that are drying-sensitive or are recalcitrant?

10. Which among the illustrated seed drying practices tend to be inappropriate? Give a brief explanation for your answer.

11. Give one or more consequences of drying seeds too fast and also of drying them too slow. Which do you think is faster, absorption or losing moisture from the seed?

12. Give a farm level technique, alternative material (or resource), or strategy to the following aspects in seed drying/processing:
a) blower/fan
b) heater
c) seedbed drier
d) air-screen machine

13. What are the physical properties of seeds that can be taken advantage of to separate good seeds from undesirable elements or "contaminants"?

14. Enumerate/describe three or more indigenous/farm level techniques to clean or separate desired seeds from other seeds and mixtures, or to grade seeds.

## Exercise on Principles and Practices of Seed Production (SP)

1. Give three or more reasons why a plant may not produce seeds or why farmers have difficulty saving seeds.

2. Seeds can be broadly defined as any propagation material. Seed technology, therefore, should also include in its scope those non-true seed materials or asexual propagules. What type of propagation technique do you think is best for the illustrated crops?

3. Which of the crops illustrated are cross-pollinated and consequently need different varieties to be widely distanced (e.g., 200 or 500-1000 m apart), or be planted at different times (e.g., 2-3 weeks apart), to avoid varietal mixture and to maintain genetic identity and promote genetic

*continued next page*

purity? *Note: Other ways of isolation are putting pollination barriers such as trees, cages, bags on flowers, or removing male flowers (emasculation), or doing artificial pollination.*

4. Temperate crops do not normally produce seeds under tropical condition. Give three or more techniques that you know of that could induce these crops to flower and produce seeds? Give three or more indigenous ways that you know of to induce flowering of different plants/crops.

5. Some plants are photoperiodic, requiring a specific dark or light period during vegetative growth for flower induction. Given the following crops with their respective photoperiod requirements and the time to attain maturity (readiness to flower or the adult vegetative stage), mark in the illustration the proper time (month) to plant so that seeds may be eventually obtained (note that photoperiodism may be a varietal characteristic).

| Crop | Photoperiod Requirement | Days after planting (DAP) when ready to flower |
|---|---|---|
| Soybean | short day | 22 |
| Radish | long day | 70 |
| Tomato | day neutral (but thermoperiodic*) | 45 |

* *thermoperiodism is a phenomenon in which flowering is promoted by alternating day and* night temperatures.

6. Seed production often requires more attention in soil fertility and pest management to get quality produce than crop production. Because of the negative impact of the use of chemical fertilizers, local sources of organic fertilizers need to be known and made available. Enumerate at least three different on-farm sources of fertilizers. Rank them from highest to lowest in terms of N content and ease of obtaining supply.

7. Genetic uniformity describes the degree of uniformity or homogeneity in genes and genotypes (varieties or population) within species. Which of the illustrations would tend to promote genetic uniformity?

8. Genetic purity refers to the trueness-to-type, trueness-to-name and proportion of true-to- type seeds while genetic diversity refers to the homogeneity or heterogeneity of seeds and plants composing a variety. Explain how the illustrated practices or situations would tend to enhance the production of genetically pure seeds.

9. Enumerate at least three practices or techniques that you have heard or know of that could lead to the improvement of the characteristics of a variety. *Premium points will be given to those which are indigenous/local.*

## Exercise on Seed/Crop Protection

(*You don't have to answer the questions in this topic for this module. Some of the questions here will be addressed in other topics. Moreover, some answers are available in a folder. You might want to add to them later.)*

1. Which of the given illustrations would more likely promote problems of pests and diseases? Explain your answer briefly.

2. Give at least two most common or most problematic pests and/or diseases in your area and cite known ways to best manage them.

*continued next page*▸

3. Describe at least two indigenous methods of protecting crops from the following:

a) rats
b) ants
c) birds
d) insect "pests"
e) snails
f) disease (pathogenic)
g) nutrient deficiency
h) monkeys

4. Give at least two examples of botanicals for the control of the following:

a) diamondback moth in cabbage
b) seedling damping-off
c) weevil attacking stored seeds
d) corn borer
e) pod borer
f) molds in seeds

5. Given the following elements, prepare a relational diagram to illustrate the principles of pest management and the ill-effects of modern agriculture (one approach: start with the characteristics of modern agriculture).

| | |
|---|---|
| high yielding varieties (HYV) | soil degradation |
| pest resistance | unhealthy plants |
| predator elimination | pest outbreak |
| monoculture/genetic base erosion | chemical pesticides |
| food quality degradation | chemical fertilizer |
| pollution of soil, air, water and food | health hazard |

6. In the conversion from conventional to sustainable agriculture, which do you think would be easier to recover, soil fertility or natural enemies? Briefly explain your answer.

7. List pesticides that you know are being banned in the Philippines. Give at least two pesticides that are commonly used in your area and specify the crop for which they are used.

8. Do you know of any poisoning in your area or terminal illness which are possibly linked to the use of chemical pesticides?

## PRACTICALS: Seed handling, storage and quality testing

1. Physical purity is the proportion of seed of a certain species including other crops or weed seeds, trash or other mixtures, while genetic purity refers to the trueness-to-type, trueness-to-name and proportion of true-to-type seeds. Examine closely the seed samples and assess their genetic variability, physical and genetic purity. Indicate whether they are high, medium or low.

2. Seed identification is useful in seed quality testing especially in determining genetic purity. It is often easier to identify different species than different varieties of a species. Species identification can have impact on seedbanking as well as agroecological production systems where biological diversity is the norm. Identify/give the name of each seed sample in the container.

3. For the given seed samples, do a germination test choosing the medium which you would consider more/most appropriate.

*continued next page*

4. To obtain an accurate result of the seed germination test, proper counting of germinated seeds should be observed. Only those having all the essential structures (normal seedlings) are to be considered germinated. Even if germinated, but the essential structures are absent, deformed or damaged, the seedling would likely be unsuccessful in the field and thus be considered abnormal. Provide the information for the following germinated samples (thru ragdoll or "lumpia" method) given to you.

| | CROP | | |
|---|---|---|---|
| | corn | soybean | rice |
| No. of normal seedlings: | | | |
| No. of abnormal seedlings: | | | |
| No. of hard (or uninfected) seeds: | | | |
| No. of dead seeds: | | | |
| Germination percentage (calculate): | | | |

5. Seed moisture content has critical role in maintaining seed quality. Standard procedures (oven method) are prescribed but there are various less sophisticated but equally effective ways or indicators of the level of moisture content. Assess the moisture content of the given seed samples. Using the scale below, mark the approximate spot or locate the approximate moisture content of each sample given to you (Note: The procedure on varying moisture content could be made available).

Seed moisture scale 0----------5%----------10%----------15%----------20%----------25%

Corn

a) 0----------5%----------10%----------15%----------20%----------25%

b) 0----------5%----------10%----------15%----------20%----------25%

c) 0----------5%----------10%----------15%----------20%----------25%

Rice

a) 0----------5%----------10%----------15%----------20%----------25%

b) 0----------5%----------10%----------15%----------20%----------25%

c) 0----------5%----------10%----------15%----------20%----------25%

6. "Tetrazolium chloride" is a chemical used for rapid determination of seed viability. A seed that is viable will have the living parts (embryo and cotyledon for dicots and only the embryo for monocots) stained red. Seeds have different embryo sizes and shapes. A seed analyst therefore should be familiar with seed anatomy to assess tetrazolium staining pattern. One liter of solution (0.5% concentration) can be used for 40-45 tests with 100 seeds/test. The number of viable seeds, though often overestimated will, in a way, reflect the number of germinable seeds. For the given illustrations, judge whether each seed is dead (D) or alive (A) based on the tetrazolium staining pattern. Note: actual seed samples will also be shown and procedure will be made available.

7. Seeds to store can be a handful of a kind but consist of several kinds (if for genetic conservation) or large volumes (often few species/varieties) if for seed production. Appropriate seed containers would depend on seed volume, environmental condition, availability of containers and packaging materials and type of seeds for storage. List some aspects or features that you think are inappropriate for each of the given storage set-up.

**-END-**

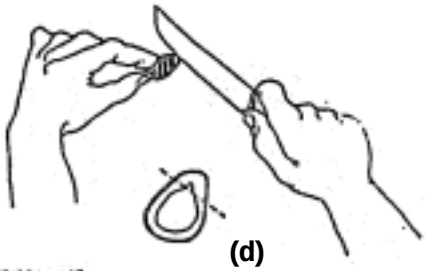
*Prepared by: The Seed Science and Technology Division, Dept. of Agronomy, UPLB March 1999*

*continued next page*

**Sqt-q#5**

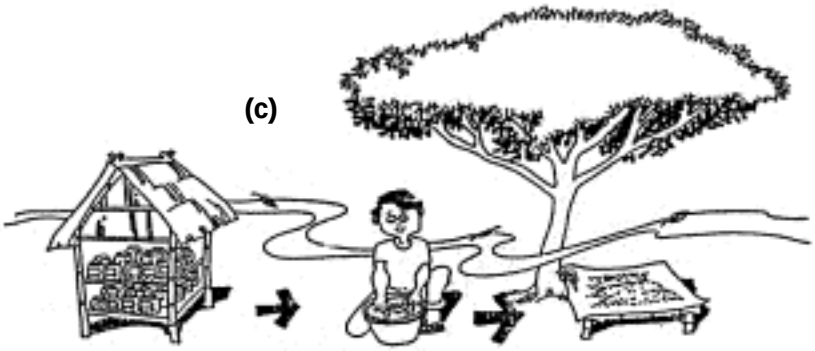
**(a) 1-3 minutes, boiling water**

**(b) 3o minutes, hot water**



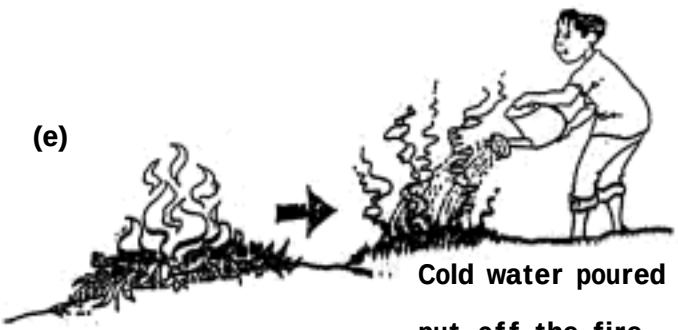
**(d)**

**(c)**



**Store** **Soak** **Dry**

**(e)**



**Seeds briefly set on fire**

**Cold water poured to put-off the fire**

**(f)**

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**Ss-q#2**

## Storage Environment and the Control of Viability

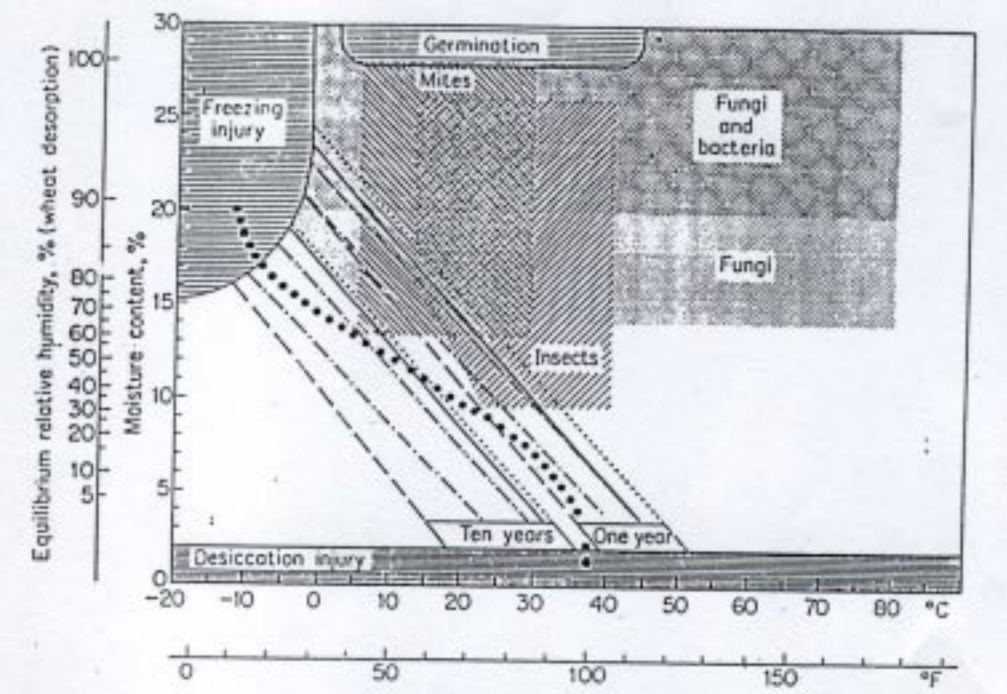


Figure 2.6 The relationship between seed moisture content and storage problems at different temperatures. Diagonal lines represent those combinations of moisture content and temperature which would lead to an expected drop of viability to 95 percent after one year and after ten years for the following five species: — wheat; _._._ broad beans; _.._.. peas; ___ barley; ..... rice. The horizontally-hatched areas indicating the regions where freezing injury and desiccation injury may take place are also related to the moisture content of the seeds whereas the remaining information is, strictly speaking, related to relative humidity. In this diagram it is assumed that the relationship between moisture content and relative humidity is that for wheat at 25 C on desorption; however, as a rough guide this may be taken as appropriate for a wide range of species (see Appendix 4). The conditions under which various storage organisms may be active are shown by different patterns of stippling. The line of solid circles (· · · ·) indicates the rule-of-thumb suggested by James (1961) for long-term storage conditions, i.e., the line indicates where value for percent relative humidity added to the number of degrees Fahrenheit totals 100.

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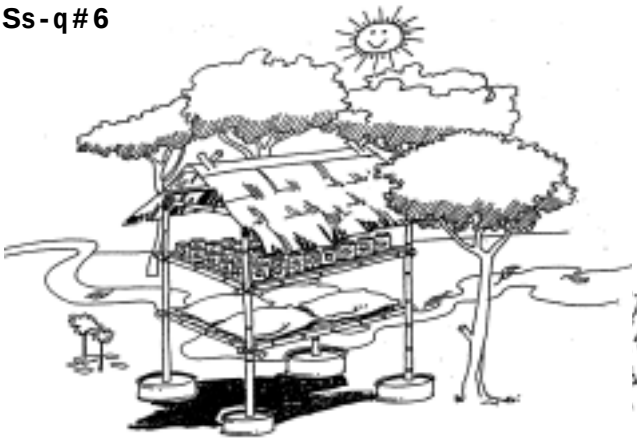
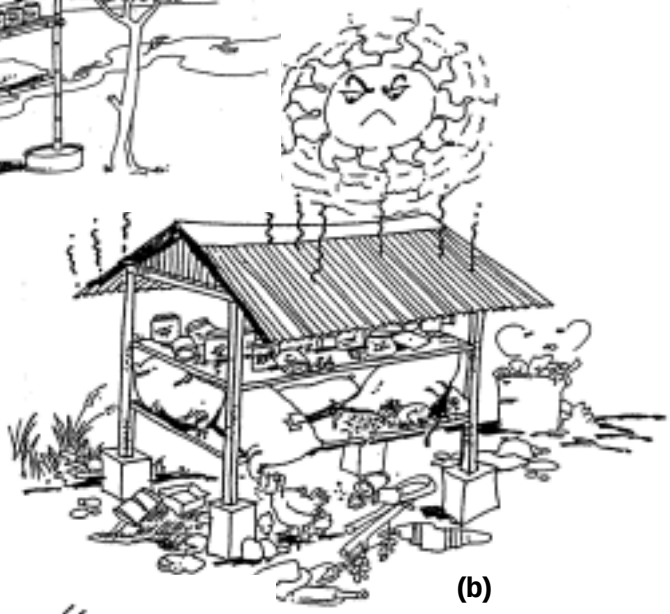
Ss-q#6

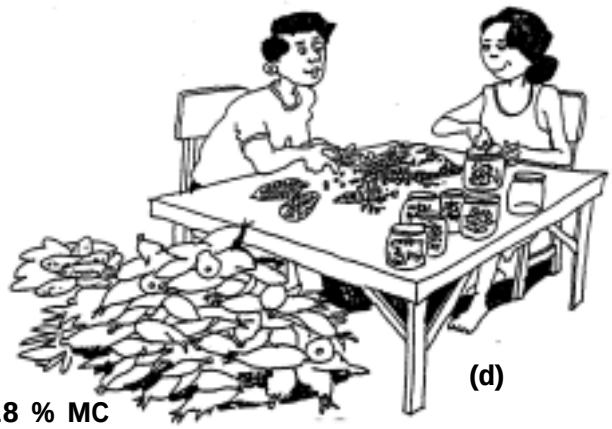


(a)



(b)

(c)



(d)

18 % MC

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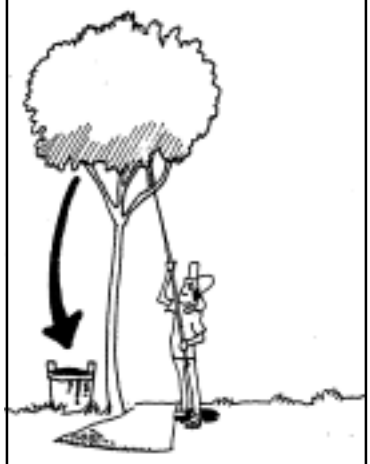
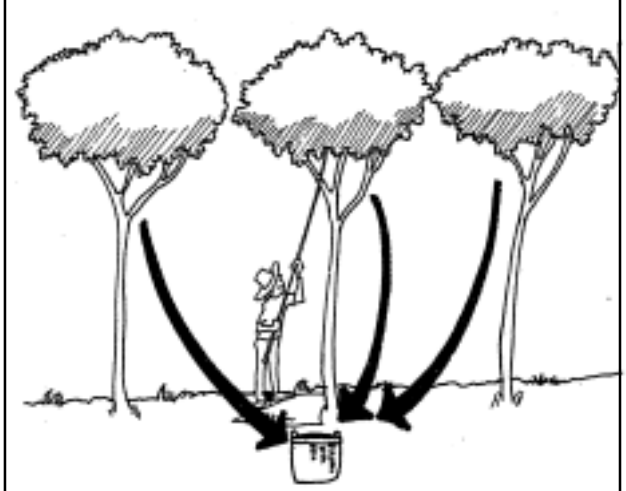
**Sh-q#7**



From one plant

(a)

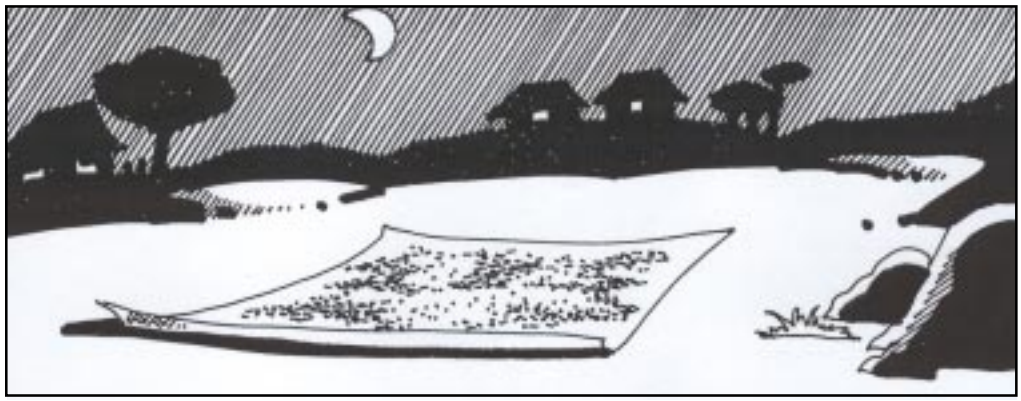


From many plants of the same species

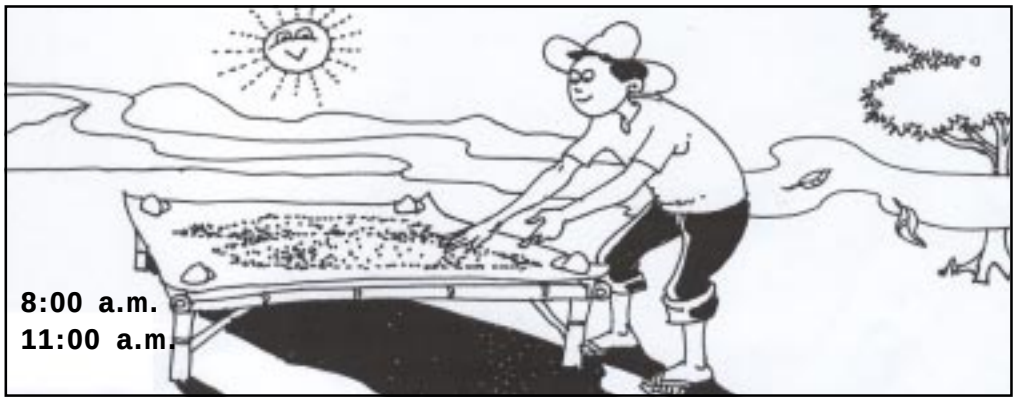
(b)

*continued next page*

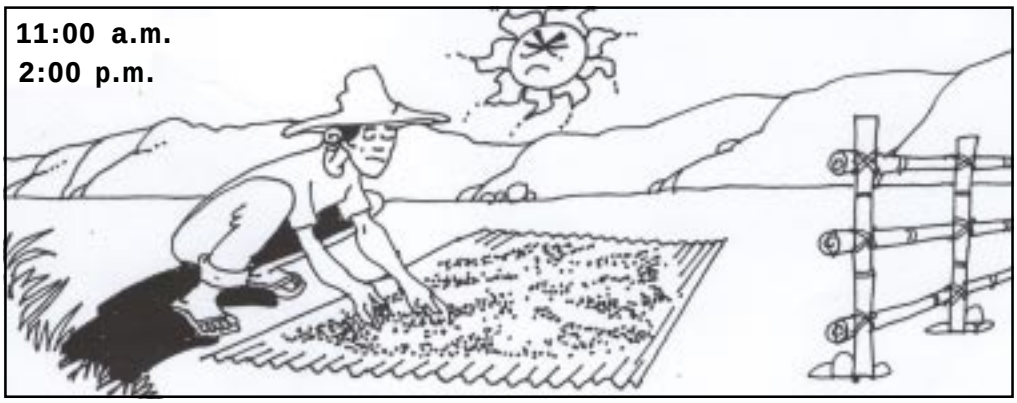
**Sh-q#10**



**(a)**




**(b)**




**(c)**

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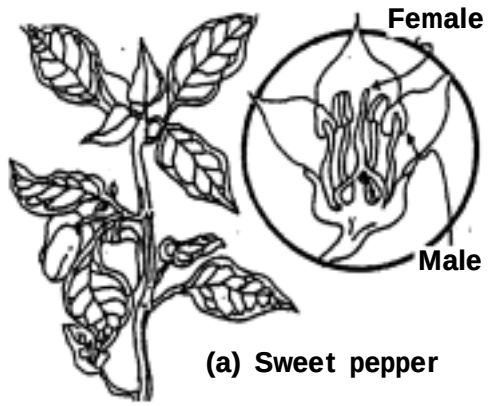
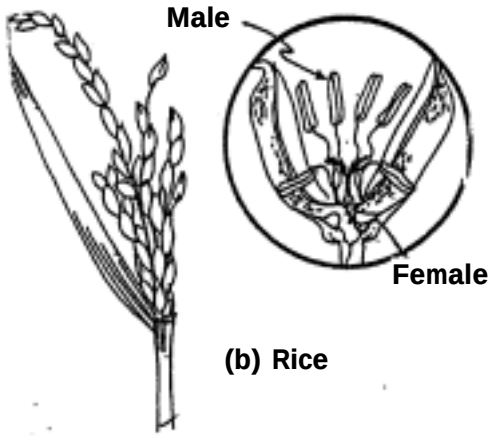
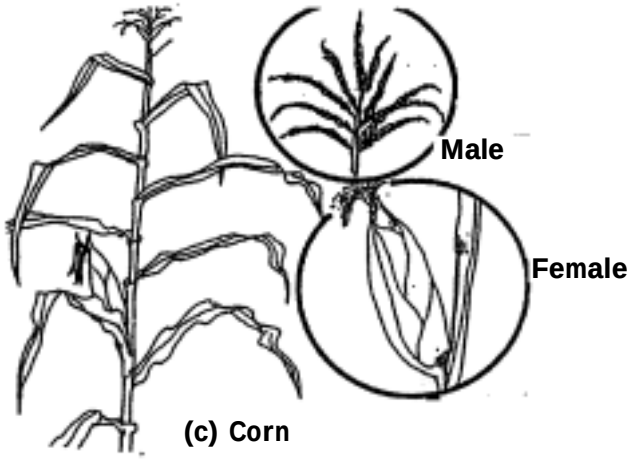
Sp-q#3



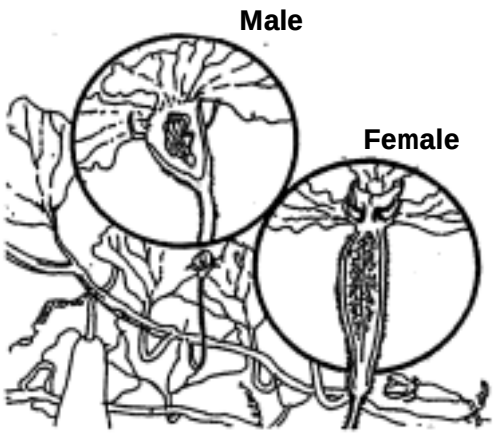

(a) Sweet pepper



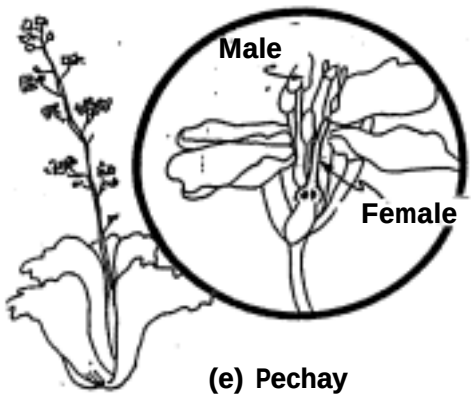

(b) Rice




(c) Corn




(d) Upo




(e) Pechay

## APPENDIX 11. Sample evaluation format given daily and at the end of the course.

**A. TOPIC/ACTIVITY EVALUATION**
(for Recap/Reflections)

Resource Person _____ Topic/Activity _____

**Instructions:** Please individually answer the following questions. After answering, discuss the answers among your groupmates (host team groupings). As a group, write down your answers and submit to the host team responsible for the next day's recap/reflections. Also, at the end of the day, place one pin each on each of the three sections of the target board to reflect your rating on speaker effectiveness, relevance of content of the topic/activity and the facilitation. If fully satisfied, pin on the bull's eye, if not, then pin anywhere farther away from the bull's eye depending on your perception. Your continuous response would greatly help us improve the said material/activity/topic. **Thank you very much.**

*Note to host teams/presentors of recap/reflections: Please collect the answers to the evaluation from each participant as well as each host team. Process the evaluation forms for the topics from previous days (or other scheduled dates) and present the outcome during the recap/reflections at the start of the morning session when your group is scheduled to report. The presentation may be conducted in innovative ways but make sure that time is well managed. The content of your presentation should include a brief summary or outline (not more than 15 minutes) of the previous day's topic/activity and answers to the questions in the evaluation (15 minutes). The host team is, therefore, given approximately 30 minutes to do the presentation. The next 30 minutes will be devoted to discussion for levelling off, answering questions, resolving conflicts, augmenting lessons and sharing realizations. Total time for this activity is one (1.0) hour.*

1. What did you like (most) about this activity/topic?

2. What did you (particularly) not like about this activity/topic?

3. What is/are your most significant learning(s)?

4. Please write down any other comments, reactions, unanswered questions, additional information you wish to share with us, as well as suggestions for improvement.

**B. SHORT COURSE EVALUATION**

Name (optional):

Instructions:

*1. Please assist us to constantly improve the quality of our short course by completing this questionnaire*. You *may* respond in Filipino.
*2. Be as frank as you can - the fuller your comments, the more substantial the assessment will be.*
*3. Please rate the following by encircling the appropriate rating and giving your remarks or suggestions on the space provided.*
*4. Thank you for your input.*

*continued next page*

I. Design of the Short Course

***A. Sequencing of topics***

4 - Highly logical
3 - Logical
2 - Somewhat illogical
1 - Illogical

Comments/Suggestions:

***B. Duration of short course***

5 - Too long
4 - A bit long
3 - Just right
2 - A bit short
1 - Too short

Comments/Suggestions:

***C. Coverage of short course***

5 - Too broad
4 - A bit broad
3 - Just right
2 - A bit narrow
1 - Too narrow

Comments/Suggestions:

***D. Flexibility of schedule***

5 - Very flexible
4 - A bit flexible
3 - Just right
2 - A bit inflexible
1 - Inflexible

Comments/Suggestions:

***E. Frequency of field trips***

4 - Too many
3 - Just right
2 - A bit few
1 - Too few

Comments/Suggestions:

*continued next page*

***F. Number of practicums***

4 - Too many
3 - Just right
2 - A bit few
1 - Too few

Comments/Suggestions:

***G. Number of videos/films shown***

4 - Too many
3 - Just right
2 - A bit few
1 - Too few

Comments/Suggestions:

***H. Which sessions/topics/activities should have been***

reduced -

omitted -

improved -

added -

II. Objectives of the Short Course

***A. Explained***

4 - Clearly
3 - Adequately
2 - Somewhat poorly
1 - Poorly

Comments/Suggestions:

***B. Achieved***

4 - Fully
3 - Adequately
2 - Partly
1 - No

Comments/Suggestions:

*continued next page*

III. Your Objectives/Expectations

***Achieved***

4 - Fully
3 - Adequately
2 - Partly
1 - No

Comments/Suggestions:

IV. Short Course Methods and Management

***A. Participants***

1. The number of participants was

5 - Too large
4 - A bit large
3 - Just right
2 - A bit small
1 - Too small

Comments/Suggestions:

2. Involvement of participants

4 - Maximum
3 - Fairly involved
2 - Partly involved
1 - No involvement

Comments/Suggestions:

3. Your learning from your fellow participants

4 - Great amount
3 - Fair amount
2 - Small amount
1 - None

Comments/Suggestions:

*continued next page*

4. Discipline of participants

5 - Excellent
4 - Very good
3 - Good
2 - Fair
1 - Poor

Comments/Suggestions:

5. What improvements can you suggest in the selection/composition/pre-sensitizing (preparation, e.g. thru benchmark) of participants to enhance your learning and the objectives of the course?

B. ***Facilitation***

5 - Excellent
4 - Very good
3 - Good
2 - Fair
1 - Poor

Comments/Suggestions:

C. ***Coordination between facilitators and participants***

5 - Excellent
4 - Very good
3 - Good
2 - Fair
1 - Poor

Comments/Suggestions:

D. ***Promptness of beginning/ending of sessions***

4 - Very prompt
3 - Fairly prompt
2 - Sometimes late
1 - Always late

Comments/Suggestions:

**E**. Modified Storyboard (Seed Tech Module)

To indicate how RELEVANT and PARTICIPATORY was the modified storyboard activity (Seed Tech Module), pin on the target board (you may do this anytime between now and at the end of this session). Also give comments or suggestions.

Comments/Suggestions:

*continued next page*

*F.* ***Logistics***

*To indicate how SATISFIED you are on the items below, pin on the target board. Give suggestions or comments.*

Comments/Suggestions

1. Accommodation/Dorm Arrangements/services

2. Meal Arrangements

3. Facilities of Training "Headquarters"

4. Secretarial Support

5. Others, please specify

G. ***Feedbacking***

To indicate how EFFECTIVE and RELEVANT the following were in terms of feedbacking, pin on the target board. Also give suggestions/comments.

Comments/Suggestions

1. Mood barometer

2. Recap, Reflections, Sharing

3. Topic/Activity Evaluation (Questionnare)

4. Topic/Activity Evaluation (Target board)

5. Host team

6. Participant Management Committee

7. Freedom Wall

*continued next page*

***H. Learning Materials/Resources/Process***

*To indicate how RELEVANT and USEFUL were the following materials, resources, process, pin on the target board. Give suggestions or comments.*

| | Comments/Suggestions |
|---|---|
| 1. References on display (books, Periodicals, handouts, etc.) | |
| 2. Databases/Glossary | |
| 3. Handouts/training materials distributed | |
| 4. Posters, seed herbarium | |
| 5.Videos/Soundslides | |
| 6. Materials that you brought with you | |
| 7. IKS corner | |
| 8. Room Exhibit | |
| 9. Action Planning | |
| 10. Training/extension material production | |
| 11. Pre-short course arrangement (communication, invitation, etc.) | |
| 12. Questions for Learning, Reflection, Discussion | |
| 13. ”Food for thought” | |
| 14. “Next day’s/today’s topic corner” | |
| 15. “Did you know that… corner” | |

*continued next page*

V. Other Aspects

A. What do you think are the general strengths of the short course?

B. Where do you think it could still improve a lot?

C. Please cite some points or questions you still wonder about or that you wish had been clarified.

D. Please give other suggestions for improvement of the course, or other comments, questions you wish to make.

## APPENDIX 12. Survey form and compilation of response to the first mail-in survey of past participants (1991-1998) to the seeds short course offered by the Seed Science and Technology Division of the Department of Agronomy, UPLB, College, Laguna.

### A. The survey form.

**SEED TECHNOLOGY/SA SHORT COURSE**
**Ex-participants**

Name : _____

Address : _____

TEL/FAX/E-MAIL: _____

1. What seed related activities are you…

   a. currently engaged in?

   b. planning to do?

2. How different are your responsibilities mentioned in no. 1 from the ones you were involved in at the time you took the short course?

3. Please describe significant ways by which the course had been relevant or useful to your work or to other aspects of your life.

4. Please describe how much of your work has been changed to be within the framework of sustainable agriculture.

5. What current problems or needs do you have that relate to seed or sustainable agriculture?

6. In what ways do you think we could improve our extension/ training function to become more effective.

7. What is your reaction to a distance mode of learning (training by correspondence) in seed and sustainable agriculture? How appropriate do you think would it be for you as an ex-participant and/or one who had not undergone any training with s?

8. We would be very happy to hear any question(s), suggestion(s) and/or news from you. Please use the space below or an additional sheet if necessary. **Thank you very much!**

*continued next page*

## B. Response of past participants.

**1. What seed related activities are you…**

**a. currently engaged in?**

Farmer partners and scholars majoring in PBG are involved in rice-breeding. We have twelve crosses on various generations undergoing breeding process right in the farmer's field. (Roger M. Cordero – Tamlang Hiniman Foundation,).
Nature of work (1994): *Nursery supervision; implementation and management of national forestation program.*

As a forester, engaged in nursery operation and plantation establishment. (Juanito C. Flores – DENR, CENRO, Kabankalan, Negros Occidental).
*Nature of work (1994):* Seed collection, testing and storage; extension worker.

Trainings. (Henry Dungganon – Antique Human Dev. Prog, Inc. )
Nature of work (1995): *Trainings on high value crop/ Agro-forestry/ SWC.*

Legume and corn seed production and research. (Elizar F. Alonzo – DA)
Nature of work (1995): *Production of high quality rice, corn and vegetable seeds with high vigor, germination percentage, purity, rating and storability characteristics. Storage of produced seeds.*

Palay seed production. (Alma R. Verde – Occidental Mindoro)
Nature of work (1996): *Produce palay from registered seeds and would like to be more efficient and reliable as a seed producer; production.*

Preservation of vegetable seeds especially in seedbanking activities of POs. Extend technical assistant to peanut and masipag rice seed production. (Pedro "Nonoy" Altar III – San Jose, Antique).

Seed collection and storage of rain tree, flamingia seeds, etc. (Oliver D. Guyon – CECAP PMO Banawe, Ifugao).

Currently engaged in reforestation activities of some 600 ha. reforestation sub-project of Forestry sector Project loan 11. Currently a project leader implementing CO and plantation establishment. (Ascension S. Santocildes – DENR CENRO, Kabankalan, Negros Occidental).
Nature of work (1996): *Forest seed storage and preservation for seedling production and reforestation , seed production area; monitoring and evaluation.*

I am currently engaged in raising seedlings or planting materials of both vegetables, field crops, fruit trees and other agro-forest trees and asexual propagation of crops. (Felomino B. Andig – NORMISIST AMPAYON, BUTUAN CITY)
Nature of work (1996): *As NORMISIST Income Generating Project (IPG) In-charge, always dealing in the production, handling, marketing, conservation of different seeds for planting materials; technical assistant, production.*

Alternative trading and marketing of organically grown rice. (Mario S. Lina - KALIKASAN, Nueva, Ecija)
Nature of work (1998): *Varietal testing, cross breeding and research for seed production; assistant ATM.*

Rice and vegetable varietal testing and production. Planted traditional vegetable comparable to hybrid and it turned out that local vegetables demand higher price in the market. (Florencio Z. Galapon Jr - KALIKASAN, Nueva Ecija)
Nature of work (1998): *Plant breeding/varietal testing; linkage and networking.*

*(Note: Italicized sentences were lifted from their benchmark information)*

*continued next page*

**b. planning to do?**

To come up with several varieties two to three years from now. (Roger Cordero)

FFS in rice and vegetable to include detoxification process on seed. (Henry Dungganon)

Engage in research and production of other regional banner crops and other high value crops. (Elizar Alonzo)

Seed banking of different Masipag rice cultivars for farmers. (Pedro Altar)

Continue to disseminate seed storage techniques to other farmers in the area. (Oliver Guyon)

Empower the community and teach techniques of seed preservation and improve the quality of life in the upland through forest based resource utilization. (Ace Santocildes)

Continue implementation of activities and encourage farmer-based or community-based seed production and genetic conservation. (Irene Galate)

Put up a little seed bank in our institution to conserve different planting materials for laboratory needs of both faculty and students. (Felomino Andig)

Conduct sustainable agriculture conference on March 4 - 5, 1999 and have a three to five years plan for a seed bank. (Mario S. Lina)

Hybrids are very susceptible to pests and diseases. We plan to submit a proposal to ILEIA to fund our project on participatory plant breeding and genetic conservation. (Florencio Z. Galapon)

**2. How different are your responsibilities mentioned in no. 1 from the ones you were involved in at the time you took the short course?**

Not much changed in my responsibilities, but we have expanded our original program and one of our major concern is Farmer Field School on Ecological Pest Management in lowland rice. This is a season-long training and a considerable number of farmers have already joined. With this, we have progressed to marketing of organically grown rice. (Roger Cordero)

The indigenous knowledge on seed storing usually used by rural folks compared to high tech used by IRRI. Handling of seeds was improved. (Juanito Flores)

My responsibilities was not directly on seed program until now, but I tried to make it a reality these coming years. (Henry Dungganon)

Before I took the course, I was bent on applying the needed commercial inputs in the production of crops as it was easier and without regard to environmental consequences. After I took the course, I thought differently. For instance, in peanut production, I applied commercial fertilizer only as starter agent and only after determining soil fertility. Seed inoculant is also applied. On pest and disease management of the crop, for the most recent crop I planted, never at all did I apply synthetic pesticides, as I thought this would be the best way to conserve and sustain the resource base – the soil and the beneficial pests. (Elizar Alonzo)

Quite different since when I took the short course my main job was on sustainable agriculture but now being a community organizer, I'm a SALT officer focusing on upland farming, livestock and institution building. However, we have efforts on Masipag farming and other SA related activities in upland and lowland such as IPM and CID. (Pedro Altar)

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With the training I had in your division, I gained more knowledge, and in fact improved my skills and knowledge on seed collection and proper storage techniques. (Oliver Guyon)

Before the short course, my responsibility was more of coordination and monitoring while at present, it is more of project implementation and community organizing. (Ace Santocildes)

Significant in the implementation of SA. Interesting for proper dissemination. (Irene Galate)

There's really a big difference because before I took the short course I was assigned as vegetable in-charge which is for production purposes (from land preparation to marketing. After taking the course, I was transferred to the nursery because it is most related to the short course especially seed practices that involves raising seedlings or any planting materials. (Felomino Andig)

My responsibilities to our organization and community broadened. (Mario S. Lina)

Before the course, we are already familiar with SA but after we took the course we had greater responsibility to protect and conserve our endangered way of living (farming). (Florencio Galapon).

**3. Please describe significant ways by which the course had been relevant or useful to your work or to other aspects of your life.**

Confident when giving lectures, especially to upland farmers particularly the social forestry beneficiaries, on how to raise their crops, store seeds and technology on upland farming. (Juanito Flores)

The short course has been useful to me since I was able to realize the importance of IK practices and applied it to farming, that seed is the life of farmers and that SA is a philosophy and way of life. (Henry Dungganon)

Please explain the type of seed project in which your institution wants to do (i.e., in relation to seed production, research, conservation, education, extension, advocacy, etc.): *Know-how on techniques on seed production, specifically vegetable crops and especially sustainable agriculture technology, process and mechanisms for implementation. (1995)*

I requisitioned lesser inputs for crop production in the station than I have ever done before which resulted to lesser expenditures of government fund for this particular development activity of our station. I share with the farmer-clienteles of the station the concept of sustainability where many of them are now practicing the idea in various ways, for example by decreasing their commercial farm inputs and practicing the concept of IPM. With regards to the other aspects in my life, I began living a simpler life – less processed food, no toilet freshener, more fresh food for the family. I'm now practicing proper waste disposal, emphasizing on the separation of biodegradable and non-biodegradable which I share with others. Changes have also occurred within myself. I developed the sustainable perspective. In line with this new outlook, I have began speaking in line with this new learning. However, I realized that there are many things to be straightened out, and many of them can only be changed through better policies, utmost efforts and constant adjustments with reality and of course with the best way of relating to human counterparts. I have also become more attentive to human beings I encounter. (Elizar Alonzo)

Please explain the type of seed project in which your institution wants to do (i.e., in relation to seed production, research, conservation, education, extension, advocacy, etc.): *Updated knowledge on new varieties/ strains of plant seeds, improved techniques in production, processing and storage of seeds, and improved programming and monitoring of seed production for distribution. (1995)*

*continued next page*▸

The course made me more aware of the importance of a reliable and informed seed grower and a producer in seed production. (Alma Verde)

Expectations: *I want to know the latest developments in seed production and apply this knowledge in my farm. (1996)*

The problems of the farmers on seed preservation, breeding and banking are given answers as part of sustainability schemes. More so, improved seed production for seed purposes was solved. Also, even for home use, preservation techniques can be applied. (Pedro Altar)

I'm applying it on my work especially nursery projects where seed collection, storage and propagation are main activities. In my hometown, I also practice what I have learned especially on the different characteristics of seed that have to be sown immediately and those that can be stored longer. (Oliver Guyon)

Community organizing inputs helped. Knowledge on seed handling is very relevant especially the indigenous knowledge/practices. They are also relevant and applicable in the field. (Ace Santocildes)

Expectations: *To be informed and equipped with the latest seed production and handling techniques, developmental issues which will be most relevant and applicable in the pursuit of my work. (1996)*

Students are involved in the sustainable vegetable productions and they are encouraged to adopt the technology. (Irene Galate)

Expectations: *To learn/acquire information techniques on the proper operation and handling of seeds.* ***Acquire information on the different aspects of sustainable agriculture. (1996)***

One most significant way is the proper storage and other seed practices which is very significant and useful to a nursery man. (Felomino Andig)

Expectations: *I expect to learn more knowledge and techniques in producing, handling, and genetic conservation of seeds as planting materials for sustainable agriculture. (1996)*

I was able to use it for organizing, in the conferences that I have attended which were all about livelihood in the community and conferences related to organic agriculture. (Mario S. Lina)

Modules on IKS and wholistic science; seed production and conservation. In principle and aim as a farmer, if you have your own seed and you can keep and sustain to produce you have liberated yourself in one aspect. (Florencio Galapon)

**4. Please describe how much of your work has been changed to be within the framework of sustainable agriculture.**

I have varied tasks, however, when it comes to specific function it really changed drastically because of the training. (Juanito Flores)

IPM in rice; rice-duck and rice-fish technology; masipag rice; associative economics; FFS in vegetables. (Henry Dungganon)
Changes in organization with the sustainable agriculture framework: *Concrete – framework on* ***sustainable agriculture, plans/ targets. (1995)***

My work has been changed by 70% to be within the SA framework. Deficiency can be attributed to intervention of new development now taking place that spawn the negative effect on people's

*continued next page*▸

way and less time in sharing the principle or concept. (Elizar Alonzo)

Changes in organization with the sustainable agriculture framework: *Emphasize commercialization in the DA technical personnel and avoidance of side jobs and designation to give full focus and concentration to substantial and primary job assignments which is purely for agricultural development. (1995)*

I am planting neem trees and kakawate in the production area with the intention of using these as non-chemical pesticide and organic fertilizers. (Alma Verde)

Changes in organization with the sustainable agriculture framework: *More training, more information,* ***quality leadership. (1995)***

Not much has changed, but before, it was focused on upland and lowland, but now more on uplands with minimal assistance to co-staff on lowland SA practices. Before, my work was specialized on SA, but now it is more general. (Pedro Altar)

With the seed technology course, the speaker's also emphasized on the importance of those agro-forestry seeds that can be propagated as a source of planting materials for AF projects in the uplands. In our province, one type of AF being practiced is the "muyung" system which to an outsider is a sustainable AF in the Cordillera region. The rain tree, for example, act as a nurse tree for coffee plantation. (Oliver Guyon)

Presently, not very significant, but to some degree it is inclined towards the SA framework. Traditional rice varieties and masipag varieties are widely used in the area. (Ace Santocildes)

Changes in organization with the sustainable agriculture framework: ***Shall develop more programs which are people-based and more responsive to the needs of upland farmers. (1996)***

I devote 60% of my work in the implementation of SA project. (Irene Galate)

Changes in organization with the sustainable agriculture framework: *Missions, goals, objectives of the* ***school be anchored on the development of livelihood opportunities. (1996)***

After the short course I spent one more cropping season on the vegetable project on which I was previously in-charged. I successfully followed the framework of sustainable agriculture from seedling to harvesting. I didn't apply any single amount of chemicals or pesticides. I still applied inorganic fertilizer but reduced the amount slowly because I also applied organic fertilizer such as animal manure as supplement. The NORMISIST people enjoyed buying our products which were free from chemicals. Even our rice were not applied with any single pesticide. The same with our nursery. (Felomino Andig)

Changes in organization with the sustainable agriculture framework: ***Since our organization is a learning institution, it is necessary to teach the students the scientific knowledge on sustainable agriculture. The school itself will show changes through raising of sustainable crops. (1996)***

I am a member of the provincial sustainable agriculture ad hoc committee in Nueva Ecija. I am in charge of finding partners to finance responsible for

KALIKASA Nueva Ecija is a federation promoting SA. We had already launched a provincial sustainable agriculture conference last December 29, 1998. (Florencio Galapon)

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**5. What current problems or needs do you have that relate to seed or sustainable agriculture?**

Most of the problems and issues encountered is the use of pesticides. Other chemicals adopted for the use of modern agriculture affect the health of human beings. (Juanito Flores)

Problems related to seed: *Suitability of species to be planted in the given area for reforestation, soil analysis. (1994)*

How to facilitate the detoxification process of seeds addicted to chemical inputs. (Henry Dungganon)

Problems related to seed: *Commercially initiated sources of seeds.*
*Storage or maintaining seed viability and commercial seed handling. (1995)*

Most pressing need that relate to my existing work is the continued availability of high quality peanut cultivars – varieties and lines – for screening (yield, processing and adaptability) in region VIII. (Elizar Alonzo)

Problems related to seed: *Impurity or adulteration in produced seeds. Harvesting and processing loss of seeds. Infestation due to storage.*

*Heterogeneity, e.g rice or impurity. Pest and disease infected seeds. Non-viable or low-vigor seeds. Lack of storage techniques. Processing damage and loss. (1995)*

Availability of palay seeds – foundation/ registered; availability and viability of "masipag" seeds in our areas. (Alma Verde)

Problems related to seed: *Limitation in the supply of foundation and registered seeds.*

*There have been instances where palay seeds approved by the local DA inspection do not grow or yield uneven (up and down) crops. These seeds are priced from 600 – 800 pesos per sack of 40 kgs. (1996)*

Preservation of peanut seeds in volume, especially against rats. Resistance of farmers on technology changes from IRRI variety to masipag and IPM practices. (Pedro Altar)

To ask for more or other definition of sustainable agriculture and illustrated examples so I can discuss it with other farmers who keep on asking questions. (Oliver Guyon)

I have problems on the availability of clean eucalyptus (0.5 kg), manguim (2.5 kg), narra (137 kg) and mahogany seeds (70 kg). Another is compatible sustainable livelihood projects. (Ace Santocildes)

Problems related to seed: *Limited knowledge in community organizing, techniques on seed storage, handling and planting, material production. Training/ workshop should best answer/ solve in order to be equipped and informed of the latest developmental strategies*

*Control and protection against pest and disease infection. Inadequate handling and preservation technique which cause early loss of seed viability. Conspicuous seed market outlet is lacking. (1996)*

Financial assistance, storage facilities, implementers, workers adopting the technology. (Irene Galate)

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Problems related to seed: *Lack of seed laboratory, storage facilities as in post Harvest Operation. Involvement of technical man in the operation and special funding for the said project.*

*Control of pest and diseases of solanaceous crops i.e, wilting during seedling and fruiting stage, prevalence of fruit flies. (1996)*

The pressing problem that I encountered was in storing seeds since we have no effective storage facilities especially for oily seeds and recalcitrant seeds. (Felomino Andig)

Problems related to seed: *The effective storing procedures. How to conserve and sustain the seed viability How to obtain high yield in the production of seeds.*

*The problem in attaining genetic conservation. Hoe to conserve it shelf life. How to determine/ identify a seed which is affected with seedhorne disease before germination with its prevention and control. (1996)*

Showing models farms of integrated farming systems in other places. (Mario S. Lina)

Many farmers still believe in hybrid seeds. Producers of these seeds are financially capable of promoting their products unlike SA that have limited budget for promotions. It will take a long way to mainstream SA. (Florencio Z. Galapon)

**6. In what ways do you think we could improve our extension/ training function to become more effective.**

**It should be inviting to other fields of profession and to make them aware of the so called sustainable agriculture. (Juanito Flores)**

I think, what you are doing now is a much improved and effective way of your extension and training function. What I have witnessed with that two-week course is by far one of the best I've ever attended. However, as things like these keep on improving, we can't finally say that it's the best. There's still room for improvement. I think that improvement is most needed after the training. Probably, contact after the training, either through correspondence or whatever practical way to stir out what had been imbibed or internalized is one way of facilitating the dynamicity of that knowledge. (Elizar alonzo)

Update us on new trends in agriculture through a newsletter. It would also be nice if we could receive other articles/publications on agricultural development. (Alma Verde)

Concentrate on giving trainings to PO/ Coop leaders that are capable and stable than staff of NGOs like us who are program dependent and soon will find some other work because of security tenure. (Pedro Altar)

Develop an ideal sustainable agriculture site. There should be more time/ days to visit successful farms. (Oliver Guyon)

Training by correspondence is an extension work but I think not very effective compared to in-house. I'm thinking of on-site training with NGOs and POs but it might be expensive on your side. (Ace Santocildes)

Introduce model farm showing the SA project to farmers or to the community. (Irene Galate)

I think it is better to have a continuation seminar which is more in-depth and longer than the previous one and only ex-participants should attend. It will be more effective if only the participants of one batch attend the seminar since everybody is familiar with each other and can share more ideas and experience than before. (Felomino Andig)

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By giving training to farmer leaders or farmers under the agrarian reform community to make them understand sustainable agriculture. (Mario S. Lina)

Public information through linkaging with groups engaged in SA especially farmer groups all over the Philippines. You can invite during SA National Conference. (Florencio Z. Galapon)

7. What is your reaction to a distance mode of learning (training by correspondence) in seed and sustainable agriculture? How appropriate do you think would it be for you as an ex-participant and/or one who had not undergone any training with s?

Given the limited resources, I think it may be very good. However, it lacks the actual experience of having to discuss with the group which I think is one of the most important process in learning. (Roger Cordero)

This is a new room for improvement and can be accredited for continuous education program in the renewal of professional license in Professional Regulatory Commission. (Juanito Flores)

Training by correspondence is nice and easy but there will be no interaction and sharing. I think, the best way of learning is learning by doing and learning by experience. (Henry Dungganon)

A distance mode of learning would differ in appropriateness between an ex-participant and one who had not undergone any training with you. While it would be more meaningful to an ex-participant and with greater understanding of the subject, to a new one, it would be of lesser impart. However, distance constraints will be minimized. It is better to implement the course as it has been previously implemented but of course with an additional energizing modification and correspondence may be done as a supplemental activity of the former with the objective to enrich, hasten and develop what has been learned. (Elizar Alonzo)

I would welcome such move especially for those of us who cannot just take off and go to Los Banos. (Alma Verde)

This is good since we can save money but I'm not sure if this type of training will give the expected output to a participant in terms of knowledge, skills and attitude input since everyone seems not to be serious to read the training kits. (Pedro Altar)

Not in favor of this because there is a need for actualization. There should be actual training with them. (Oliver Guyon)

I think this is fine. We can have updates on SA and seed technology. For those who have not undergone training with you, this is still appropriate. They can complete the course with less expenses or without traveling to Laguna. What is needed is comprehensive parameter in training completion. (Ace Santocildes)

Closer supervision in the implementation. You can appreciate the relevance, importance, advantages to the environment. (Irene Galate)

With regards to distance mode of learning in seed and sustainable agriculture, this will only be effective for the ex-participants because they have already studied the fundamentals of this framework. (Felomino Andig)

A greater number will benefit from this because even if you're at home, as long as you can spare some time, you will be able to learn a lot of things. This is just based on my experience on distance learning given by Education for Life, Foundation. (Mario S. Lina)

As an ex-participant, it will be an advantage to us because we will be updated of the latest information especially on national and global issues. In exchange we may also feedback what's

*continued next page*

happening to us. Distance learning is possible even for those who have not undergone any training with you if they view SA in the same perspective as you are. (Florencio Z. Galapon)

**8. We would be very happy to hear any question(s), suggestion(s) and/or news from you.**

Sponsor a training/seminars related to SA or forestry that can be used in the CEP for renewal of licensure. (Juanito Flores)

I'm thinking of a collaborative project between the DA (Leyte) of our region, especially it's a research and development arm – the EVIARC, and UPLB that will deal with seed and sustainable agriculture related issues and concerns. There's a great chance that DA management in our region shall affirm this proposal. The department is presently engrossed in agricultural development efforts in crops, livestock and marine. (Elizar Alonzo)

I am very much thankful to the facilitators and to the coordinator of the short course. Through this seminar I am now transferred to another assignment or task which is more valuable and one of the big contributory factor to the institute and even to the neighboring places. (Felomino Andig)

I hope the next time you give a training, there will be a levelling off to fully understand SA. What are the basis for certifying organically grown products and for standardization of organic agriculture. (Mario S. Lina)

I would like to suggest that if it's possible, all the ex-participants of the course meet in a national conference and present their accomplishments after they have taken the course. (Florencio Z. Galapon)

Prepared by:
Annalissa L. Aquino
University Research Associate
Seed Science and Technology Division
Department of Agronomy, UPLB

*continued next page*

## C. The accompanying letter

UNIVERSITY OF THE PHILIPPINES AT LOS BAÑOS
COLLEGE OF AGRICULTURE
College, Laguna, Philippines 4031
Tel. Nos.: (049) 536-2466; 536-2468; 536-2217
Fax No.: (049) 536-2468

DEPARTMENT OF AGRONOMY

18 March 1997

_____
_____
_____

Dear _____,

Greeting! We are writing all previous participants of our 2-week short course on seed. The course underwent some transformation but basically it dealt with the same area, i.e., seed technology, genetic conservation and sustainable agriculture. we have had six courses in all and decided that on the seventh year we "rest". The number of applications did not meet the set minimum so we thought it is the best time to do some more self-reflections. Operating the course is really not easy without adequate financial backstop but on the other hand the trend might be an indication that a different form of training or service from us is needed. At the moment we are only "survived" by the university-funded Seed Research and Development Project, with an MOE P50,000 p.a.

We enclose some materials to let you know about what we could possibly offer. To make what we do more relevant we hope you could fill out the enclosed questionnaire.

On to how we are. It has been a real enriching six years of the course. We learned a lot from you and the other resource persons, as well from the process itself. The turnover of staff has been quite high, as staff seeks greener pastures. Nympha, Bebot, Kit, Nanet, Elvie and Mark are no longer with us, but we have Lucille de Guzman, Lissa Lappay and Ana Medel as relatively new additions. The old timers are of course Malve, Rene, Merly, Timi (for some of you) and myself. Sustainable agriculture has progressed considerably, it being the framework of the new/revised Bachelor of Science in Agriculture curriculum. The Agroforestry Seeds Circular has stopped coming out with new issues (the last was 1993) for lack of funds and "energy". However, feedback from readers had been very encouraging as we are being urged to continue the effort. The Tagalog Manual on seed production and handling is soon to be revised and maybe, an English translation could also be done. We hope that in the future you could help in its translation to the various local languages. In place of, or in addition to, the short course, a different form of training may be in order, e.g. training by correspondence or distance learning.

Now we would also like to know how you have been after the short course. The enclosed questionnaire should give us some idea about that, but we would welcome some personal notes in addition. Looking forward to hearing from you receiving the filled out questionnaire. You shall receive feedback about it sometime in the near future.

Warmest regards from all of us.

Sincerely,

PAMELA G. FERNANDEZ
Faculty and Head, Seed Science and Technology Division

## APPENDIX 13. Communication and second survey questionnaire sent out to former participants of the summer short course on Seed Technology and Genetic Conservation for SA (1991-1998).

UNIVERSITY OF THE PHILIPPINES AT LOS BAÑOS
COLLEGE OF AGRICULTURE
College, Laguna, Philippines 4031
Tel. Nos.: (049) 536-2466; 536-2468; 536-2217
Fax No.: (049) 536-2468

DEPARTMENT OF AGRONOMY

18 March 1997

_____
_____
_____

Dear _____,

Greetings! We are writing all previous participants of our 2-week short course on seed. The course underwent some transformation but basically it dealt with the same area, i.e., seed technology, genetic conservation and sustainable agriculture. We have had six courses in all and decided that on the seventh year we "rest". The number of applications did not meet the set minimum so we thought it is the best time to do some more self-reflections. Operating the course is really not easy without adequate financial backstop but on the other hand the trend might be an indication that a different form of training or service from us is needed. At the moment we are only "survived" by the university-funded Seed Research and Development Project, with an MOE of 50,000 p.a.

We enclose some materials to let you know about what we could possibly offer. To make what we do more relevant we hope you could fill out the enclosed questionnaire.

On to how we are. It has been a real enriching six years of the course. We learned a lot from you and the other resource persons, as well from the process itself. The turnover of staff has been quite high, as staff seek greener pastures. Nympha, Bebot, Kit, Nanet, Elvie and Mark are no longer with us, but we have Lucille de Guzman, Lissa Lappay and Ana Medel as relatively new additions. The old timers are of course Malve, Rene, Merly, Timi (for some of you) and myself. Sustainable agriculture has progressed considerably, it being the framework of the new/revised Bachelor of Science in Agriculture curriculum. The Agroforestry Seeds Circular has stopped coming out with new issues (the last was 1993) for lack of funds and "energy". However, feedback from readers had been very encouraging as we are being urged to continue the effort. The Tagalog Manual on seed production and handling is soon to be revised and, maybe, an English translation could also be done. We hope that in the future you could help in its translation to the various local languages. In place of, or in addition to, the short course, a different form of training may be in order, e.g. training by correspondence or distance learning.

Now we would also like to know how you have been after the short course. The enclosed questionnaire should give us some idea about that, but we would welcome some personal notes in addition. Looking forward to hearing from you and receiving the filled out questionnaire. You shall receive feedback about it sometime in the near future.

Warmest regards from all of us.

Sincerely,

**PAMELA G. FERNANDEZ**
Faculty and Head, Seed Science and Technology Division

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UNIVERSITY OF THE PHILIPPINES AT LOS BAÑOS
COLLEGE OF AGRICULTURE
College, Laguna, Philippines 4031
Tel. Nos.: (049) 536-2466; 536-2468; 536-2217
Fax No.: (049) 536-2468

DEPARTMENT OF AGRONOMY

25 January, 1999

_____
_____
_____

Dear _____,

Happy New Year!

Enclosed are the communication and questionnaire, which we sent to our ex-short course participants, from 1991-1996. We are planning to compile and make an official document of the turnout. The material shall serve as guide on our future thrust and activities.

Although it has been only a year since you had the course we thought that your input into the survey would complete the 7-years the course had been offered. We, therefore, would appreciate it very much if you could fill out the questionnaire and send it back to us as soon as you can.

We hope that we will be able to find an opportunity to meet again soon. Thank you.

Warmest regards,

PAMELA G. FENANDEZ
Assoc. Prof. & Head
Seed Science & Technology Division

*continued next page*

**SEED TECHNOLOGY/SA SHORT COURSE**
**Ex-participants**

**NAME:**_____

**ADDRESS:**_____

**TEL/FAX/E-MAIL:**_____

1. What seed-related activities are you…

   a) Currently engaged in?

   b) Planning to do?

2. How different are your responsibilities mentioned in No. 1 from the ones you were involved in a the time you took the short course?

3. Please describe significant ways by which the course had been relevant or useful to your work or to other aspects of your life.

4. Please describe how much of your work has been changed to be within the framework of sustainable agriculture

5. What current problems or needs do you have that related to seed or sustainable agriculture?

6. In what ways do you think we could improve our extension/training function to become more effective?

7. What is your reaction to a distance mode of learning (training by correspondence) in seed and sustainable agriculture? How appropriate do you think would it be for you as an exparticipant and/ or for one who had not undergone any training with us?

8. We would be very happy to hear any question(s). Suggestion(s) and/or news from you. Please use the space below or an additional sheet if necessary. *Thank you very much.*

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## APPENDIX 14. Sample format and questions related to SA and agroecology, designed to profile students or participants collectively and give immediate and visual feedback.

### PROFILING: Participant's perspective on sustainable agriculture & agroecology

Participants: Pin or make a dot using pentel pen on the box (or boxes) that best describes you or your community 's reality the most

1. My knowledge about agroecology/ecological agriculture is…

| | | | |
|---|---|---|---|
| ☐ Nil/None | ☐ Little | ☐ Some | ☐ Plenty |

2. Most farmer's knowledge about ecological agriculture is…

| | | | |
|---|---|---|---|
| ☐ Nil/None | ☐ Little | ☐ Some | ☐ Plenty |

3. My major crop (or species) of interest (or concern) is/are…

| | | | | |
|---|---|---|---|---|
| ☐ Upland rice | ☐ Lowland rice | ☐ Corn | ☐ Camote | ☐ Cassava |
| ☐ Sugarcane | ☐ Peanut | ☐ Vegetables | ☐ Coconut | ☐ Fruit trees |
| ☐ Agroforestry | ☐ Forest sp. | ☐ Animals | ☐ Fish | ☐ Others, specify |

*continued next page*

4. My minor crop (or species) of interest (or concern) is/are…

| | | | | |
|---|---|---|---|---|
| ☐ Upland rice | ☐ Lowland rice | ☐ Corn | ☐ Camote | ☐ Cassava |
| ☐ Sugarcane | ☐ Peanut | ☐ Vegetables | ☐ Coconut | ☐ Fruit trees |
| ☐ Agroforestry | ☐ Forest sp. | ☐ Animals | ☐ Fish | ☐ Others, specify |

5. The number of varieties or breeds I have for my main crop/species/enterprise is…

| | | | |
|---|---|---|---|
| ☐ 1 | ☐ 2 | ☐ 3-5 | ☐ More than 5 |

6. Where I am from or where I am responsible or have influence, the frequency or commonness of the following practice is …

| | | | | |
|---|---|---|---|---|
| a) Self-seed production (seed recycling) | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| b) Self generation of animal stocks | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| c) Farmers improving or Breeding own variety/ Animal stock | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| d) Multistorey cropping | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| e) Chemical fertilization & Chemical pesticides | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| f) Animal manuring | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| g) Green manuring | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| h) Composting | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| i) Cover cropping | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| j) Non chemical or alternative Pest Management | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| k) Integrating crops with livestock | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |

7. When our seeds are Obtained from outside, they are most commonly…

| | | |
|---|---|---|
| ☐ From the market/ trader | ☐ Bought from neighbors | ☐ Exchanged with neighbors |

*continued next page*

8. My preference for the following is..

a) $F_1$ hybrids/commercial seeds or breed

| | | | |
|---|---|---|---|
| ☐ No preference or undecided | ☐ For all or some of my crops | ☐ A few to try out | ☐ None |

b) Asexual propagules

| | | | |
|---|---|---|---|
| ☐ No preference or undecided | ☐ For all or some of my crops | ☐ A few to try out | ☐ None |

c) Farmer-generated seeds

| | | | |
|---|---|---|---|
| ☐ No preference or undecided | ☐ For all or some of my crops | ☐ A few to try out | ☐ None |

d) Seedboard variety and certified seeds

| | | | |
|---|---|---|---|
| ☐ No preference or undecided | ☐ For all or some of my crops | ☐ A few to try out | ☐ None |

9. My knowledge about negative impact of the following are:

| | | | | | |
|---|---|---|---|---|---|
| Hormones, feed additives, antibiotics | ☐ None at all | ☐ Very little | ☐ Some | ☐ Adequate | ☐ Plenty |
| Chemical Fertilizers | ☐ None at all | ☐ Very little | ☐ Some | ☐ Adequate | ☐ Plenty |
| Chemical Pesticides | ☐ None at all | ☐ Very little | ☐ Some | ☐ Adequate | ☐ Plenty |
| Irrigation | ☐ None at all | ☐ Very little | ☐ Some | ☐ Adequate | ☐ Plenty |
| Tillage | ☐ None at all | ☐ Very little | ☐ Some | ☐ Adequate | ☐ Plenty |
| Genetically Engineered (Biotech)Seeds | ☐ None at all | ☐ Very little | ☐ Some | ☐ Adequate | ☐ Plenty |
| Modern animal breed and then associated care | ☐ None at all | ☐ Very little | ☐ Some | ☐ Adequate | ☐ Plenty |

10. Varieties/breeds are produced by..

| | |
|---|---|
| ☐ Plant/animal breeders | ☐ Genetic engineers (Biotechnologists |
| ☐ Farmers | ☐ Nature |

*continued next page*▸

11. "Indigenous/local practices and beliefs, especially those not related to actual production (ex, rituals, prayers, superstition) should be discouraged or done away with (omitted) for better production efficiency"

| | | | |
|---|---|---|---|
| ☐ Strongly agree | ☐ Moderately agree | ☐ Strongly agree | ☐ No opinion or unsure |

12. "Knowledge, practices from formal institutions are more appropriate or better for farmers than what farmers already know"

| | | | |
|---|---|---|---|
| ☐ Strongly agree | ☐ Moderately agree | ☐ Strongly agree | ☐ No opinion or unsure |

13. In an agriculture enterprise, the PRIORITY/IMPORTANCE placed on the following should be…

| | | | | |
|---|---|---|---|---|
| a) High yield, biomass, (or animal body weight) | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| b) High quality of produce | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| c) Stability (constancy in production) despite stresses more than high yield/itself | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| d) Efficiency more than maximum production | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| e) Equity (i.e. where majority benefits | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| f) Sustainability (continuity of production over long term | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| g) Availability of credit | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| h) Presence of external market that offers good price | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| i) Self sufficiency and reliance | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |
| j) High value crop | ☐ High | ☐ Medium | ☐ Sometimes low | ☐ Very low or never |

14. A developed seed industry means..

15. Developed Philippines means…

| | | | | |
|---|---|---|---|---|
| a. Becoming an "industrial economy" economy | ☐ Fully agree | ☐ Fully disagree | ☐ Somewhat disagree | ☐ Undecided |
| b. Becoming an "information economy" | ☐ Fully agree | ☐ Fully disagree | ☐ Somewhat disagree | ☐ Undecided |
| c. Remaining agricultural but Globally competitive (high value, cash crops) | ☐ Fully agree | ☐ Fully disagree | ☐ Somewhat disagree | ☐ Undecided |
| d. Remaining agricultural but, prioritizing self reliance and food security and small farmers' interest | ☐ Fully agree | ☐ Fully disagree | ☐ Somewhat disagree | ☐ Undecided |
| e. Having high GNP | ☐ Fully agree | ☐ Fully disagree | ☐ Somewhat disagree | ☐ Undecided |

16. Trainings I have attended relevant to the course (Also seed collated info from benchmark 2 questionnaire) are on…

| | | | |
|---|---|---|---|
| ☐ Sustainable agriculture | ☐ Soil fertility, nutrient and health management | ☐ Water and soil management/ conservation | ☐ IPM/APM |
| ☐ Animal production | ☐ Crop production | ☐ Nursery management | ☐ Asexual propagation |
| ☐ Seed tech/ production | ☐ Genetic conservation community seed making | ☐ Farming systems, agroforestry | ☐ Self-development |
| ☐ Community development | ☐ Community organizing | ☐ Others (specify) | |

(Also see collated info from benchmark 1 questionnaire for revalidation)

17. My knowledge/familiarity of IMPACT of the following issues, trends to farming and national development is…(see collated info from benchmark 1)

| | | | | |
|---|---|---|---|---|
| ☐ None at all | ☐ Very little | ☐ Some | ☐ Adequate | ☐ Plenty |

18. In the Philippines the extent to which the following needs/rights is fulfilled is…
a. Health and Sanitation
b. Full development of human potential
c. Appropriate Technology
d. Peoples' Participation in governance
e. Family care & psychosocial integration
f. Good Income
g. Peace & order, Public safety
h. Recreation

## APPENDIX 15. Checklist of farm/farmer/organization features indicating sustainability.

| CRITERIA/TRAITS | Relevant Visits/Activities/Topics | | | | | |
|---|---|---|---|---|---|---|
| 1. Diversification of Enterprise/Biological Diversity | | | | | | |
| 2. Integrated | | | | | | |
| 3. Resource management/conservation (Soil, Water, Nutrient) | | | | | | |
| 4. Soil health, quality (non chem; nourished naturally) | | | | | | |
| 5. Recycling (e.g. use of biodegradable materials); low external inputs | | | | | | |
| 6. Appropriate variety/seed (non hybrids, non GMOs) | | | | | | |
| - Recycled | | | | | | |
| - Genetically diverse | | | | | | |
| - Appropriate culture management | | | | | | |
| - Compatible with farmer's culture | | | | | | |
| - Local varieties, species | | | | | | |
| 7. Appropriate Pest Management | | | | | | |
| 8. Multistorey cropping | | | | | | |
| 9. Location specific (not packaged technology; not dependent on transfer of technology) | | | | | | |
| 10. Self reliant; source of funds to run the enterprise/ activity | | | | | | |
| - Internal | | | | | | |
| - Not dole out | | | | | | |
| - Not come from TNCs with non-SA development perspective (highly motivated by profit) | | | | | | |
| 11. Enterprise is NOT market driven; NOT primarily profit driven; Farmer driven, farmer-led, VALUES-laden | | | | | | |
| 12. Systems yield (not commodity yield) | | | | | | |
| 13. Net positive income of household, well distributed labor, intra family equity, considers externalities (household economics; associative economics) | | | | | | |
| 14. Self-reliant "financing"-not loan/credit based | | | | | | |
| - not subsidized | | | | | | |
| 15. Immune to or not influenced by external programs or agreeements (GATT, APEC) | | | | | | |
| 16. Farmers have control over land and water resource | | | | | | |
| 17. Farmers conscious of and have means to be updated of issues related to SA, development | | | | | | |
| 18. Farmers are experimenting; innovative | | | | | | |
| 19. Farmers are pro-Nature, pro-People, pro-God, Pro-Country, pro-Animals (humane) in their values and ways | | | | | | |
| 20. Farmers are "nationalistic", pro-community | | | | | | |
| 21. Farmers are legitimately participating; not driven by subsidy, income, top down program | | | | | | |
| 22. Farmers have clout: (strong group, individuals); strongly and legitimately organized | | | | | | |
| 23. Farmers know self very well and good in human relations, self confident and is self actualized | | | | | | |
| 24. Farmers are well grounded on issues | | | | | | |

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| CRITERIA/TRAITS | Relevant visits/activities/topics | | | | | |
|---|---|---|---|---|---|---|
| 25. Technology is appropriate to farmer, culture, location; well-anchored on IKS | | | | | | |
| 26. Technology facilitates promotes local area and community development | | | | | | |
| 27. Systems approach, holistic and integrative (considers impact to whole system, seeks real cause rather than remedy symptoms) | | | | | | |
| 28. Prioritize food security (stable, available, accessible, equitable, quality/nutritious food supply), able to conduct training on SA, farmer to farmer extension, networking | | | | | | |
| 29. Enterprise/endeavor is beyond the goal of RELIEF, but on the LEVEL of REHABILITATION, aiming ultimately for DEVELOPMENT | | | | | | |

## APPENDIX 16. Snacks for the Professorial Chair Lecture.

1. "Puto Maya" (Cebuano)
   *steamed malagkit & purple rice with coconut, ginger & muscovado (sugar)*

2. "Budbod Kabog" (Cebuano)
   *suman na millet with muscovado*

3. Squash cake (brown flour, brown sugar, squash)

4. Tempeh (soybean) peanut (Indonesian) and dilis "pulutan"

5. "Salbaro" (Cebuano)
   *super thin cookies made of coconut flour & sugar*

6. Health juice:
   *calamansi + gumamela + pandan + brown sugar*

## SUPPLEMENT 1. Excerpts on education relevant to the Professorial Chair Lecture on "Alternative Seed Training and Education for Sustainable Agriculture" July 20, 1999.

*Following are some thoughts on education excerpted from various sources. This supplement aims to give readers an insight into education-related discussion especially on the need for alternative education/training. Many of the sources are uncommon but can be found in the mini library of the Seed Science and Technology Division. For complete citation please refer to the Literature Cited section of the paper.*

### A. Anonymous. That college professors are liberal

One of the ideas that most college teachers have about themselves and their profession, and one that is certainly shared by the community in general, is that college professors are liberals. That is patently false. I am not, of course, talking about what ticket they vote in November every four years. I'm talking about the way they think in general. One of the qualities of liberalism is that it thinks freely and is willing to alter when new information comes in; it is open to new ideas and experimentation. Certainly that is not the governing characteristic of many college professors. Sometimes, of course, it does have political implications.

Faculty member's conservatism shows up in an unwillingness to alter the status quo of the educational program.

On most college campuses there is considerable lip service paid to interdisciplinary work of one sort or another. Actually, interdisciplinary work succeeds only on those campuses on which administrations give the interdisciplinary programs so much support that faculty members do not feel they can vote it down. Usually it means that an individual faculty member who wants to teach in an interdisciplinary way, and has the credentials to convince a large number of the faculty that he is able to, takes over. But the moment that he leaves, the program disappears.

There is a generalization that works in American college education – or education at any level in America, for that matter – which goes: any successful experiment will be voted out as soon as possible.

There is a reason for this behavior, but it is an unfortunate one. Experimental programs of any kind take extra work on the part of the faculty. For one thing, it means they have to revamp their entire approach to the subject matter, whatever it might be. And second, it threatens the establishment on any campus. These are not good reasons to be against any educational program, but they are real ones.

The question, then, is whether there is a difference between the educational conservatism of faculty members and their political positions. Not really. There is an old Republican adage that if you want to change somebody into a conservative, you give him money to manage. That has a remarkable amount of truth to it. The change in the political position of American faculty members occurred during the 60s. There are some who will argue they were driven into conservatism by fear of the various student movements, and that may, indeed, have had something to do with it. But perhaps more important, they were suddenly making more money than they had in the past. Teachers' salaries, at least at the college level, began to approach those of other jobs, although certainly not other professions. It is certainly remarkable how conservative the ownership of stock makes many faculty members. I began to seed that in the early 60s in Wyoming and in New York.

I wouldn't want to be misunderstood. I think there is something about the educational process that does keep teachers young and liberal. But it is wrong to think that people come into teaching with a pre-set liberal position. One of my favorite quotations to describe the educational situation on many college campuses is not one that I made up myself, although I

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would have loved to. I owe it to John Satterfield, who came as provost at Elmira College after being on the faculty of Florida Presbyterian, now Eckard College. John described the usual situation quickly and succinctly. He said most college faculties are made up of the Old Turks and the Young Guard.

When I was doing a Ford Foundation study of humanities programs in engineering institutions, it struck me over and over again that the teachers who held the most liberal positions, who were most open to the consideration of new ideas, were those who had been around a long time. The real traditionalists were young men and women just out of graduate school. They were waving the banners of their disciplines and felt they would not be able to hold up their heads among their peers at the annual national meetings if they were not teaching the same courses in the same way as their colleagues at every other institution. For all their liberal political protestations, they were the preserves of their own immediate past.

## B. Arnold, Geißler and Pilnei, 1986. What role does the teacher of professional education play as a mediator or qualifications and as a development worker in his own country?

Educators, pedagogues and teachers are frequently referred to as "change-agents", because they support the social, cultural and economic development of a country in a particular direction. It is the aim of change-agents to pass on new knowledge, new ideas and new attitudes to other persons (e.g. to apprentices in vocational training).

### How does one become a change-agent?

One becomes a change agent by acquiring new knowledge. Thus, for example, a counterpart from a training centre in a country of the Third World becomes familiar with new technical processes and technologies during his course of advanced training. He also learns how to plan training and how to organize classes visually and effectively. But new knowledge alone is not sufficient. A "change agent" must also undergo a process of further personal development. He must reflect on the problems in his country, he must himself be open to change and take pleasure in finding contact to other persons.

### What role does the teacher of professional education play in the development of his country?

On account of the fundamental importance of vocational training for the economic and social development of a country, the teacher of professional education also occupies a key role in development policy:

- A multiplying agent. He passes on his technical knowledge to young people or other adults, and thus contributes to enabling his home country to have more technical skilled workers available (the teacher of professional education is a multiplying agent).
- An innovator. By utilizing didactically more suited methods of training and teaching aids, he contributes to improving the quality of training, and to a more effective utilization of existing training resources (the teacher of professional education is an innovator).
- An educator and ideal. He educates young people, e.g. he teaches attitudes to work, discipline, accuracy, critical awareness, and thus motivates them to work at their professional development and to involve themselves in affairs relating to the social development of their home country. By his own example, he shows how new technical and personal knowledge forms part of further development (the teacher of professional education is an educator and a model).
- The vocational trainer contributes to the situation in which skilled workers work in a more qualified and satisfied manner and factories manage their affairs more successfully. Qualified personnel increases the adaptability and flexibility of firms, thus promoting economic and social development (the teacher of professional education promotes development).

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## C. Bishop 1989. Alternative Strategies for Education

Many developing countries have begun to consider seriously an alternative to their formal systems of education – non-formal education. In contrast to the highly institutionalised, chronologically graded and hierarchically structured formal education system, countries have turned to non-formal education to enrich the lives of more of their citizens, to bring more people into the sunshine, at a cost they can bear.

### What is non-formal education?

Non-formal education refers to all the organised and semi-organised educational and training activities that operate outside the regular structure and routines of the formal educational system, aimed at serving a great variety of learning needs of different sub-groups of the population, both young and old. The defined non-formal (out of school) education includes:

Y School equivalency programmes to provide a 'second chance' to those who have missed school or dropped out early;
Y Occupational skill training given outside the formal system, on-the-job training;
Y Agricultural extension and farmer training programmes;
Y Other extension services;
Y Adolescent and adult literacy programmes;
Y Youth activities with substantial educational purposes;
Y Community education and community programmes of instruction in health, nutrition, family planning, etc.
Y Co-operatives, and the like.

Non-formal education does not include the unorganised learning that takes place within the home, in factories, through radio and television, etc. Such learning is referred to as informal education.

John Hilliard gives a very broad yet succinct description of non-formal education:

1. Non-formal education can be valid, high quality education for imparting 'life' skills and knowledge. It is not third-rate formal education.
2. It is education designed to reach large numbers of people where they live and work. Its objective is to impart useful knowledge, skills, and recreation without removing people from their normal environments and responsibilities.
3. Non-formal education can be highly diverse in organization, funding and management. It can emphasize local initiative, self-help, and innovation on the part of large numbers of people and their local institutions. Every successful learner can become in some degree a teacher.
4. It is education designed to pay its own way through increased employment, productivity, and social participation.
5. Its objective is to make learning a national, lifelong learning experience, compatible with the interests of individuals and communities, for all economic levels of a society.

### Characteristics of non-formal education

Non-formal education takes place within a context of immediate and meaningful action, work, and use. Thus the training of doctors is done in teaching hospitals where the classroom, the sickroom, the surgical room and the laboratory are all in close proximity, to facilitate and integrate all the medical operations. Learning grows out of the need for it. And what is learned is put to use. In vocational agriculture programmes instruction alternates between the classroom and the farm. In the classroom young farmers learn the scientific principles of agriculture. These are then put to use on the farm. Thought and action complement each other. This doesn't always happen. Often in vocational and technical education programmes instruction is confined to formal schools with little or no relation to the world of work. Education without the outlet for the learning is useless; non-formal education provides experiences for which there is practical use. Learning and doing, doing and learning, are so interrelated that it is hard to

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differentiate them. In non-formal education learning is part of normal living, without the apparatus and procedures of formal schools. Learning is so natural one is hardly aware that it is taking place. This is the situation Dewey advocated for his 'ideal' school. This is the situation one finds in elementary schools where good teachers use such natural non-formal approaches.

Brembeck points out how in formal schools we subject the pupils to a regime which is anything but natural.

*The education of youth is very perplexing. We isolate them in formal schools at the very time when they are reaching for mature values and orientation. Instead of helping them develop really meaningful relationships with adult society and work we abandon them largely to their own devices, justifying out actions by saying that they are learning important things they will need in the future. We place youth in this holding pattern at the very time biologically and psychologically they want to be 'with it' rather than 'out of it'.*

In general, non-formal education has in the past been viewed with disdain. Out-of-school programmes have not been seen as interrelated parts of a coherent system of education and national development. On the contrary they are seen as (and are in fact) a motley assortment of separate educational activities, each with a life of its own, covering an astounding variety of educational purposes and clienteles, and sponsored by an equally astonishing variety of sponsors, public and private.

In contrast, formal education has enjoyed far greater prestige than out-of-school education. This is because its symbols of accomplishment – certificates, diplomas and degrees – have a special value in the market place and in the eyes of society. It is not surprising that governments, and especially Ministries of Education – with some notable exceptions such as India and Brazil – have been indifferent and apathetic towards incorporating non-formal education in their national development plans. They see education outside the formal system as something less than true education, ungraded, unstandardised, hap-hazard and circumstantial, without the authentication of certificates and diplomas, as some bastardised form of formal education. Not surprisingly, they have put their faith – and their money – in formal education, because that is what people most valued and demanded.

**The demand for more education arose because education was seen...**

- As a basic human right;
- As a *sine qua non* for economic growth;
- As the means of making up the chronic shortages of qualified technical and managerial cadres;
- By individuals as passport to better-paying jobs, especially in the modern sector;
- As a means of liberating the people from old ideas and superstitions;
- As fostering a better-educated electorate, better able to participate in the democratic political process.

**The educational policies of most developing countries have been:**

- To provide *education*, at least to the first level, to as many of the population as possible;
- To improve *economic growth*;
- To decrease the social *inequality* between the rich and the poor, the 'haves' and the 'have-nots';
- To improve educational *efficiency*.

In many ways education in developing countries is dysfunctional. It relies heavily on rote learning, leads to an inappropriate reverence for paper qualifications, and is based on curricula that are irrelevant to the pupil's future lives. It also creates an imbalance, with many schoolleavers unemployed on the one hand, with a shortage of skilled and semi-skilled workers on the other.

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President Nyerere of Tanzania criticised the existing educational system on four main grounds:

- It is basically an elitist education designed to meet the interests and needs of a very small proportion of those who enter the school system… designed for the few who are intellectually stronger than their fellow,' inducing a sense of superiority among those who succeed and of inferiority among the majority and therefore the growth of a class structure of society.
- It divorces young people from the society for which it is supposed to be preparing them. This is especially true of secondary and university education: 'many of the people in Tanzania have come to regard education as meaning that a man is too precious for the rough and hard life which the masses of our people still live.'
- It encourages pupils to believe that all knowledge comes from books and a formal education.
- Education is parasitic: 'Our young and poor nation is taking out of productive work some of its healthiest and strongest young men and women. Not only do they fail to contribute to that increase in output which is so urgent for our nation; they themselves consume the output of the older and often weaker people…they do not learn as they work, they simply learn' (106).

## Non-school factors

What seem to be more important determinants in learning subjects usually tested in school are non-school inputs such as:

- The home and family environment, parental behaviour, the amount of homework done by the students (assuming conditions are conducive to home study),
- Peer group interaction;
- Nutrition – early malnutrition can cause serious brain damage. In some developing countries malnutrition may effect up to 20 to 30 per cent of the population. In most cases malnutrition means early drop-out from the educational system;
- The possibility and probability of access to higher education;
- The character and personality of the student, his motivation.

Many developing countries have begun to consider seriously an alternative to their formal systems of education – non-formal education. In contrast to the highly institutionalised, chronologically graded and hierarchically structured formal education system, countries have turned to non-formal education to enrich the lives of more of their citizens, to bring more people into the sunshine, at a cost they can bear.

## What is non-formal education?

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Y It is education designed to pay its own way through increased employment, productivity, and social participation.
Y Its objective is to make learning a national, lifelong learning experience, compatible with the interests of individuals and communities, for all economic levels of a society.

**Successful educational reform depends on:**

Y Broadly based popular support and participation in the reform;
Y Sustained commitment to the reform by the political leadership;
Y Flexibility and adaptability in the implementation phase.

Education by itself cannot cure underdevelopment. It must recognize the importance of the political and economic factors within the country and work in unison with these factors.

## D. Doronila 1991a. A critique of development education and training among Philippine NGOs. Education Forum.

*The Pedagogy of Development Education.* ***Development education utilizes a pedagogy that is evocative, participative, processual, critical and contextualized. Thus, an analysis of the seminar outlines and seminar screens now being used by some NGOs in this country will show seven distinct parts, usually in the following sequence:***

1. **Unfreezing,** which sets the informal, casual and egalitarian tone of the whole seminar, and in which participants and facilitators get to know one another. Emphasized in this portion, usually carried out through action songs, creative dramatics and informal dialogue, are the importance and dignity of each participant, a verbalization of how each participant defines herself/himself, and the valuable contribution each one can give to the success of the seminar.

2. **Conscientization at the first level,** in which participants verbalize their initial awareness of their life situations, the reality of their social environment, and their understanding of this objective reality.

3. It is also at this point where some kind of **levelling off** is accomplished, as participants become more aware of the commonalities and differences of their life situtations, and of their perceptions of objective reality.

4. **Contextualization**, in which new parameters of participants' existing knowledge are introduced or evoked by placing their life situations in a local, regional, national and even global context. Thus, for example, Manila teachers' problem of low salaries may be contextualized in the similar situation of teachers in other regions, further contextualized at a national level in relation to how much of the national budget is allocated to debt service (therefore significantly decreasing the allocation to education), and to the wage freeze provisions of the Letter of Intent (LOI) of the Philippine government to WB-IMF; and on a global level, to the activities of WB-IMF worldwide particularly in education and the economies of the Third World. All these are supposed to be integrated and synthesized, with the local community context at the core of the synthesis.

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5. **Further conscientization,** in which participants are encouraged to verbalize their new understanding in the context of the new parameters of their situation, to come to a consensus on their new definitions of their situation as well as of the various contexts of this situation.

6. **Planning,** in which participants prepare, deliberate on the come to a consensus on what to do next.

7. **Implementation** is expected after the seminar for which some organizational form becomes necessary if it is not yet in place, in order to ensure sustained and long-term work.

The major forms of evaluation for development education are much more stringent than for formal education because the success of development education is usually defined in the short term by the development of new forms of consciousness or counter-consciousness, and in the long term by sustained implementation of whatever plans of action have been evolved by the participants themselves.

Because of the generally low literacy levels and the as yet "oral" nature of many of our communities (no regular access to newspapers, very few reading materials of any type), we need to explore varied ways of visually presenting much of out textual material, and learn to use and develop visuals, "chalk talk", role playing and similar drama techniques as part of our pedagogic "bag of tricks". It is of course necessary for us to continue to develop capacities for and interest in reading, even as we help community folk to develop their own reading materials.

## Major Strengths and Weaknesses in the Practice of Development Education in the Philippines

This part of the discussion proceeds from the thinking that weaknesses in development education are to some extent inherent in its very strengths, and that therefore the purpose of this discussion is not to denigrate the strengths but merely to call attention to possible weaknesses that may arise if we do not continually assess with a critical mind our own development education efforts.

The following strengths and weaknesses may be noted, within the limitations I have set forth in the first part of this paper:

1. The transformational nature of development education and of NGO development work in our country appears to have arisen from the recognition a) that the delivery of services by the government is often slow, inefficient and unable to reach those who need them most; b) that people generally have no participation in deciding what and how these services ought to be delivered; and c) that in most cases the nature and distribution of these services are such as to serve and promote only the interests of dominant groups or elites in the country.

2. One strength of current development effort is its exciting creativity and inventiveness. The variety of activities incorporated in many seminar modules shows that some very difficult and complex topics such as the health situation in the country, some aspects of our history or the nature of our agriculture and industry are being presented in such a way as to show the relation of these rather abstract situations to the everyday lives of people.

The demand on the facilitator of this activity is that he or she must have the skill and the knowledge to quickly synthesize all the answers, add his own share of facts and insights, and return all of these to the participants in an integrated and a comprehensive manner.

3. Among NGO workers, especially those whose NGOs are part of a larger network, there is a good deal of sharing and imitation of pedagogical methods and techniques. I consider this a strong point not only because of the pooled knowledge but also because it is a step towards the building of a community of development educators and the building of a theory of development education which takes into account the historical and cultural particularities of education work among our people.

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However, it is also the case that some of us copy or imitate pedagogical methods and techniques without really understanding the assumptions or the theory behind them. Thus, we may be reduced to empiricism, that is, to practice uninformed by theory.

4. Finally, there are still some development education seminar modules that utilize what Paolo Freire refers to as the "banking" method, where perhaps in our impatience for immediate results we use the same "telling" method that has made much of formal education work in this country generally irrelevant and unexciting. "Banking" is a method that neither engages the hearts of people nor empowers them to understand their situation in order that they can take hold of it and thereby contribute to the transformation of our world into a more just and humane one. This, after all, is the ultimate objective of development education worldwide and the source of out continuing inspiration as development workers.

## E. Doronila 1991b. Bringing back education to the mainstream of peoples lives: The Education Forum.

Teachers are principally concerned with the formation, for good or ill, of the predispositions of millions of students, helping to shape their ways of perceiving and acting upon the world. Goal is development of people within a nation and across nations so that they can secure for themselves and for other those structural and personal changes leading towards greater equality, justice and freedom in the national and world community.

A truly pro-people and liberating education should bring back education to the mainstream of people's lives in Asia, rising education to facilitate the process by which people can restore to themselves the power to critically understand their life situation, and to change it through their organized efforts, if necessary.

**EDUCATION** – a mechanism for cultural reproduction, contributing in two principal ways to social reproduction, or the maintenance of the economic base and its corresponding political order:

**First –** it helps to reproduce or rostructure the characteristics of the labor force required by the production system in terms of skills, competitiveness and labor force distribution. e.g. vocational/ technical school production manpower for labor-intensive light industries and economic activities related to export-oriented, import dependent orientation

**Second** – the school system reproduces ideological predispositions of the school going public or the ways of perceiving, thinking about and acting upon the world, crystallized into a set of values, beliefs, goals, norm and attitudes.

### Major ideological predispositions reproduced thru the formal education system:

1. Neocolonial identity and consciousness
2. Values supportive of a personalistic and authoritarian political structure
3. Non-critical, fatalistic, non-analytical outlook that manifests itself among other things in a curious readiness to attribute felicitous political events to miraculous causes. Above are precisely the competencies and predispositions required for the maintenance of an export-oriented, import dependent economy.

Royal Decree of 1863 – hispanization of the Indios
Act 477 in 1900 – outlined the education program for the resocializá of file into the American colonial world
PD 6-A in 1972/Educ Act of 1982 – articulated for education the closer alignment of the Phils. to its designated role in the international division of labor as supplies of cheap, skilled semi-skilled manpower in the name of national development

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Education Forum is oriented to the promotion of nationalist, scientific and mass-oriented education.

Nationalist education fosters in Filipinos an awareness of their own colonial consciousness, an understanding of the concrete Philippine conditions in which the struggle for sovereignty and democracy is being carried out, and a commitment to be deeply involved in the process of changing these conditions.

Given the highly institutionalized and centralized character of Philippine formal education particularly at the basic education levels, Education Forum (EF) recognizes that truly broad and far-reaching changes within the present system may be realized fully by political power, and on the basis of significant changes in the political and economic system. Nonetheless, this does not preclude smaller efforts at present towards system restructuring and reorientation. EF recognizes further that the critical agents of change are the teachers, first, because they are the principal transmitters and validators of the culture being transmitted through the schools; and second, because with the exception of students, they comprise the largest subsector in education. Finally, EF recognizes that educational reorientation efforts cannot be isolated from the urgent needs and problems of Philippine society as a whole, and from the efforts of other groups similarly motivated.

## Aspects of Educational Reorientation

In seeking to institute changes within the formal education system, EF has also been guided by a second view of education, as a process of knowledge transmission which takes place within a structure of power relationships through which constraints are operated upon it (Smith, 1971). This view characterizes the education system as a power structure transmitting a dominant ideology mainly through knowledge selection, transmission and distribution. A case analysis of the Philippine public elementary education system from this perspective has already been made (Doronila, 1983). Three foci of change are suggested by this view:

1. The power structure for knowledge selection and transmission within the education bureaucracy
2. The content and process of educational transmission, and
3. The structure of meaning embodied in a particular distribution of knowledge transmitted through the education process. Such a view is useful for EF efforts because it enables change agents to address specific aspects within education itself without at the same time losing sight of the general direction of the national change process.

However, before these aspects could be directly addressed by EF, it was necessry to propagate the twin ideas of the intimate relation of education and society, and of the reproductive function of education. In effect, this amounted to specifying the context of formal education in the Philippines. While this may seem pretty obvious to us here it must be remembered that, by and large, education theory in Philippine colleges of education stops at the level of the formation of individuals in their atomistic singleness, rather than the formation of individuals who must live together within a society with particular social structural characteristics.

Given such a view, the emphasis of education is almost wholly on teaching methods, focusing more and more on progressively finer distinctions of measuring the transfer of learning, to the point sometimes of absurdity, as in the popular view among teachers that what cannot be measured in behavioral terms must not be taught. Thus, it will be noted that national evaluation studies in education steer clear of such broad concepts as national sovereignty, democracy and national identity, opting instead to measure only the more predictable and non-controversial learnings in English, mathematics and the like.

## Development Education in Formal Schooling

Formal education, as we understand it, is mainly concerned with the formal structuring of consciousness (Bernstein, 1975) through the standard components of formal schooling, namely,

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curriculum, pedagogy and evaluation. Because these components are carried out in the context of formal or planned educational relationships mediated by a central administrative structure, there is always the double tendency of homogenization (standardization) and abstraction from the concrete milieu of people's lives.

The consequence of these twin processes is to reduce consciousness formation to an abstracted process of discussion and debate, sometimes unrelated to the actual, day-to-day struggle of people and even of the students themselves as they try to make sense of events and conditions that directly affect them.

This is not to say that abstraction and standardization are undesirable, but that they should be construed only as part of the process of formal education, not its entirety.

In recognition of this, the alternative or development education efforts of EF in formal education includes not only the first aspect of counter-consciousness formation but also the empowerment of students and teachers themselves so that they can participate in organized and collective action related, as always, to the national movement for social transformation.

## F. Doronila 1998. The Emergence of Schools of the People and the Transformation of the Philippine Education System

An analysis of the educational system and its processes, as well as of their transformation, entails a study of the ways by which a given education system operationalizes within a socio-historical process its answers to at least five educational questions:

1. Who will be educated?
2. What will they be taught and how will these be evaluated?
3. In what institutional arrangements will these take place?
4. What social and developmental purposes are expected to be realized through these educational activities?
5. Who will make the decisions regarding these questions?

**Shorn of the rhetoric, the critique of Philippine education included among others:**

1. The separation of education from its social context, thus the irrelevance of its content and processes to the real problems and directions of Philippine society;
2. The denigration of out own knowledge in favor of foreign-oriented content taught in a foreign language, resulting in a weak national identity; and
3. The majority's lack of access to quality education, with huge drop-out rates from Grade 5, and without significant provision of organized continuing education in the nonformal sector.

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**Three common perspectives animate many initiatives in adult non-formal education:**

Y the view of development
Y the participative process self-consciously woven into the programs
Y the holistic and integrative frameworks of the ongoing projects

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**Development concept:**

Y process of human development, of social transformation in which man is both the subject and object, and in which he participates at all levels of decision-making. Self-reliance is both a means and an end in this process. It is a process which starts with the release of creative energy of man, assumes equal access to and a rational use of resources by the poor and vulnerable groups, tends to eliminate the difference between mental and manual labour and uses the full range of technological choices available from other sources properly adapted. This kind of development is not only more humane but also represents a new man, nature, technology mix. In the participatory process which results in growth, human development and equity are not trade-offs (Wignaraja, 1991:195; cited by Doronila 1998).

**Nonformal adult education:**

Y appears to have the longest–running programs among all education sectors (others are early childhood, basic formal education)
Y do collaborative work
Y increasing blurring of boundaries between formal and nonformal education with the professionalization and increase in scope beyond literacy training of adult nonformal education
Y encourages collaboration among all sectors in the community, open-ended and continuing, as a result of conscious effort toward using nonformal education as a principal support for improving livelihood and enhancing comprehensive community development
Y local capability building

## G. Espeneli 1998. IIRR Training of Trainors for Sustainable Agriculture

The Sustainable Agriculture (SA) Movement started in the early 80's. Much of the effort in promoting SA were understandably focused on technology and practices. Those who get interested in it often still follows the 'technology fix' frame of mind.

SA is variously defined but a common framework had been adopted. The concept can thus be useful in any endeavor. On one hand SA is regarded as a development strategy. On the other, the soul of any activity, program or endeavor. It requires a paradigm shift and to be effected, training becomes an important tool. Yet many trainors who were either practitioners or advocates lack the basic skill, knowledge and attitude in training. SA requires that trainors be trained on how to train. Various institutions and organizations now offer training of trainors and many focus on sustainable agriculture. One of them, the IIRR expressed the following as the challenges for such training:

1. SA implies new thinking about teaching/training and learning. Aside from content, trainers should also focus on "how people learn what they should be learning when they undergo a SA training.

2. Documentation of SA practice and results to a wealth of knowledge on the subject exist but are largely undocumented. Such could be used as tools to prime participants up and share what they know, in addition to serving as tools for learning more about the subject: What is available from formal institutions still are biased toward modern agriculture and approaches, including that of education. In contrast, these institutions are quite rich in information biased towards big (transnational, private, chemical/life industry companies) who spend huge amount for R & D.

3. Paradigm shift on how we view farmers and farming systems

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*Peasants don't lack brains only opportunities (S Yen).*

Y View farmers as stupid manner of conducting training follows that view by pumping them with loads of loads information.
Y View farmers to have inherent knowledge out of their lifelong experience, then, challenge trainors towards facilitating knowledge process, continuous observation and feedback from farmer to enhance their decision making capacity and group learning.

With above thinking it supports the belief that there is a role for farmers in agriculture Research & Extension. They become important actors (not audience/watcher) in the development of agriculture sector.

Training designs should consider the differences among the various ecological systems.

4. Trainer skills and attitudes

Y Sensitivity to learners' needs
Y Communication skills
Y Able to look for opportunities and more creative ways of helping learners learn
Y Build on what they have
Y Help participants articulate time tested practices and IK

5. Rethinking own values as trainers of SA

Y SA a way of life itself
Y Sensitivity to environment presence lifestyle that do not encourage consumption of junk foods
Y Consistency of action with the values which serve as foundation of SA.

6. Maximizing resource for SA

Y developing partnership among practitioners and training institutions
Y avoid reinventing existing efforts (need a more systematic look at documenting lessons in using existing designs, experiences, materials and resources)

## H. FAO 1998. A training guide to participatory curriculum development in agricultural education

**The changing curriculum**. The curriculum is not a fixed and authoritative structure which contains the organised content for learning. It is a dynamic instrument. It reflects the educational purposes to be attained and the educational experiences that should be provided to achieve those purposes. And since those purposes will change over time, so will judgements as to what are the best experiences likely to achieve the purposes. Thus, the curriculum will change and develop as the programmed itself is implemented. There is a need for continuing curriculum reform as society itself develops and changes.

Three factors can be identified as having influences on the curriculum development process:

a) The educational ideology which the curriculum developers hold, including the current tendency towards the globalisation of the curriculum;
b) The nature of the group of persons who are involved in the process of developing the curriculum; and
c) The kind of educational programme for which the curriculum is being developed.

**The "classical" model of curriculum development**. This model is based on 'learning by objectives'. The curriculum aims at developing behavioural changes through setting clear

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learning goals and developing the knowledge and skills to achieve these objectives. The development of a new curriculum or the adaptation of an existing curriculum requires inputs and decisions which originate, generally, from a small group of experts or officials. Although teachers and trainers are, in some cases, gaining more control over what should be taught and how, the basis of the curriculum has usually been set by those in higher authority. Aims and objectives are set by subject experts, those at the 'top' of the system, at senior levels in educational institutions, in the Ministries and planning departments. Students are seen to be at the bottom of the system and often have little or no part in the curriculum development process. Lawton (1989) calls this the 'classical' approach. Schamhart and van den Bor (1994) describe the approach to curriculum development associated with this as 'rational', characterised by an objectivist approach, a systematic planning procedure, an assumption of common goals for the student learner, and the provision of adequate expertise, resources and technology. The curriculum is arrived at through a process of situation and needs analysis, setting common aims and objectives, determining content and methods to be used, and establishing an evaluation procedure.

**The "participative" model of curriculum development**. This model adopts a more open and participative approach to learning, based on the belief that each student or participant is an individual and will therefore have equally valid but individual responses to learning situations; that there should be a mixture of 'closed' goals and 'open' goals in any educational curriculum. Many educationalists feel that the participants have an important part to play – that education should be learner-centred. This has given rise to an alternative 'romantic' approach, as Lawton (1989) calls it. Proponents of this approach usually consider that the students should have a considerable input into the development of the curriculum. It is now generally acknowledged that adults (and, for that matter, children) learn more effectively when they decide or have some control over what they want to learn. In other words, the curriculum should be learner-centred. Much research has been dedicated during the last twenty years or so into how learning occurs, especially with regard to the orgnisation of the learning matter and materials and the activities of the learners. Schamhart and van den Bor (1994) term this model 'participative curriculum development', characterised by a more subjectivist, interactionist approach, by the recognition of individual perception and behaviour and the variations in the social contexts of different groups of learners, by a less structured procedure, and by an appreciation that understanding and knowledge depend on a process of constantly shifting interactions among individuals and between them and their environments.

**Participatory curriculum development (PCD)**. Participatory curriculum development calls for radical changes to the approaches described above. The aim is to develop a curriculum from the interchanges of experience and information between the various stakeholders in the education and training programme.

PCD seeks to identify all the stakeholders. It seeks to involve them in the construction of the curriculum – the full curriculum, including not just the subject matter being taught, but also the experiences and activities which the students engage in during the course. It seeks to explore with them, collectively or individually, their views about the desired learning objectives and the processes intended to bring about the achievement of those objectives. Rather than belonging to a small select group of experts, the process of curriculum development now involves as many of the stakeholders as possible.

Most importantly, the top-down structure has disappeared. The curriculum developers are still in the centre of the picture, but they are free to draw upon the experience and insights of all the other stakeholders, who include members of the educational institution and a wide range of groups and individuals from the internal (known) environment and the external (unknown) environment. The students, when it is possible for them to be involved in the process, are treated on an equal basis with all the other stakeholders.

Agriculture is valued very differently from society to society. In a few countries, it is given a high status, but elsewhere it is regarded as a 'low-status' subject area. In many countries, agriculture is not taught as a school subject at all. It may be found in vocational 'non-academic' schools,

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in third-level agricultural colleges, or as an area of knowledge and skills which should be dealt with by the extension service, or by non-formal education departments. Another factor which will influence the curriculum which you prepare is the way in which a subject is approached. For example, agriculture can be taught as an objective scientific subject, impartial, remote, neutral and detached from its local surroundings. Most agricultural textbooks are written like this. It can however also be taught as part of a wider area of social development, where the human elements are included and where value judgements are made. Clearly both of these approaches call for different curricula.

### Formal agricultural education

Formal education systems usually include those parts of the education system which are institution-based. Normally, these institutions embrace schools (primary and secondary), colleges, polytechnics and universities. There may be other types of institutions which do not easily fit into this list. The following characteristics may be attributed to formal education programmes (Rogers 1992).

They tend to be:

Y Impersonal;
Y Youth-oriented;
Y Preparatory, for later application;
Y With a fixed compartmentalised content;
Y With selective entry;
Y Institutionalised and sectorised;
Y Terminal (usually examination-oriented); and
Y Self-assessing

Curriculum development in formal education systems is often highly organised, with certain people or groups having total responsibility for the development of the curriculum.

### Non-formal agricultural education

We described above some of the characteristics of formal education. The following characteristics may be attributed to non-formal education (Rogers 1992).

It tends to be:

Y Personal;
Y Oriented to all age groups, especially adults;
Y For immediate application;
Y With changing and integrated content;
Y With open entry;
Y Located anywhere, non-sectorised;
Y Continuing, not terminal; and
Y Validated by change

Non-formal education and training may be provided by a very wide range of organisations, for a wide range of people, and in a wide range of locations and formats. This makes it difficult to generalise about non-formal education.

Putting education into categories can cause confusion, partly because there is often an overlap between them. We cannot always draw clear-cut boundaries. Some activities can involve elements of both formal and non-formal education, for example extension. Many extension programmes involve an education and training element. It may be the intention of an agricultural extension service to communicate a whole series of messages to people. Some of these may be dealt with formally, in institutionalised training centres, and some non-formally in a range of different settings.

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**Domains of Learning.** Five main areas of learning changes have been identified; they are sometimes called 'domains' of learning.

1. **Knowledge:** For most people, learning means adding to or making changes in their own knowledge. But learning is more than just knowledge. It covers other domains as well. Nevertheless, new or changed knowledge forms part of learning.

The field of 'knowledge' is a very difficult one. There are several different ways of knowing. Knowing people is a different thing from knowing objects or truths, and these again are different from knowing oneself. Academic knowledge (book knowledge) is often different from practical or experiential knowledge.

a) **Knowledge and theory:** Not all knowledge is held with the same sense of certainty. Some knowledge is tentative knowledge, to be tested further. The distinguishing line between what is a theory and what is knowledge is very thin…
b) **Experiential knowledge:** This means that experience is a vital part of knowing. Practical experiential knowledge is different from head knowledge or book knowledge…
c) **Knowledge and status:** just as there is a hierarchy of status attached to subjects, so there is a hierarchy given to different forms of knowledge. Pure science is often regarded as a higher form of knowledge than applied science, which in turn is thought to be higher than practical or technical knowledge…

Such considerations will affect the way the curriculum is developed. If greater stress is placed on book knowledge than on field knowledge, the curriculum will concentrate on text-centred student activities and will develop tests, which assess book knowledge more than practical or experiential knowledge.

2. **Understanding.** It is possible to know something (a fact) without understanding why it should be true or what are its implications. Understanding then is wider than knowledge. It seeks to come to grips with general principles, with relationships between different elements of knowledge, and with the wider implications of individual items of knowledge.

Understanding needs to be learned; it is a separate domain of learning. It does not always come automatically with learning new knowledge, but it often goes along with knowledge. There is much truth in the view that training consists of the acquisition of knowledge without understanding and that it leads to activities being performed mechanically, not to true thinking and creative activities.

3. **Skills.** Skills are sometimes referred to as 'knowing how to do something'. But knowing how to do something and being able to do it are not the same thing. One may know how to mend a machine in theory but not be able to mend it in practice. The skill is being able to mend it, not knowing how to mend it.

One major difference between the learning required to develop knowledge and the learning required to develop skills is that skills call for practice. Practice is a process of 'developing repetition', by which the learner makes progress through doing something over and over again, while making adjustments all the time. The need for such practice is often omitted from many curricula, partly because of pressure of time, but probably more often because progress through practice depends upon the students making and learning from mistakes. Most educators and trainers do not like to think of their students making mistakes.

4. **Attitudes**. Many people think that learning only concerns the intellect, not the feelings. But true learning which will lead to behavioural changes cannot exist without some involvement of feelings…

People are learning new attitudes all the time. But teaching for attitudinal learning is much more difficult. As experienced trainers know,

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> *Changing attitudes is much slower, less direct and less certain than changing knowledge and skills. But it is possible. (Abbott and Mc Mahon 1993 page 146)*

Perhaps this is why attitudinal learning is often neglected in many forms of education and training.

Attitudinal learning is vital if behavioural learning changes are to be achieved.

**Learning and behavioural changes**. Just as a distinction can be drawn between knowing how to do something and being able to do it, so too we need to draw a clear distinction between being able to do something and actually doing it. Many courses state their objectives in the form of: 'at the end of this course, the students will be able to do…' something or other. But being able to do something will not ensure that the students will in fact do it…

True developmental learning will require at the very least changed knowledge, skills and attitudes.

**Learning and the Curriculum**. The question we need to ask at this stage is: How can the curriculum be used to promote learning?

The discussions in this guide have arrived at a number of conclusions about learning which will affect the curriculum development process. Learning is an active, not a passive process: the curriculum will therefore need to consist of activities which the students will do rather than a set of topics which the teacher will teach. Experience is the core element in learning: the curriculum will therefore need to concentrate on what kind of experiences the students are having. The students will have different preferred styles of learning, therefore the curriculum should not treat all the students in the same way if all of them are to be helped in the most effective manner.

> *A crucial factor in the teaching/learning process is providing an effective learning experience. This is the criterion by which all teaching and learning must ultimately be judged. An effective learning experience is one that results in a maximum of desirable change in behaviour on the part of the learner. Effective experiences involve more than simply placing oneself in a position to learn. (Leagan 1971)*

**Barriers to learning.** Those who are planning the curriculum will need to take account of the barriers which exist to effective learning. Studies such as those by Cross (1981) have identified three main groups of barriers:

a) **Programme barriers:** First, there are those barriers which exist in the learning programmes. These include false information about the courses, wrong timing of the learning programmed, bad relationships between the student and the source of the learning, or between students and other students, the wrong level of work, etc. Such matters lie within the control of the curriculum developers and educational managers to change.
b) **Learner barriers:** Secondly, there are barriers which exist within the learner the existing value systems of the students, their feelings of lack of confidence or lack of motivation, the demands of prior concerns, the existence of other factors which they feel are more significant than the source of learning, their existing knowledge, etc. Such factors indicate the importance of stressing the attitudinal development of the students in the curriculum.
c) **Situational barriers:** Thirdly, there are those barriers which lie in the outside context. For example, there is no point in teaching about fertilisers if fertilisers are not available at the right time or are too costly. There are many teaching-learning programmes which have foundered because the planners did not examine in detail the situational barriers which will prevent the implementation of learning. The curriculum must be concerned with such factors and how to cope with them. In this, the contribution of the stakeholders can be invaluable. This will be the theme of the next section.

Since the aim of the curriculum is to help the students to learn, it is important that the curriculum should take into account the various factors which affect learning:

Y It should arise from the felt needs of the students, start where they are, not where the institution

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wishes to start;
- It should not be solely concerned with knowledge and skills but also with developing understanding, and attitudes – and with behavioural changes which demonstrate the effectiveness of learning;
- It should use active rather than passive methods of learning;
- It should be based on the provision of learning experiences; and
- It should be built round the achievement at different stages of set measures of success.

### Characteristics of Participation in Development

1. The programme is not outsider-led alone, but jointly-led.
2. No one picture is true, not even that of expert; there are lots of true pictures.
3. Insiders have valuable knowledge which is true for them.
4. The expert does not own knowledge; each person makes his/her own knowledge.
5. Participation is the process by which all the participants (including the outsider expert) learn.
6. Values and attitudes are as important as knowledge and skills; knowledge and skills cannot be compartmentalised.
7. Local concerns are concrete and integrated; they cannot be compartmentalised into academic disciplines.

It is this set of insights, which underlies participatory curriculum development.

The conclusion to this discussion is that when faced with an overlarge amount of subject matter to be included in any curriculum, which will inevitably happen when PCD methods are used, the curriculum developers should not try to include too much. Rather, sample areas of study should be selected which will illustrate how the subject should be studied. The curriculum should be designed so as to make sure that the students understand that they have only begun the process of becoming an agriculturalist. They need to come to feel that the course is only an induction, that it is starting a process, not finishing one.

Teachers will only do this, however, if they are themselves continuing to work at their own subject, if they are learning new things, engaging in self-directed study. No one can teach effectively unless they are themselves a learner. The best teacher is a learning teacher. No lecturer knows everything there is to know about his or her subject; indeed, no lecturer knows as much about the subject as they need to know. We all have more which we must learn.

**Skills of learning:** The promotion of the skills needed to engage in self-development has normally been left more or less to chance. In large part, this is because the main emphasis of traditional educational institutions has been placed on the transfer of knowledge rather than on the promotion of critical reflection on experience which (as we have seen above) is the main process involved in continuing personal growth. But there are skills of learning which can be developed further. Many of the open universities which are being established throughout the world are finding that the first demand from the students and the first requirement for their programmes are courses on study skills.

It is strange that in most formal educational establishments, the development of the skills of learning-how-to-learn tend to be neglected. The skills of reading and of summarising arguments, of creating patterns of knowledge to assist memorising, of structuring and writing down materials, of developing effective note-taking processes, of thinking in a systematic ways, of calculating, of examining experience, of testing new information against existing strongly held views – all these and many other strategies for learning effectively need to be developed just as surely as the skills of farming or the skills of teaching etc. They will call for systematic and repeated practice.

**Attitudes towards self-development:** We have suggested above (Key Point 9 page, 97) that one of the most important elements in any curriculum is to help students to continue to develop themselves after they leave the course. This will mean, not just encouraging the development of the skills of self-directed learning, but also helping them to become:

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Y More and more committed to their own self-development;
Y More and more confident, having experienced sufficient success in this area to encourage them to make further efforts; and
Y More and more innovative, creative, open to new ideas, constructive and experimental, prepared to take risks, etc.

One of the most effective ways of developing positive attitudes is through active learning groups – sub-sets which have been given tasks and encouraged to develop the freedom and responsibility to undertake such tasks for themselves, and to make their own judgements as to their success or otherwise. Participatory forms of pedagogy are one of the most effective ways of building up commitment and enthusiasm. Treating students as professionals will help and encourage them to develop professional attitudes.

The teaching staff of the college or institution will need to serve as a role model in this respect. The students will only become more committed, confident, innovative, experimental, open to new ideas if they see in their teachers these same attitudes.

## Encouraging Behavioural Changes

The ultimate aim of the curriculum is to encourage behavioural changes... But transfer from learning programmes into behavioural changes is not always automatic. Other barriers may come between the learning programmes and the implementation of behavioural changes. Most of these are external to the training programme... The curriculum should try to identify as many of these barriers as possible, and seek to help the students to devise ways of counteracting them. This is one part of the curriculum development process where the contribution of the stakeholders will be particularly valuable.

**Choosing the content:** Several writers on education and the curriculum (e.g. Davies 1971) have noted that there is a tendency for teachers and trainers to concentrate on decisions about teaching and not about learning. Teachers and trainers think more about what they are required to do than about what the learners should do, or the experiences which should be provided in order to facilitate learning. Some teachers decide that the best way to manage learning is to talk continuously, 'filling up' the students like empty buckets.

But as we have already seen above,

Y Students learn for themselves; teachers cannot learn for them;
Y Students learn at their own rates, in their own ways; and
Y Accepting responsibility for their own learning motivates students to learn.,

This means that the decisions which the teacher-manager take relate as much to learner activities as to teacher activities.

**The place of experience in the curriculum:** This raises the question of the primacy of experience in learning. This is an area of some debate among educationalists. Most educational systems prefer to teach theory first and then to provide experiential learning to apply this theory. Textbooks on crops are read before going into the field; a manual on tractor maintenance may be read before students even see a tractor. (This guide may be read before any curriculum development is carried out!) Because head knowledge is valued more highly than practical knowledge in most educational and training systems, it is thought necessary for the students to learn theory first.

But another approach is to provide the experience first, and then subsequently in the classroom to reflect on what the experience implies. This, it is argued, will make the textbook material and the laboratory work more meaningful and will motivate the students to learn more effectively. Students will search for information in relation to what they have seen far more readily than accept information about what they have never seen.

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Perhaps the ideal approach – if time allows – is to undertake experiential learning first, then to reflect critically on it with new inputs, and then to apply the new insights and knowledge in a further experience.

**Methods for Teaching and Learning**

Following on from the earlier discussion on the different styles of learning, four main categories of teaching-learning methods have been identified:

Y Discovery methods – by which the students are encouraged to explore, to search for knowledge, to try out skills for themselves, and to learn from these experiences (projects, surveys, independent study, field visits, reading, etc)
Y Participatory methods – by which the students in groups share opinions and insights, and learn from each other (group work, discussion, debates, seminars, brainstorming, games, etc)
Y Presentation methods – by which the teacher-trainer or students make a structured presentation (lecture, demonstration, films, videos, etc.)
Y Application (sometimes also called evaluatory) methods – by which the students apply and test out what they have learned, and provide feedback to the teacher-trainer (exercises, problems, practicals, essays, attachments, role play, simulations). Rogers 1992

Educational materials must be culturally appropriate to the students. It may seem odd to stress this. But with the globalisation of educaation and training, there is a tendency for teaching institutions to take up materials which have been prepared and used in one country and transfer them with the minimum of adaptation to quite different cultural contexts. This is especially true of distance education, where courses devised in one country are sometimes sold to other countries as complete packages. This is not the best way to promote learning.

Other aspects of teaching-learning materials which will need to be considered are that they should be attractive, interesting to the learners (not just to the teachers), challenging, economically viable to produce, and well organized in terms of content.

Evaluation is part of the process of the transformation of knowledge, skills and attitudes, which is education and training. There are two main focuses to evaluation. The first (Goal Achievement) asks whether the goals of the curriculum, the learning objectives, have been achieved, and what learning has taken place and how. The second (Impact) asks what difference this has made to the learners and to their lives, their work and to their relationships to others.

Some common reasons for problems with the curriculum at the implementation stage are as follows:

Y The aims and objectives are too ambitious and unrealistic;
Y The curriculum has created something of a 'dual system', where practical/vocational subjects are seen as an inferior alternative to more 'academic' subjects;
Y Poor planning (inappropriate choices and/or sequencing of content, methods and materials) and ineffective use of resources;
Y Lack of participation by the major stakeholders leading to lack of commitment, motivation and enthusiasm;
Y Lack of appropriate knowledge, skills and attitudes of teachers because of the lack of adequate and relevant training and support;
Y Constraint imposed on the learning process by the examinations and/or qualifications systems; and
Y Lack of resources, including funds.

Education and training can play a vital role in the process of helping people to deal with change. It is important that we keep this in perspective. Education and training cannot address factors where the answers lie more in the political arena than elsewhere. For example, it is easy to overstate what education and training can do to overcome the problem of unemployment, under-employment, or population growth. But by addressing human resource capacity needs

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within rural communities, the perceptions of many rural dwellers about their ability to develop and implement innovative and diversified approaches to their own problems may be enhanced. Through education and training, they can come to realise that what they know is valuable, and that they can make an important contribution to their own development.

The attitudinal factors: Many people are reluctant to accept educational change. These include many teachers, parents, employers, members of the Ministries and, of course, students. Some of these stakeholders will not always be enthusiastic about the changes they are being asked to help to devise.

Rowntree (1981) notes five such barriers to the implementation of educational changes:

Y The teacher's lack of clarity about the proposed innovation;
Y Their lack of the kind of skills and knowledge needed to conform to the new role model;
Y The unavailability of the required teaching-learning materials;
Y The incompatibility of the organisation's management arrangements with the proposed innovation; and
Y Loss of staff motivation.

## I. Francis 1990. Researching, teaching and extending a sustainable agriculture

Teaching Considerations for Tomorrow's Farming Systems:

Y Greater regulation of agriculture and more environmental guidelines

Much of out focus in production agriculture has been on the management practices that result in a specific yield or net income per acre. To adequately prepare students for future challengers, we need to stress three dimensions of the process. First is the set of biological principles that underlie production agriculture. With a solid foundation in basic biology, they will be able to adjust their thinking to apply those principles to new crops and systems in the future. The second focus should be on a problem solving process, rather than on a specific set of production practices or pat solutions. Finally, it is important to consider new measures of success, other than only grain yield or net income. It will be important in the future to quantify environmental impact, and to include this in the costs of production – to the farmer, the consumer, and to society.

Y Scarce energy and higher cost of fossil fuel inputs

The assumption that energy will become more limiting and expensive in the near future systems. Education on conventional systems in agriculture has been based on the assumption that fossil fuels would be available indefinitely. It is valuable to introduce this question, to evaluate current and potential future technologies under a range of energy cost scenarios, and provide students with the tools to do these analyses. The process of evaluating future systems is more important than any specific example that would be memorized and taken out for farmer application.

Y Reduced tillage and need for better residue and weed management

There is a vital need for a shift in emphasis from weed and insect control to management of these pest species. We also need to revise our conventional thinking about the need to perform primary tillage on an entire acre when the seed is only planted in a small fraction of that acre. In the future, we may need to look at completely clean fields as wasteful, energy consuming, and non-profitable. In contrasts, we need to know what level of weed and insect infestation can be supported by the crop without loss of economic yield, and adjust our management practices accordingly. This is a large challenge, since perceptions of how fields should look and what is optimum have been build over many years around conventional farming wisdom.

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Y Higher irrigation costs and some controls on groundwater use

Principles of soil-plant-water relations are important. Students need a basic understanding of where water comes from, how it enters and is stored in the soil, and how it enters and is used by the plant. With these ideas well in mind, they can begin to evaluate the efficiency of conventional dryland and irrigated farming systems and have the basic for designing alternatives. There is a good information base on measurement of stored water, on response of crops to irrigation, and on timing or scheduling of water application. These methods should also be a part of the curriculum.

Y Location specific systems, recommendations, and technologies

Basic to student's understanding of production recommendations is an evaluation of how these are derived, what basic data is needed and over what range of years and locations. How these practical recommendations of specific components of technology relate, one to another, and how they influence total system performance is important. There is potential here in an advanced undergraduate course to integrate the basic principles and practical examples from a number of previous courses, and to show how these mesh together in the farming operation.

Y Government program acreage flexibility and more crop rotations

It is difficult to predict the precise form and reward system that will be included in future government programs. For this reason, the educational effort should be focused on understanding why some countries have chosen to use government intervention in the market place. How successful have these programs been in this country and elsewhere? What policy alternatives could be used, and what might be their effects on profits, stability of production and prices, and on potential for long-term sustainability of markets. These factors should be studied in addition to the rotation effects described in the research section.

Y Multiple crop systems, species mixtures, relay and double cropping

There is a wide opportunity to teach principles of crop interactions with weeds, inter-and intra-specific competition for growth resources, and efficient use of time and space in potential future cropping systems. Much of this data is available from the tropics where multiple cropping systems are more prevalent. There is a growing interest in temperate regions in species mixtures for management of certain insects, in crop rotations for weed management, and in the fertility relations in rotations and crop mixtures. Understanding principles of crop nutrient and water use, and how this is affected in space and time by competition from other species can be invaluable to students who will then gain an understanding of how to design new and unique cropping mixtures and sequences. Use of computer simulation is perhaps the most efficient way in which future systems can be designed and tested.

Y Increased diversity of crop and animal enterprises and products

There is a great need to branch out from our traditional crops into new species. These are useful from a teaching perspective because students do not arrive with preconceived ideas of the crops, and can perhaps more readily understand new ideas about cultural practices, multiple cropping systems, and efficient total resource use. Many universities do not have courses on world crops or exotic animal species, much less how these can be integrated into total farming systems. The latter topic is a valuable one that will become more available as methods and data are developed to deal with the complexity of systems. The need for efficient data management, and decision aids such as expert systems are useful in this area.

Y Multiple purpose crops and animal species, value added products

Innovation is the key, and a problem solving approach that can lead people into new avenues of thinking about how crops and animals can be grown and used. A broader range of courses at the undergraduate level, including some in chemical engineering, human nutrition, biochemistry,

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and materials science could be useful in broadening the traditional mind set of students in agriculture. It would be valuable for students in agronomy to take courses in agricultural economics, and vice-versa. Food science and engineering courses would broaden the outlook of those who traditionally focus on production agriculture.

Y Increased concerns about nutritional quality and food safety

The area of food safety and nutritional value is one of the hottest topics in the media today. There is a wealth of ignorance of the real facts about food, with a flurry of advertising in favor of certain products and nutritional "specialist" such as actors and football players giving their opinions on national TV. We need solid, research-based educational programs in this area. The potential benefits of organic foods need to be studied in the laboratory, and fact somehow separated from religion and fiction. This should be a high priority for the organic food industry, just as it is for university food science programs.

## N. Francis and Madden, 1993. Agriculture, ecosystems and environment

The following list of philosophies, approaches, programs, and networks includes ideas from other sectors of the economy, integration of thoughts and discussions, and some 'blue sky projections' toward the future. In general, they focus on highly participatory activities and broad ownership of the agenda for research and education. The ideas include a proactive empowerment of all those in agriculture to design and develop the future. Some examples are:

1. Broadening the intellectual and practical base for research, including a balance of on-station and on-farm research with farmers and ranchers as key players on each team.
2. Developing new criteria for system evaluation, including yield or net return per unit energy, per unit capital, per unit of renewable/non-renewable resources.
3. Developing indices for farm level, regional, or national productivity such as the 'gross sustainable product' used by Indonesia.
4. Evaluating systems based on ecological impact as well as direct human benefit in the short-term, with careful assessment of the long-term costs of off-farm impact.
5. Collecting and evaluating a broad range of information resources such as farmer trials and industry tests, and including a rigorous review before including these in a comprehensive database for agriculture.
6. Including risk analysis in evaluation of system success, both risk to producer and risk to those who work in the field and to those who live nearby.
7. Developing systems based on integrated biological and farm structuring, nutrient and water cycling, crop and animal integration, and long-term biological planning (Francis et al., 1986).
8. Incorporating social perspectives into the analysis of cropping and livestock systems, including long-term farm stability and rural community viability.
9. Focus of universities on catalyzing the learning process rather than on conventional teaching approaches; move toward development of critical thinking and communication skills, problem solving processes, and information access and evaluation.
10. Evaluating new thinking on topics such as Gaia, deep ecology, and ecofeminism (Lovelock, 1979) and seeking potential applications in sustainable agroecosystems.

## O. Freire 1984. Pedagogy of the oppressed; and an interview with him

Education, whether in Delhi or Chicago, reinforces the culture of silence.

Learners are not empowered by mechanical programs that emphasize reading skills and vocabulary development. These authoritarian programs merely groom illiterates to become complacent workers, satisfying the demands of the market place. The illiterated become literates, but they are still the "wretched of the earth".

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There are no neutral education systems. It is impossible for me to think of about education without considering the question of power, of asking the question: In favor of whom or what do we promote education for?

The more you deny the political dimension of education the more you assume the moral potential to blame the victims.

Teachers and students should be equal participants in a dialogic process. Combat the banking concept of education-open head insert fact.

Kids begin life as curious beings. They constantly ask questions. Then they go to school and the schools slowly start killing their capacity to be curious. Today the question we face is how to use curiosity as a fundamental instrument in the learning process.

I have searched for an education that stands for liberty and against the exploitation of the popular classes, the perversity of the social structures, the silence imposed on the poor- always aided by an authoritarian education.

## P. Hope and Timmel, 1984. Training for transformation

Formal education has led many people away from the villages and the day-to-day experience of poverty. Our interventions as development worker can sometimes be quite inappropriate. As Paulo Freire has suggested in his book "Education for Critical Consciousness", the services we intend to give to others might very well be a cultural invasion. The beliefs and values imposed on people may be against their own set of cultural values.

## Q. IIRR 1998. Training of trainors for sustainable agriculture

Adult learning differs from child learning in a sense that:

Y Adults learn what is of interest to them
Y Adult learning is autonomous
Y Adults use personal experience for their learning adult

### Main learning principles

1. *Adult behavior changes in response to various pressures*
2. Adults enter learning activities with a perception about themselves that influences the learning process
3. The past experience of adult needs to be valued and nourished during the learning process
4. Adults learn best when the environment is safe, accepting, challenging and supportive
5. Adults enter learning programmes with immediate and personal needs, problems, feelings, hopes and expectations
6. Solutions that adult learners seek must come from their own understanding and analysis; and be congruent with their life-style and functioning
7. In skill-oriented learning, there should be active participation on the part of the adult learner in those activities which use the relevant skills
8. Continuous monitoring of progress on their learning needs to be done by adults
9. Success in satisfying the expressed learning needs and achieving a desired objective is a powerful reinforcer for further learning
10. Learning creates several emotional feelings in adults-excitement, agitation, tension, confusion, disorientation, fear, frustration, etc. Stress and anxiety can hamper a learning process and should be sensitively tackled.
11. Different adults learn differently

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To facilitate adult learning create an atmosphere which…

Y Encourages people to be active
Y Promotes and facilitates the individuals discovery of personal meaning
Y Recognizer peoples right to make mistakes
Y Accepts differences
Y Tolerates ambiguity
Y Encourages openness, self and mutual respect
Y Is a cooperative process, and
Y Encourages peership among learners

With sustainable agriculture as the emerging paradigm, training becomes imperative. Shifts required need to be considered by a trainor. Examples are:

Y Stronger opposing force with life industry merger and monopoly globalization agenda, privatization, international agreements (GATT, APEC)
Y Increasing emphasis on local government institutions, farmer associations and cooperatives to offset the negative impact of public sector extension
Y Shift to farmer-to-farmer approaches with public sector extension playing an orchestrating role. Participatory technology development can provide the linkage between modern science and indigenous knowledge resulting in the development of more relevant sustainable technologies
Y Participatory learning methods, participatory monitoring and evaluation, gender sensitive methods will also need increased attention as participation in general is emphasized
Y Reduced development funding could spur effort to coordinate efforts, exchange resources, improve networking and focus/specialize. Partnerships and collaborative efforts will be emphasized

Shifts translate to change in many dimensions to operationalize change, general education and training.

Sustainable agriculture aims to change the status quo and strongly emphasizes social change being fundamental. It means breaking free of current distribution of resources and power. It implies improvements in the lives of this vast majority of the people in the direction that they consider appropriate for themselves. This then entails inform, mobilizing and organize, of the sector for them to identify, articulate and struggle for their common interests. Effect expected would be

Y Conscientization of the poor
Y Empowerment of the powerless
Y Organization of the unorganized

**Role (crucial) of training in facilitating social change**

1. It can be used for personal change (e.g. in understanding of the dynamics of society and social change, of their own strengths weaknesses; and of their potential role in the process of social change
2. It can be used by an individual to require relevant knowledge and skills to play meaningful role in social change
3. It can give participant (individuals and group) the experience (in microcosm) of the possibilities of participatory and democratic functioning during the training program itself and thus learn to experiment with their own vision of an egalitarian society.
4. It can make participants (individuals and groups) acquire appropriate values and attitudes necessary for building such an alternative society.

Training only sow the seeds towards structural transformation. It does not claim to lead, on its own, to social transformation – but an important contribution towards the process.

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The trainer roles is multidimensional. He/she is involved way before the training during and way after the training. He/she the course designer, administrator/organizer, facilitator, report writer and follow-up coordinator.

As facilitator a trainer has 4 basic functions:

1. Emotional stimulation
Y Helps others to contact and release feelings, challenging, confronting and serving as a catalyst for interaction

2. Caring
Y Involves accepting, understanding, and supporting others; make them experience warmth and affection as a model for others and helping others to develop intimate relationships

3. Meaning attribution
Y Helps in giving meaning to experience, to understand and acknowledge the source of their feelings and actions; and in focusing group attention in significant interactions

4. Executive function
Y Review ground rules, explore group processes gate keeping and handling the general logistics of group meeting.

## R. ILEIA 1991. Learning for sustainable agriculture.

In both developing and industrialised (currently not developing?) countries, the need is being recognised for more sustainable forms of agriculture. But this, in turn, demands a different kind of agricultural training to prepare us for continuous learning.

For a review of research needs for low-external-input and sustainable agriculture (LEISA) in Africa (Haverkort et al. 1991), policies of international and national research/development and donor organisations were examined. It was encouraging to see the emphasis now being put (at least in words) on LEISA or similar concepts – both as a more realistic approach to developing small-scale farming, and as a reaction to the growing awareness of the negative environmental effects of high-external-input agriculture (HEIA). However, conventional education and training in agriculture is still concerned primarily with HEIA technology. There is a great need for learning which will enable us to meet the demands for LEISA development.

### New skills needed

To attain agricultural sustainability, people must think ecologically, in terms of complex interactions, processes and adaptation to changing conditions. "Solutions" are not permanent. One must constantly observe what is happening on the farm and in the environment, try to comprehend this and decide upon appropriate action.

Moreover, techniques and systems of sustainable agriculture cannot be confined to learning particular techniques isolated from a real human setting. Rather, it means learning how to assess complex situations, how to solve problems from a holistic perspective, how to work together with others in seeking shared goals, and, above all, learning how to continue to learn. These are skills required on all levels, from the farmer to the international policy-maker.

In addition, grassroots development agents, who are trying to support farmers directly in their efforts to improve their own situation, need to develop skills in doing just that. This means they need skills in recognising farmers' efforts, helping farmers assess their situation and potentials, supporting farmers' experimentation and their mutual learning through communication, and strengthening their identification with their (agri)culture. They also need skills in stimulating local organisation and helping farmers influence policy making "form below".

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Thus, learning for sustainable agriculture involves a process of Participatory Technology Development (PTD) in a very wide sense. "Technology" refers to the combination of knowledge, inputs and management practices which are used together with productive resources to gain a desired output. A technology may be a way of sowing, but also a way of organising marketing or building networks. It became increasingly evident during the workshop on "Training PTD" (see report in this issue) that PTD is part of a development process within organisations which enables them to seek sustainable forms of agriculture.

### Learning experiences

The emphasis in this issue is on learning experiences gained by farm women and men, grassroots development agents and people involved in on-farm and applied research for sustainable agriculture. It also includes "training for trainers": developing people's skills to stimulate a learning process among others.

Most of these learning experiences have been gained outside of formal educational systems, but examples of attempts to revolutionise these systems are also offered from Colombia and Australia. These pioneering ventures may still be viewed with skepticism by "mainstream" institutions, but they indicate paths which merit further exploration.

## S. Ison 1991. Teaching threatens sustainable agriculture

A central flaw is that sustainability is too often seen as an outcome – as something that exists, such as a sustainable farming system – rather than a process of change.

The problem is that a pre-occupation with teaching has left us largely ignorant of learning.

Graham Gibbs (1981): This pre-occupation with teaching has...actually constrained the effectiveness of higher education and limited its abilities to meet society's demands...We might say that we are now beginning to perceive that the purpose of education is LEARNING. And we are beginning to realise that frequently TEACHING interferes with learning.

Teaching is pervasive in all institutions associated with agriculture. It is the normal mode in many formal curricula; it underpins the transfer of technology model of agricultural research and development; and it is central to many organisational structures.

The teaching paradigm so differs from learning paradigms that is constrains our attempts to engage in sustainable agriculture. Indeed, teaching threatens sustainable agriculture.

### Problems with agricultural education

Universities and other agricultural education institutions reinforce the teaching paradigm by describing their purpose and function as 'custodians' and 'preservers' of knowledge. This creates the image of knowledge as a 'commodity' that can be 'stored' or 'warehoused' and then 'dispensed' or 'given' (usually by a lecture) to a recipient (a student). All this is further reinforced by the functional breakdown of teaching and research – often with different departments, administrators and rewards – and the way in which individual academics describe, usually in terms of conflicting interests, these roles.

Agricultural educators, both natural and social scientists, are frequently wedded to the belief that the building blocks of 'knowledge' must first be laid down before students can hope to grasp the complexities of an emergent science such as agriculture. This contrasts with a view that takes knowledge as a social product that cannot be isolated from the process by which it is generated - a dialectic.

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Some of the components and symptoms of the teaching paradigm have serious implications for sustainable agriculture:

1. **Lecturing.** Teaching frequently relies on lecturing and structured practical sessions. Yet there is no simple relationship between what is taught and what is learnt. Meaning cannot simply be transferred to students.

2. **Problem solving and creativity.** Teaching frequently results in surface learning by students. It is enforced by overload, poor feedback, inappropriate teaching strategies, by offering tasks and material that can be learned by rote, and by assessment procedures. Most academics would argue that they desire students to develop deep approaches to their learning, yet curricula based on lecturing and examinations promote and reward regurgitation alone. Teaching that promotes or maintains dependence also stifles creativity and initiative. Too little account is given to method or the process of learning – how to learn. Criticism is the essence of the scientific method: education must now rediscover opportunities for students to be critical and to use criticism.

3. **Education assessment**. An education based mainly on lectures and examinations teaches students to solve just one problem – how to transfer the content of lectures to examinations, and so pass. Under this system students know their interests lie in good grades, not in education.

4. **Individual learning histories**. Teaching takes little account of individual differences in learning abilities or styles. There is an interesting paradox in formal education systems: before going to school, the learning environment of children is rich in messages, which are received by touch, use of pictures, mime, stories and metaphor. But this range declines over time to be eventually dominated by messages from the lecture. For non-formal short courses many trainers have started to reverse this trend by adopting creative learning strategies, but these styles rarely penetrate formal agricultural curricula.

5. **Content and context**. Teaching fails to recognize two things: that the problems facing sustainable agriculture are multidimensional, and that agreement on what constitutes a problem in the first place must be a continuing process between people. Curricula based on a series of discrete, taught, disciplinary subjects assumes, as if by osmosis, students will be capable of developing the necessary integrative and interpersonal skills by the end of their degree. Teaching is rarely contextual, so responsibility for content remains with a curriculum committee or individual lecturer. This, of course, maintains power in the hands of the teacher rather than giving to the learner.

## LEARNING PARADIGMS

Some radical rethinking about agricultural education is urgently required to meet the needs of a changing, sustainable agriculture. Most fundamental is the need to re-establish universities as a community of learners. Academics must become involved in learning, learning about learning, facilitating the development of learners, and in exploring new ways of understanding their own and others' realities. The challenge is to make students active learners busily engaged in the process of bringing new knowledge and ways of knowing to bear on a widening range of increasing difficult problems…Educational system does not need repairing, but needs to be rebuilt by…

### Rethinking education

a. Give students greater learning autonomy, so that their responsibility, leadership, innovation and creativity skills are enhanced rather than stifled. This necessitates the development of flexible, learner-centred curricula as opposed to teacher-centred curricula.
b. Place more focus on the application of concepts or knowledge to real problem situations, and in working with people to reach agreement about the existence and nature of the problem. Learning is a lifelong process and learners will be well served if they first know how to learn and discover something about their own learning styles

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c. Alter assessment procedures to give greater responsibility and power to the students, and to encourage them to understand the real world better than solely how to pass examinations.

### Change curricula

Agricultural universities and colleges have lost their way and changes must be made in curricula and the way in which people are taught. There are different processes of acquiring knowledge that are important to the issues of reform in university function and curriculum development (Table). Curricula must focus more on 'praxis': practice informed by critical theories and achieved through the conscious commitment to methodological enquiry, to serve the needs of a sustainable agriculture.

## T. Kamla 1991. Participatory development demands participatory training

Sustainable development means educating the powerless to become empowered. The changed role of development workers requires participatory training that gives them the experience of nonhierarchical collective learning and decision making.

## U. King, Francis and Emal, 1989. Evolution in revolution: new paradigms for agriculture communication

The agricultural sector has several challenges in the educational agenda:

1. how to redesign curriculum, at al levels, to teach sustainable principles; how to retrain teachers, faculty, researchers, and extension to teach process not product
2. how to encourage all the stakeholders in the system to become participants in the educational process; how to develop continuing education systems for small and very rural agricultural producers; how to impose on the K-12 institutions, on an already busy school schedule, the new paradigm of agricultural sustainability
3. how to use emerging technologies to nurture and enhance a sustainable education agenda; how to continue to offer free or at-cost materials; how to avoid privatization of messages
4. how to develop technical education in sustainable agriculture to help students learn to keep in step with breakneck transitions; how to help students expand their use of and control over computer; how specialists (technical, discipline-oriented, content and subject matter specialists) nurture students in becoming systems oriented and obtaining and becoming proficient with interdisciplinary background

## V. Kolb 1984. Experiential learning

### Characteristics of experiential learning

- Learning is best conceived as a process, not in terms of outcomes
- Learning is a continuous process grounded in experience
- The process of learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world
- Learning is an holistic process of adaptation to the world
- Learning involves transactions between the person and the environment
- Learning is the process of creating knowledge

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## W. Lacy 1993. Can agricultural colleges and the needs of sustainable agriculture?

As a concern about the long-term viability of our food and fiber system has grown, many agricultural research administrators, prominent scientists and policymakers have focused increasing attention on the important research and educational needs in sustainable agriculture. Colleges of agriculture should be important in meeting the challenges of sustainable agriculture; a central questions is whether they are adequate for the task. There are several individual and institutional constraints that limit the ability of these colleges to address the needs:

1. Assumptions and biases regarding the relationship between humans and nature, and the concept of progress;
2. The demographic characteristics, education, and experience of research scientists;
3. The specialized departmental organization of research institutions;
4. Imbalances among analyses on the molecular, cell, organism and ecosystem levels;
5. Emphasis on farm level analysis and technology development;
6. New agricultural biotechnologies that may overemphasize short-term, narrow technical considerations and proprietary products;
7. Compartmentalization of education by discipline, and the limited informal and field experiences for students;
8. The background and education of current Extension Service agents;
9. The emphasis on economic effects in research impact assessments, to the neglect of environmental effects and social consequences for farmers, rural communities and society at large;
10. Limited capability for comprehensive public analysis.

Despite these limitations, new research agendas and college programs are effectively addressing many needs of sustainable agriculture systems. To be more successful, these efforts must be broad-based and sensitive to a wide range of issues, and must include all participants in the system.

### What are the research and education needs of a sustainable system?

1. Diverse research and educational programs are necessary
2. Complex biological and social relationships must be sustained and enhanced
3. Research agenda to address these relationships should have several elements:
   - Experimental and exploratory component research that improves our understanding of natural and managed systems;
   - Integrated projects that examine whole farms and ranches, and natural systems
   - Impact assessments that examine the economic, environmental and social consequences of sustainable agriculture practices at the local, regional and national levels
   - Decision support systems and artificial intelligence projects that address the information needs and complexities of dealing with whole farm systems; and
   - Policy research that analyzes policies conducive to sustainability.
4. Research and extension programs supporting sustainable agriculture systems require an integrated approach that entails interdisciplinary cooperation, functional integration of research and extension, and inter-organizational collaboration among institutions and agencies.
5. Choosing research priorities, and the research itself, must involve the opinions of a broad cross-section of farmers, farm organizations, suppliers and processors, scientists and extension faculty, environmental and consumer organizations, and government agencies and policymakers.
6. The new and exciting research paradigms and programs emerging in sustainable agriculture must avoid becoming rigid and dogmatic. Finally, all participants must remain vigilant to ensure that research and education are always of the highest quality.

However, as cultural historian Thomas Berry has written, “the human community and the natural community and the natural community will go into the future as a single sacred community or we will both perish on the way”.

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## X. Long, 1990. Learner managed learning

Orientation of learning. The readiness to learn that is shown by an individual is, in effect, their orientation towards learning. There are two sides to this orientation. The first is that of the learner and the second is that of the teacher, trainer, or professor. In order to discuss comprehensively the principles of adult learning we need to consider the orientation of the people providing the learning experiences. It is this that is referred to as the orientation of learning.

Pedagogy bases itself on a subject oriented approach to learning. In this situation there are certain subjects that must be taught and in which the learner must gain competence. Accordingly results are achieved in relation to subjects studied and either passed or failed. For virtually every person to whom I speak their key educational experiences have been obtained within such a framework.

Obviously such an approach is appropriate in early formal learning experiences and in some subject areas. It is futile to seek involvement and participation from any person until they know enough about the subject or task in order to know even what questions to ask. For this reason there is a sense in which some form of a pedagogic approach is necessary in most educational training situations.

Andragogy extends this. Andragogy is a problem-centred education. Because andragogy is geared to particular developmental cycles through which the individual is passing then, what is being sought are solutions to problems currently being faced or about to be faced. Often the person may not look for answers to such problems but rather a way of confronting and dealing with them. In other words they are looking not for content but for process.

What this means is that the andragogic approach deals with the whole concept of learning not from the point of view that says 'certain subjects must be passed' but from the perspective of saying 'there are certain problems or issues that must be dealt with'.

What andragogy is all about is applied knowledge. What learner managed learning is all about is encouraging us to seek out the knowledge that we need as we progress through life and to open our minds to the potential of formal and informal learning occurring from every experience.

The argument being assembled is not one which says we must dispose of pedagogy. Rather the argument being assembled is saying that we must examine where pedagogy is appropriate and recognise that, as an individual grows and develops, there is a need for a shift in paradigm away from a pedagogical approach through to an andragogical approach. It is only by making this transition that we will be encouraged to embrace the concept of life long learning and see the relevance of self-direction in the entire learning process.

## Y. Occidental 1998. Thoughts on participatory training phase

### Participatory Training Phase

The pre-training phase of a participatory training scheme should provide sufficient time to successfully achieve stages 1 and 2 before the actual training needs identification and assessment. Supposedly, the first and second stages should equip the prospective trainees with the skills and attitudes necessary for participatory activity. If participation is the voluntary involvement in self-determined change, then certain skills needed for a data collection, data processing, objective analysis, and priority setting should be clearly transmitted by the trainors to the prospective trainees since they are considered as prerequisites in making appropriate decisions.

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### During Training Phase

**Rebirth** – It is the stage when a trainee emerges from a homegrown social structure, values, and technology adoption into a more competitive and productive venture. It reflects his development-from a complete novice to a self-directing trainee.

**Growth** – Growth is concerned with the taking care of the essentials like careful planning, manpower deployment, learning updates (both formal and non-formal), and wise use of resources. Improved information management and efficient communication flow are prerequisites to growth.

Rebirth and growth fall under the during training phase. It is the period when the trainees participate in evolving a micro development plan, formulating development objectives, defining the specific tasks required to achieve the objectives, and identifying outside sources of support.

### Post-Training Phase

Renewal – Renewal is a conscious and deliberate state of imbalance wherein a trainee chooses between a static equilibrium or a bigger vision of the future. Participation is a long and winding process. Being such, evolving activities that would fit in each of the aforementioned stages for a more meaningful and fruitful participation are suggested for further studies.

Renewal or the post-training phase is the stage wherein the trainees make a decision that greatly concerns their welfare. They have to decide whether to continue the development cycle through attending a higher level of training, to fall back, or to remain in status quo. At this stage, reinforcement in terms of follow-up or any appropriate assistance is highly recommended. The linkages established prior to the actual training should all the more be strengthened and sustained. To facilitate these follow-through activities, a core group from the concerned human resource development center who will take the lead in monitoring the participatory training activities should also be required.

## Z. Ockelford 1995. Partners in creative training; training of trainer's in Cambodia, PACT Cambodia

### Responsibilities and Qualities of Trainers

I. Responsibilities

1. Contextualization - help trainees understand the context of their work (what is the general & specific situtation that they are trying to improve or change and how work or job is going to help achieve that change).
2. Develop decision making and sense of accountability – assist the trainees in acquiring the necessary knowledge, skills and attitudes needed in making their own decisions and being accountable for them;
3. Performing tasks – assist people in gaining adequate knowledge, skills and attitudes in performing their tasks well
4. Self discovery and development – help identify the trainee's potential creativity and provide opportunity for these to be developed; and,
5. Provide learning environment – create and provide the best learning environment for the trainees

II. Qualities

1. Ability to analyze situation of problems
2. Ability to communicate and relate to trainees of various levels
3. Ability to facilitate participatory processes
4. Sensitivity and respect for the trainee's interests and needs

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5. Patience, humility and flexibility
6. Genuine interest in human and community development
7. Creativity in training technique/methodologies
8. Mastery of the subject matter to be taught

## AA. Prakash & Estera 1998. Escaping education. Living as learning within grassroots culture

On the other hand there is cultural richness and diversity among grassroots. Development packages designed by the developed world for the uneducated and more educated (the social majority) include a series of 'meds' such as human rights, education and democratization. Education as it has been developed in the world of the social minority and exported to the world of the social majorities has only lead to the destruction of the pluriverse world of the social majorities.

It teaches children to leave home and not to stay at home. School and compulsory education implies that the child's destroy is not to succeed the parents but to out made them.

Attempts given to education with interdisciplinary programmes for ecological literacy won't prove successful until it is realized that authentic cultural practices are necessarily taught outside the classroom, where the notion of profession has no meaning.

Education, either packaged as a basic 'need' or human right is a Trojan horse for the subjugation and domination of the world of the social majorities by the social minority. Human rights is general and education as a basic human right are basically products of the social minority of the world. These are social and cultural constructions of the western world. This discourse now includes human resources, the global economy, growth, technology, planning, production, science, one world, participation, empowerment and democracy. Whenever education and development travel together they bring with them poverty, pollution, disruption of autonomy, destruction of the rich of pluriverse of their diverse cultures.

Education, development and human rights are different instruments for the recentness spread of monoculture of the social minority and thus for the re-colonization of the world of the social majorities.

## BB. Rajasekaran, Martin, and Warren, 1993. A framework for incorporating indigenous knowledge systems into agricultural extension.

Incorporating indigenous knowledge systems into agricultural and extension education programmes will result in understanding the 'emic' perspectives of local people, bridging the communications gap between outsiders and insiders, recognizing the accomplishments of local farmers, helping outsiders familiarize themselves with local conditions, and increasing the participation of farmers and their organizations in integrating, utilizing and disseminating what already exists.

## CC. Simpson 1999. The roots of change: Human behaviour and agricultural evolution in mail

Human creativity and social interaction are inmate human characteristic and are central forces in the evolution of local agricultural systems.

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## DD. Schon 1983. Education for reflection-in-Action: An alternative to the positivist epistemology of practice

Good teaching required "not a method but an art".

Tolstoy thought of each of his pupils as an individual with unique ways of learning and imperfections.

Many practitioners, locked into a view of themselves as technical experts, find nothing in the world of practice to occasion reflection. They have become too skillful at the techniques of selective inattention, junk categories, and situational control, techniques that preserve the constancy of their knowledge-in-practice. For them, uncertainty is a threat; its admission is a sign of weakness. Others, more inclined toward and adept at reflection-in-action, nevertheless feel profoundly uneasy because they cannot say what they know how to do, cannot justify its quality or rigor.

## EE. Wiggins 1989. The futility of trying to teach everything of importance

The aim of curriculum is to awaken, not "stock" or "train" the mind. That goal makes the basic unit of a modern curriculum the *question*. Given the intimidating, easily trivialized mass of knowledge, what the modern student needs is the ability to see how questions both produce and point beyond knowledge (whether one's own or the expert's). Educational progress would thus be measured as the ability to deepen and broaden one's command of essential questions by marshaling knowledge and arguments to address them.

Questioning is not a context-less skill any more than knowledge is inert content. One learns the power of the question only be seeing, for oneself, that important "facts" were once myths, arguments, and questions. And one therefore learns self-confidence as a student only by seeing that one's questions, not one's current store of knowledge, always determine whether one becomes truly educated.

The modern educational task is to put students in the habit of thoughtful inquiry, mimicking the work of professionals.

If the students' questions partially determine the direction of the course, it will no longer be possible to write scope and sequence lesson plans in advance. The teacher and students must have the intellectual freedom to go where essential questions lead, within bounds set by the general questions, themes, and concepts of the syllabus.

There is little evident student craftsmanship in academic work far cry from what one witnesses on the athletic field, on stages, and in vocational wings, by the way. The cause is seeing facts as the remedy of ignorance and accurate recall as the only sign of knowledge.

Since it is impossible to teach everything we know to be of value, we must equip students with the ability to keep questioning. The value of an idea, when time is limited, stems from its ability to pass this test: does it sufficiently illuminate student experience and provoke new thought? If not, it clutters up the curriculum.

A truly liberal education is one that liberates us from the oppression of unexamined opinion and feeling—a far cry from letting students encounter only what they think relevant or fun.

The sign of poor education is not ignorance. It is rationalization, the thoughtless habit of believing that one's unexamined, superficial, or parochial opinions and feelings are the truth; or the habit of timid silence when one does not understand what someone else is talking about.

Curriculum must develop in students the habits of mind required for a lifetime of recognizing and exploring one's ignorance. The modern curriculum should thus: (1) equip students with the ability

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to further their superficial knowledge through careful questioning, (2) enable then to turn those questions into warranted, systematic knowledge, (3) develop in students high standards of craftsmanship in their work irrespective of how much or how little they "know", and (4) engage students so thoroughly in important questions that they learn to take pleasure in seeking important knowledge.

In curriculum design, the following aphorisms should be kept in mind to enable students to be more thoughtful about what they do and do not know:

1. The most essential habit of mind we can provide students is the ability to suspend disbelief or belief as the situation may warrant.
2. The deep acceptance of the painful realization that there are far more important ideas that we can ever know leads to a liberating postulate: all students need not learn the same things.
3. If everything taught is said by teachers to be important, then nothing will seem important to students.
4. Curriculum is inseparable from assessment:
5. The "essentials" are not the "basics".

## FF. Zamora and Fernandez, 1998. Views on the state of seed education

In our attempt for a more relevant seed education, an essential first step is to identify our intended clients and their needs. We can immediately identify five distinct, but not mutually exclusive groups – the students, extension workers, people in the seed industry, farmers and legislators. It is immediately obvious that the present focus of UPLB in seed education is on formal academic degrees for both Filipino and foreign students. In the last 9 semesters, we have graduated a total of 12 graduate and 5 undergraduate students specializing in Seed Technology. This emphasis is easy to explain because teaching is supposed to be the primordial function, the *raison d'etre* of the university. In the same period, UPLB has conducted numerous training programmes which undoubtedly has created some impact as evidenced by the expansion of the programme and the continued existence of the Seed Technology group in the University.

It is a common belief that education contributes to development by providing individuals with specific skills and knowledge. It is assumed that the existence of such individuals (mainly students and extension workers) will by itself bring about development strategies that could best serve its intended clients. Training programmes, the nature of which must necessarily change with time, is only one of the essential components of the overall strategy. It is obvious, from the composition of the participants in this conference and other joint activities, that the university has succeeded in forging a strong linkage with the industry. This is rare and will detract from the common observation that we in the university are in ivory towers. Such linkage should be further strengthened because a sound and relevant seed education programme needs solid support from the various sectors particularly those from the seed industry.

## SUPPLEMENT 2. Past documents reflecting the author's or the group's teaching, research and extension (development) philosophy. Materials were prepared for the author's and the group's award nominations.

### 1. General teaching method (P. G. Fernandez)

1. Benchmark information; profiling; leveling off of expectations, potential problems
2. Discuss issues, then relate subject course role to self (needs, wants, aspirations) and career choice; Present the sustainable agriculture concept, frameworks
3. Individual "sit-down" and take home exams
4. Group assignments and take home exams
5. Evaluation of group dynamics by each student (including self assessment)
6. Surprise quizzes (group and individual)
7. Have students watch, review, read and reflect on videos, posters, calendars, articles, et. (group and individual activities)
8. Have them critique seminars, workshops, meetings, research proposals, news articles, legislative bills and laws, etc.
9. Have oral reporting and interchange (experiential sharing)
10. Field visit and assessment
11. Prepare project proposal, action plan

### 2. Nomination letter of the Chairman

January 1997

**Dr. Cecilio R. Arboleda**
Dean
College of Agriculture
UPLB, College, Laguna

Dear Dr. Arboleda:

The Department of Agronomy wishes to nominate the Agronomy Seed Development Program for the **Outstanding Extension Program Award for 1997**. Pertinent documents are enclosed for your reference. We hope you will consider our nomination. Thank you.

Very truly yours,

**ENRIQUE C. PALLER**
Chairman

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## 3. Significant contribution of the Seed Tech group.

**SEED SCIENCE and TECHNOLOGY TEAM, Department of Agronomy**

**Significant Contributions**

The team has been very active in promoting sustainable agriculture through the seed since the late 1980's. Its efforts are focused in the development of the informal seed sector and a seed industry framed within sustainable agriculture. It has provided trainings, service as information clearinghouse for seed sources, technology, and issues, learning materials and publications that are useful to a variety of readers or users. A large portion of the information and materials produced have been developed through primary and secondary research. The following are some of the more specific accomplishments:

- The team has published or written many materials that are useful in extension or development work. These are now being used extensively by technical staff/development workers in the country and elsewhere, and had already been translated to other languages such as Vietnamese, Indonesian, Spanish.
- They are among the few R&D groups who pioneered in actualizing and institutionalizing NGO-UPLB linkages. This partnership are in the form of publication, training, research and extension.
- Some information materials that they produced are considered one of the few reader-driven publications available and circulated to over 2000 readers locally and internationally.
- They have completed a 5-year project on Agroforestry Seed Information Clearinghouse (AFSICH)) funded by IDRC and World Neighbors. This served local, regional and international groups and individuals both formal and nonformal. The project actively extended seed information including issues to over 3000 network members. Its aim was to help promote sustainable agriculture through the seed.
- They have institutionalized a yearly summer short course on seed and genetic conservation (now on its 7th year) using sustainable agriculture as framework and serving NGOs and GOs nationwide. Other trainings (local and international) had been offered upon request. The team has, through the years, developed a methodology that actualized a participatory learning approach. The courses offered are holistic, cutting across various disciplines and are intersectoral as they seek to involve NGOs, GOs and farmers as trainors or participants. The training materials that had been developed provide an interactive learning process and are appropriate for echo seed trainings or long distance learning.
- They have been quite active in advocacy, having co-coordinated national conferences on contentious issues such as GATT and IPR.
- They are engaged in applied research with research objectives defined by farmers. They have also been conducting research and development work on indigenous knowledge systems. From these they were able to develop various databases for extension and instruction.
- They have developed and maintained one of the richest learning resource units (mini-library) in campus, serving various training programs, visitors, students, and staff of the University.

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## 4. Description of the Seed Tech group's non-teaching activities

**RESEARCH-EXTENSION and DEVELOPMENT HIGHLIGHTS:**
**Seed Science and Technology Division**

Y The team has published or written many articles or papers, manuals that are useful in extension or development work. Examples are some volumes or chapters of the Agroforestry Technology Information Kit published by IIRR, DENR and the Ford Foundation, now being used extensively by technical staff/development workers in the country and elsewhere. These materials had already been translated to other languages now such as Vietnamese, Indonesian, Spanish.

Y They pioneered in actualizing and institutionalizing NGO-UPLB linkages. This is significant since the university was initially reluctant to venture into this approach while this has become the strategy identified as most effective for promoting sustainable agriculture. This partnership are in the forms of publication, training and extension.

a) They produced the Manual on Seed Production and Handling written in Filipino and translated into several local languages by various POs and NGOs. This material is judged the first of its kind as a joint UPLB-NGO publication.

b) They produced and served as guest editor of the Sustainable Agriculture Newsletter in 1990- a type of sourcebook, published by the NGO, CUSO, of Canada - which has over 3000 readership internationally.

c) They produced and edited the Agroforestry Seeds Circular in 1991-1994. This is also a form of source book designed for development workers and farmers but also extensively read and used by local and foreign universities and research agencies as a reference/instruction material. It is one of the few reader-driven publications available and circulated to over 2000 readers locally and internationally.

d) They have completed a 5-year project on Agroforestry Seed Information Clearinghouse (AFSICH)) funded by IDRC and World Neighbors. This served local, regional and international groups and individuals both formal and nonformal. The project actively extended seed information including issues to over 3000 network members. Its aim was to help promote sustainable agriculture through the seed.

e) They have institutionalized a yearly summer short course on seed using sustainable agriculture as framework and serving NGOs and GOs nationwide. A holistic, participatory and intersectoral training module on seed and genetic conservation was developed. An interactive learning module appropriate for seed trainings or long distance learning was also deviced.

f) They also offer NGO, PO and GO requested seed related information as well as sustainable agriculture training both in-campus and on-site.

Y They have coordinated more than 3 national conferences and trainings that brought together NGOs and GOs in the same forum to discuss issues of national and international consequences (e.g., GATT and IPR).

Y They are engaged in applied research with research objectives defined by farmers (e.g., invigoration; recalcitrant seed; storage; salago, malapapaya, and mahogany seed storage and germination). They also conduct research and development work on indigenous knowledge systems.

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Y They run Seed Research and Development Project (SRDP) which focuses on enhancing resource-poor farmer capabilities in seed production for the development of a sustainable seed industry. Therein a training is provided to NGOs, GOs and POs. Queries/Information needs on aspects related to seed, sustainable agriculture, alternative systems of production, research and education/extension are also responded to the project also conducts farmer-driven research.

Y They have developed and maintained a learning resource unit useful for training, but most especially, for students, staff and guests who need information on sustainable agriculture, seed and other related fields.

Y Develop and maintain various databases for education-extension and research. Topics include indigenous practices (IKS), dangerous pesticides, alternative crop and seed protection, glossary of terms on sustainable agriculture and seed, crop information for seed production, seed handling, storability, quality testing and enhancement esp. of local crops. These databases have proven very useful for students, NGOs, POs, GOs and individuals seeking related information.

Y They have developed a learning/information resource facility that is being recognized as one of the richest in UPLB on subjects related to seed, sustainable agriculture and related fields.

Y They back-stop international and local NGO and PO networks (e.g., MASIPAG, SIBAT, IRDF, GDS, IIRR, GRAIN, NAVDANYA)) as well as GOs in their information and training needs related to seed, genetic conservation and sustainable agriculture in general.

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## 5. Description of the Agronomy Seed Development Program

### Executive Summary

#### Staffing and Funds

The Seed Science and Technology Division is currently headed by Dr. Pamela G. Fernandez and composed of the following staff: teaching staff (Ma. Fatima Ovejera-Mercado), researchers (M.S. Tolentino, L.E.P. de Guzman, A.L. Lappay) and administrative personnel (M.G. Carlos, A.G. Medel, R.D.C. Sapanta). Dr. Noel G. Mamicpic has recently retired but have been also highly active in the various programs of the Division. The basic funding that enables the Division to run its extension program comes from the Seed Research and Development Project which is supported by the NFAC funds. The objectives of the project are to to develop awareness in the formal and informal seed sectors and all other constituents in the use of good quality seed, appropriate seed technology and their relation to sustainable agriculture; to encourage farmer or community-based seed production; to conduct seed research and development activities that will support on-farm technologies for the development of the countryside and resource-poor farmers.

#### International Training

The Division has undergone transformation in response to changing times. In 1981, it spurred the establishment of the International Training Programme on Seed Technology for Vegetable Crops (ITPST-VC). Various facilities for instruction, research, training, seed production and processing, including a hostel and a number of vehicles were acquired through a grant from the Netherlands government. From 1981-1988 this program had conducted semi-annual or annual three-month long trainings on seed technology for vegetable crops involving a total of at least 150 international participants (mostly from the ASEAN region). This activity has been instrumental in the international recognition of UPLB as a seed training center in the ASEAN region. Other trainings, workshops and seminars have also been conducted by the ITPST in collaboration with other agencies. The staff of the Division had served in the directorate of ITPST and/or acted as resource persons and support/technical persons for its various activities.

#### National Plant Genetic Resources

The Division was also instrumental in the creation of the National Plant Genetic Resources Laboratory based at the Institute of Plant Breeding. The laboratory has now collected more than 29,000 accessions of more than 450 species of crops and provides samples to requesting local and international researchers. It has extended its utility to non-government organizations or NGOs by offering cold storage for their seed collection.

#### Seed Industry Support through Seed Production

The Seed Support Project (1978-1986), based at the Division has successfully encouraged farmers in Bansud, Oriental Mindoro to use improved seed of rice and to do their own multiplication of improved varieties. Other seed related activities in the surrounding areas resulted in an off-shoot of this effort including a participatory multi-sectoral planning workshop that produced the Bansud Municipal Agricultural Development Plan and Programs.

The Division has also responded to the country's need to develop the seed industry and to the regulation of seed import for some species. This was done by enhancing local capabilities to produce seed of some temperate species, namely, pechay, radish and mustard. The applied research on the seed production technology of these species led two seed companies to venture into commercial farmer-contract seed growing in these seed cooperatives.

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Farmers were encouraged to select varieties and produce seeds in Quezon (Sariaya); Batangas (Padre Garcia); Cavite (Tagaytay), and Laguna (Nagcarlan). A market for the resulting seed has been established (e.g., through Planter's Products, Inc. for the "Golden Bounty" seeds). By awarding its leader the "Achievement Award in Seed Science and Technology", the Philippine Seed Industry Association gave full recognition to the extension services of the Division. The Seed Research and Development Project (SRDP) which superseded the Seed Support Project (i.e., 1986 to date) continued the promotion of farmer-based seed production. The KASARINA farmer organization in Nagcarlan, Laguna was given an on-site on-the-job training and continued technical support from the Division staff to enable its members to manage their own seed production of radish, pechay and mustard and to become self-reliant in seed production for these crops. Subsequently, these farmers have engaged in seed production of other species.

## Seed-related Activities for Sustainable Agriculture

### Seed Information and Advocacy

In 1989 the Agroforestry Seed Information Clearing House (AFSICH) project was established in the Department. It aimed to respond to the need for seed-related information, including seed sources, for development projects. The Division then took on a new challenge to address the needs of the time. It committed itself to promote the field of seed science and technology along the framework of sustainable agriculture (SA). It also became active in networking and advocacy of SA as exemplified by its participation in various discussions on GATT and intellectual property rights (patenting) issues.

The Division team is a member of the Sustainable Agriculture Coalition (both at the regional and national level) that does advocacy work on SA. It is also linked with the Information Center for Low-External-input and Sustainable Agriculture (ILEA), which is an international network for SA advocacy. It corresponds closely with Genetic Resources Action International (GRAIN) which is an international NGO doing advocacy work on plant genetic resources.

### Participatory and Holistic Training and Short Courses

The team developed a multisectoral, multidisciplinary, and participatory approach to extension/training. This is manifested by its emphasis on biological and genetic diversity in any seed- or general agriculture undertaking. Resource persons from various university units and sectors (including farmers and NGOs) are invited during trainings. Participants come from a mixed background and affiliations (e.g., NGOs, people's organizations or POs, farmer's organization or FOs, and government organizations or GOs, including schools and universities) and are mixed together. Therein, problems, needs, experiences and indigenous knowledge related to seeds are also being elicited and shared.

The team now offers a yearly short course (since 1991) on "Seed Production and Handling Technology and Genetic Conservation" with SA as framework. A module has been evolved that includes in addition to technology, issues, value analysis, social consciousness, and community organizing. Participation is encouraged in the modification of modules according to the profile and needs of participants through a series of benchmark/diagnostic questionnaires given during the announcement/invitation phase. Participation and sharing are also enhanced in the preparation of a project plan and during "group" exercises and practical examinations. A training manual that is highly illustrated has been developed. It is designed as an independent material that elicits participation and sharing of group members through questions concepts and illustrations.

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The team also has been conducting other trainings on seed and/or SA both in the university and off-campus (e.g., in Cavite, Negros Occidental and Oriental, Zambales, Siquijor, Davao, Cebu, Cagayan de Oro, Bicol ) closely following the approach used in the short course. Trainings are designed to be continuing wherein progress of participants is monitored even after the training program (e.g., through correspondence, publication and informal visits).

### Offshoot Initiatives

Some of those who participated in the training conducted by the Division have formed organizations promoting SA (e.g., the MOSAFA or Mindoro Occidental Sustainable Agriculture Farmers Association; the Bohol Advocates for Sustainable Agriculture or BISA, composed of concerned Department of Agriculture staff and NGOs), have converted farms to SA (e.g., the Romblon farmers) or established community seed banks (e.g., network members of SIBAT or Sibol ng Agham at Teknolohiya).

### Collaboration and Networking

Links to NGOs (local and international) have been established and assistance is offered in the form of trainings and technical support to their extension program. The assistance provided to MASIPAG (a farmer-NGO-researcher partnership for development organization) which has now close to 100 promising lines bred by farmers themselves, is in the area of seed technology. In collaboration with the International Institute of Rural Reconstruction (IIRR) the staff has been involved in the preparation of several publications designed for practitioners. The group helped

prepare the topics/portion on seeds found in the Low-External Input Rice Production (LIRP) Kit and the Agroforestry Technology Information Kit (ATIK), which are circulated internationally. Some of these materials were eventually reproduced in source books and even translated into a Thai language. A Tagalog (Filipino) manual on "Seed Production and Handling" (with illustrations) emphasizing SA practices was produced in collaboration with IIRR. It is now being used as reference and extension material by many NGOs and FOs, especially in their training on seed. The team assisted the NGOs, SIBAT, MASIPAG and KMP (Kilusan ng mga Magbubukid sa Pilipinas or Philippine Peasants Organization) in their genetic conservation effort for rice and other crops. Through participation in national SA fairs, the Division has widened the reach of its services.

### Publication

Publications (e.g. newsletters and Circulars) produced by the group provide information on seed sources (especially on agroforestry), seed technology, and other seed-related and sustainable agriculture-related resources and activities. These publications (and the Division) also serve as venue whereby readers or network members can ask questions, air their views and get answers to their inquiries. These publications are sent to approximately 1700 readers (80% in the Philippines and 20% international) who are from NGOs, GOs, the academe, FOs, POs, private groups and individuals including farmers (7% of total).

### Information/Learning Unit

The Division maintains an office that serves as a clearinghouse and learning unit. It contains information about seed and SA related information aspects, e.g., network members, indigenous seed and crop protection practices, seed sources and "sustainable" seed technology. It has developed a number of databases that are available to any one interested. It aims to serve the formal and nonformal sector of the seed industry.

The Division is also actively involved in collecting, promoting and exchanging information related to seed, genetic resources and biodiversity, agroforestry, alternative pest

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management and sustainable agriculture in general. A major source of information are the farmer/NGO network members, especially in the area of indigenous knowledge systems. One of the main activities of the Division is to conduct practical research on seed production/ technology in support of other technologies for the development of the countryside and resource-poor farmers. Farmers are also encouraged to conduct their own seed research, production, conservation and extension activities. Despite very meager MOE funds, which amounts to PHP50,000.00 annually, and the uncertain tenurial status of some of the staff, the Division continued its commitment to serve its intended partners.

The significant contribution of the Seed Science and Technology Division of the Department of Agronomy to the development of the seed industry and its ability to provide service to various sectors of the seed industry, i.e. the grassroots (POs, FOs, cooperatives), NGOs, and GOs, at the national and international levels, students and other institutions despite meager funds and their other commitments to research, teaching and administration, we believe deserves recognition, and hence, the nomination for the outstanding extension program award.

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## 6. Nomination of PAMELA G.FERNANDEZ for the "Metrobank Outstanding Teacher" Award.

Dr. Pamela Fernandez highly deserves the award in view of her outstanding achievement in teaching. She is one of the pioneers of sustainable agriculture in campus and has concretely incorporated this paradigm in her teaching methodology and course contents. She is also a very effective and well-liked teacher.

She is among the few faculty members who instituted reforms in her courses to fit into the sustainable agriculture framework long before it became a formal program of the College and the University. She led in the revision of Crop Science 1a and 1b courses to Crop Science 1 and 2, which are realigned to the sustainable agriculture framework.

She has developed a participatory-interactive teaching approach and materials, part of the reform she undertook to fit her courses into the sustainable agriculture framework. The reforms she has undertaken are well-received by the students, as reflected in the student reaction and written feedback.

She instills awareness about issues of national and international dimensions to her students, although her courses are mostly technical in nature. She encourages her students in technical fields to be holistic in thinking.

She has developed various teaching aids that cut across courses and which prove to be versatile being useful not only in teaching but also in training and extension.

She has developed various research, extension and training materials which are equally useful to students, staff and development workers, not only locally but also internationally.

Dr. Fernandez' published or written articles or papers in refereed journals or in proceedings of national and international conferences are also useful, not only for researchers, extension agents and development workers, but also for her formal classes. These papers cover a wide variety of subjects with technical, conceptual and issues coverage.

Dr. Fernandez' field of interest extend beyond seed technology. She also teaches a wide variety of courses, such as crop science (Crop Science 1a and 1b), crop research methodology (Agronomy 112), seminar presentation (Agronomy 299). She is also able to teach courses and topics in agroecology and physiology.

She takes initiative for self-improvement that eventually benefit her profession. For example she finds means to correspond with and visit various international and local organizations involved in alternative seed and agricultural systems to learn about their realities, as well as scout for possible ideas resources that could enrich her basic university function.

She has developed a learning resource unit/facility being used not only for training, but most especially, for students, staff and guests who need information on sustainable agriculture, seed and other related fields. The learning materials accumulated or developed include video sets, slide sets, posters, databases, journals, reprints, and books. Such unit has one of the richest collection references and other learning materials in the whole university for subjects on sustainable agriculture and seed.

Her dedication is also shown by her involvement in voluntary activities, e.g., in extension and by continuing to serve as an information unit that handle queries about seed and sustainable agriculture.

Dr. Fernandez is also recognized as one of the few faculties who pioneered in and advocated the strengthening of the informal seed sector and seed system, recognizing their significant and critical role in the development of a sustainable seed industry. She institutionalized a short course on seed production, handling and genetic conservation for sustainable agriculture. The course is attended by development workers from NGO and GO.

I HEREBY CERTIFY TO THE BEST OF MY KNOWLEDGE ALL INFORMATION CONTAINED IN THIS FORM ARE TRUE.

Cecilio P. Arboleda
Dean, College of Agriculture

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## 7. Statement from the nominee

### Teaching Philosophy

The nominee believes in the idea that teaching when misused could hamper the development of the student. She subscribes to the idea that the current teaching approach has contributed greatly to current problems in society and the environment; that teaching can actually "threaten sustainable agriculture".

She believes in participatory teaching, where the students can, to a certain extent, help define his course curriculum, as well as the course content, direction and methodology of the course. The student should as much as possible be able to relate his own realities and use this in his various activities, esp. those that require sharing of his experiences or learnings to the class.

Students are resources from which the teacher can learn from and such learnings can enrich future classes. The teacher should not assume that he or she is the sole preserve of knowledge and that students' minds are simply memory banks from which information can be deposited and withdrawn. Students can also learn from each other and this should be exploited by the teacher through innovative means such as group exams, assignments and discussions.

The teacher ought to be aware of current developments and issues both in the local and international scene so that her classes are always attuned to current realities. She should teach her student to be conscious of their own role in the community and constantly be reminded that everyone is a development worker. A teacher should also constantly be updated of current developments in his own field. This is important because knowledge in modern science is said to have a half-life of less than 3 years or so.

It is highly useful for a teacher to also be involved in research and extension/training esp. of the informal sector. Such experience can greatly enrich one's examples in class as well as one's teaching methodology. This has been the case with the nominee's experience working with NGOs and POs.

Examinations may be used as a venue for further learning. It is therefore important that answers to the examinations are discussed with the students.

The teacher should endeavor to make learning an exciting and fulfilling experience. He/She should not promote fear or stiff competition to the point that students attend classes and fulfill requirements only for the sake of getting a good grade. It is therefore important to make the students comfortable and friendly with the teacher.

Levelling off of needs and expectations is a necessary activity at the beginning of class so the teacher and the students know each other. This should be true for all levels of education. Doing so would be useful in adjusting the teaching methodology as well as the content of the course.

The nominee strongly believes that the role of the teacher is to open the door for the students and that real learning would only happen if the student opts to enter such door.

### Important Insights about the Teaching Process

The video tapes, posters and other learning materials acquired by the teacher has greatly helped in illustrating principles which are otherwise left only to the imagination of the students. These also have helped expand the coverage of the course. In cases where the teacher is not able to attend class such resources have proven to be very good materials to keep the

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students equally interested and fulfilled. These materials have proven to be effective in drawing out students' own experiences and sharing.

Levelling off at the beginning of classes and constant feedbacking helps to relax students and make them help themselves in their own learning process.

The development NGOs and the POs can provide very good ideas on teaching methodology. Theirs are highly interactive and participatory. Teaching can be greatly enhanced by eliciting indigenous knowledge systems and providing scientific basis for some of them. The indigenous knowledge base of students and participants of trainings is quite rich.

**Special contributions made to the Profession**

The nominee has developed teaching/learning materials that follow the framework of sustainable agriculture and which are useful in promoting participatory learning and sustainable agriculture. She has developed a learning resource unit and has accumulated learning resources, not easily available through the formal channels, that are now used by many students not only in the field of agronomy but also in other technical and non-technical areas.

The nominee is one of the first ones who adopted sustainable agriculture in their teaching. She has developed a seed course framed against sustainable agriculture and led in the revision of some fundamental courses to make them within the same framework. She has vigorously pursued the strengthening of support to the informal seed sector and the resource-poor farmers. Thse are demonstrated in the materials that she developed, in her writings, as well as in the various training curricula that she developed.

## SUPPLEMENT 3. Reflections on local and foreign seed technology training *by Lucille Elna Parreño-de Guzman, staff of SSTD**

### A. Comparison of UPLB and IAC Seed Technology Training Course

| | Seed Science and Technology Division (SSTD) Department of Agronomy, UPLB | International Agricultural Center (IAC) Wageningen, The Netherlands |
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| **Course Title** | Seed Technology and Genetic Conservation for Sustainable Agriculture - Short Course (March 15-30, 1999) | International Course on Seed Production and Seed Technology (April 11-July 14, 1999) |
| **Rationale/ General background** | Sustainable agriculture (SA) has become the official program of many organizations, both formal and non-formal. Adopting SA in the area of seed and genetic conservation requires shifts in more than just one or two aspects in the system. It does not only mean adopting appropriate inputs and technology but also giving attention to developing human resources. The seed being a basic production input, a unit in genetic conservation and diversity, an "agent" of change, and one that largely determines the system of production can be a powerful tool to promote SA. A seed training curriculum with an SA perspective is viewed as one that places great value on indigenous knowledge systems, promotes strengthening of the informal seed sector, ensured understanding of various development perspectives, creates synergy among different sectors, and utilizes a holistic/integrative and participatory training approach. | A secure supply of quality seeds is a key condition for future agricultural and horticultural growth in the developing world. Productivity-led growth in agriculture depends on the application of advanced technology. Successful introduction of advanced technology is in turn largely dependent on farmers' access to seed of desired genetic composition, adequate purity and optimal physiological stage. The high priority that seed programmes deserve in agricultural development strategies is confirmed by the fact that improved seed offers the highest economic and social returns among all agricultural inputs.<br><br>The Netherlands has a well-developed seed industry with a private sector and actively cooperating governmental services. The IAC, in cooperation with the Wageningen Agricultural University (WAU), governmental institutions and private industry, organizes an International Course on Seed Production and Seed Technology, offering relevant Dutch knowledge and experience in the contemplated curriculum. |
| **Objectives/ Goals** | Participants should be able to: (1) identify and acquire skills in basic seed technology framed within sustainable agriculture; (2) discuss issues and concepts that relate to seed, the seed industry and overall development; (3) describe the strengths and weaknesses of both the formal and informal seed systems; (4) describe and | Through the course, the International Agricultural Centre proposes to harness relevant knowledge and available experience in the Netherlands towards the training of seed agronomists and seed technologists in developing countries. In view of IAC's policy to promote participation of women in |

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| | explain the value of some indigenous seed and genetic conservation practices; (5) write up an action plan related to seed undertaking and relevant to one's line of work, using the sustainable agriculture framework; (6) identify various seed-related resources, and (7) promote networking for advancing a sustainable seed or genetic conservation undertaking. | IAC training courses, women are especially invited to apply. |
| **Framework** | Sustainable agriculture; empowerment of resource-poor farmers. | Conventional/modern agriculture. |
| **Frequency** | Yearly (currently on its 8th year) | Yearly (currently on its 12th year) |
| **Duration** | 16 days during summer (March/April) | 14 weeks during spring and early summer (April-July) |
| **Schedule** | Monday to Saturday; 7:30 am - 12:00; 1:30 - 5:00 pm with some night sessions | Monday to Friday; 8:30 am - 12:00; 1:30 - 5:00 pm no night sessions |
| **Fees** | Tuition fee of PHP 4,000.00 excluding board and lodging and fare to and from the venue. With very limited fellowship grant. Some expenses shouldered by SRDP and personal funds. Fees were spent on handouts, training materials, publications given, field trips, etc. | Course fee of 6,000 NLG, board and lodging of 110 NLG per day, round trip airfare and allowances all shouldered by the Netherlands Fellowhip Programme (NFP) and other international funding institutions (e.g. UN agencies, European Union Development funds, World Bank, etc.) |
| **Requirements for admission** | Participants should an undergraduate degree if not equivalent experience or training and should be reasonably competent in the use of English and Filipino. | Participants should be have (1) at least a BSc degree or equivalent in agriculture; (2) at least three years experience in seed technology; preferably engaged in a position at managerial level and involved in the seed industry or a seed programme; (3) competence in the English language. |
| **Participants of the 1999 course** | Filipinos from all over the country with varied backgrounds, responsibilities and activities related to seed or sustainable agriculture. They come from GOs, LGUs, NGOs, POs, and academe (34). In other years, private groups/individuals have also attended. | From 10 developing countries (Cuba, Ethiopia, Ghana, India, Kenya, Mongolia, Nepal, Pakistan, Philippines, and Vietnam) and one developed country (Switzerland) working in the different aspects of the seed chain in GOs, academe, NGO and the private sector (17) |

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| **Venue** | This year it was held at the Continuing Education Center (CEC) which was far from the Department and we have to travel back and forth for the materials that we need during the training. We have to transport a lot of things (books, posters, videos, etc.) from the Department to CEC. The room was set-up with library and other displays. Communication center was still in the Department. Participants were housed in the CEC but they have to go out of the building to take their meals. In the previous years this training was held at Rm. 100 of the Department. It was more convenient for the organizers but not conducive for the participants because of the heat and the noise from passing vehicles. | Except for two, all the participants were housed in the IAC hostel (Wageningen International Conference Centre-IAC) on the basis of full board and lodging. Each participant had a room of his own with toilet and bath inside. The classrooms, IAC offices, library, computer room, restaurant, recreation and facilities were all in the same building. |
| **Facilities (199)** | Quite adequate for our needs. Aside from paying for the use of the training hall, we had to rent some equipment from CEC when the course was held there. In other years training, no expense was incurred for hall and equipment rental. | Aside from the regular equipment needed for the training we have two computers, printers/paper with free internet access inside our classrooms. We also had access to a room with 13 computers. This was opened from 7:30-10:00 pm during weekdays. |
| **Transportation** | Jeepneys were used when traveling within the UPLB campus or within Laguna. We used airconditioned vans for long duration trips (e.g. Manila and Cavite). The space in each vehicle was just enough for the participants and staff. | Bus with very courteous drivers which leaves on time. The bus has a capacity of ~40 persons but there were only 17 of us participants so it was very comfortable even if we had to travel for more than four hours sometimes. It even had a TV, VHS player, refrigerator and toilet. The bus driver also acted as tour guide during our technical trips. |
| **Pedagogical approach** | Topic presentation was mostly by lectures and discussions, oftentimes with the use of transparencies. Videos (~8) were shown as separate sessions from lectures. During lectures participants can ask questions anytime from resource speaker. The seed technology portion of the course was presented using the modified storyboard (MSB). This is a group learning approach wherein participants were required to | Topic presentation mostly by lectures and discussions with the use of tranparencies. Slides and videos were sometimes shown but together with the lecture. During lectures participants can ask questions anytime. The first two modules of the course were presented through case studies. Participants were divided into groups and were made to analyze the cases and present their answers |

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| | answer the MSB questionnaire, write their answers in a manila paper and these were processed by the resource speakers during the lecture/discussions. Practicals were given wherein participants had a hands-on experience of doing seed quality testing, asexual propagation and farmer breeding. There were interactive sessions during the HRD topics with NGO resource person. Group work were also done during HRD sessions. There were also some technical excursions to elaborate some of the topics discussed. Topics were delivered in 1.5 - 3 hours. Participants were required to answer 2-3 benchmark questionnaires before the training. During the the training levelling-off sessions were also conducted because of varied organizations and backgrounds. This also helped the resource speakers in addressing the participants' concerns. Participants were divided into host teams to facilitate the evaluation of each day's activity and a participant management committee (PMC) was also formed host to help the organizers in taking care of the participants' needs/concerns. We had separate boards for "food for thought", "did you know that?", " announcements", "mood barometer", etc. | in class. The plant variety protection and seed sector in developing countries modules made use of role playing to synthesize the lessons learned by the participants. Quality assurance module also made use of three "zero assessments" to gauge the level of knowledge of the participants on quality assurance and ISO. Practicals on DUS, VCU, morphological and genetic markers, seed quality testing, asexual propagation, variety identification, etc. were conducted on site (field, laboratory, greenhouse, etc) with all the complete materials/equipment needed present and all participants did it all at the same time. No HRD session were included and there were some disagreements between participants which were not resolved. Topics were delivered within 30 minutes to 1.5 hours. There were no benchmarks before and during the course. There were cases that the resource speaker's topic did not really address the participants' concerns. No teams or PMC were formed. Some tasks were given by course coordinator to individual participants (e.g. checking if lunch parcels are already in the bus before a trip, coordinate a meeting of participants to choose a speaker for the closing ceremonies, etc.). |
| **Content** | The course covered the whole spectrum of alternative seed technology concerns reflecting an alternative paradigm. It included genetic conservation, farmer-based approaches in conservation breeding and seed production, sustainable agriculture, indigenous knowledge systems, technical and political aspects of seed technology, alternative development concept, and other concerns. A module on human resource development is also an integral part. It helped very much in keeping the relationship between | The whole training course was divided into eight modules of one to two weeks each: (1) target oriented project planning; (2) quality assurance in the seed sector; (3) plant variety protection or socio-economic aspects of plant breeding and the seed multiplication chain; (4) seed sector in the developing countries; (5) seed quality control; (6) propagation of plant material; (7) seed physiology; and (8) producers' and users' perspective in seed production technology. We had participants from other countries |

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| | participants very smooth and this was also hoped to help them in their work (dealing with farmers, becoming effective development workers, responsible human beings, etc.). | who came only to attend in two of our modules: the 1st International Workshop on Quality Assurance in the Seed Sector (Philippines, Thailand, South Africa, Zimbabwe, and Syria) and the 3rd International Course on Plant Variety Protection (Russia, Taiwan, Thailand, Indonesia, Kazahkstan, China, Kenya, Tanzania, etc.). We also had extra plant breeding practicals on RAPD, the use of morphological and molecular markers to distinguish between different varieties of potato and the evaluation of resistance to leaf rust. In general, most of the topics were focused on situations of a developed country. Except for one module, all lectures/discussions were on formal seed technology/ production. We were only able to visit two farmers who were into organic agriculture. Indigenous knowledge systems per se was not discussed but was touched a bit in the PVP module. |
| **Process/ Activities** | Applicants were required to answer 2-3 benchmark questionnaires before they come for the course for screening and pre-sensitization purposes. They were required to do action plans (previously project proposals) which they plan to implement after the short course. They were also required to produce an extension/training material on their field of expertise. We also had a session on sharing of experiences and levelling-off aside from the sharing that happened during the lecture/discussion time. We also had constant feedbacking, reflections, technical and social excusions, practicums, and group activities. | The course was in transition and there were no country reports and exams like the previous courses. It was also divided into modules in preparation for the coming year's planned change to shorten such courses. Sharing of experiences happened only during lecture/discussion time or outside of class hours. We also had a lot of case studies, group activities, practicals, technical and social excursions, and role playing. |
| **Resource speakers/ persons** | Many from other UPLB units and nearby institutions (e.g. IPB, BPI, IRRI, etc.). There were also some speakers from the NGO/PO community (MFI and MASIPAG). Facilitators (course coordinator and technical assistants) | From different academic and research institutes in the Netherlands (e.g. IAC, CPRO-DLO, WAU, NAK, NAK-G, LIAC, etc). Some speakers came from France, Syria (ICARDA), Geneva (UPOV), and Ghana (IITA/ |

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| | also served as resource persons. The resource speakers/persons were generally not given monetary renumeration but they received a certificate and a t-shirt designed by course participants (reflecting their learnings). Speakers for technical excursions received publications produced by SSTD or food products from Laguna (eg., buko pie, fresh milk, uraro, etc.). | GTZ). There were also a lot of farmers and people from the private sector. I was not aware whether resource speakers received monetary renumeration for their time/effort but for technical excursions, the course coordinator usually gave out a bottle of wine as token. |
| **Excursions (technical and social)** | Very limited (~8) due to financial and time constraints. Trips were made within UPLB campus, in other parts of Laguna, Cavite and Metro Manila. The course was constrained by the lack of SA farms nor SA seed production farms nearby. | A lot of technical excursions (~31) within the Netherlands. We also social excursions (~9) within and outside of the country (some of which we paid for by ourselves but was arranged by IAC). We checked out of WICC-IAC and stayed for 10 days in a student's apartment in Deventer when we had our propagation of plant material module at the Larenstein International Agricultural College (LIAC). We also stayed in six different hotels during this module when we went around the country and visited a lot of farms, greenhouses, breeding and seed companies. |
| **Learning materials** | One two-inch folder thick of different materials on seed technology, genetic conservation, sustainable agriculture, indigenous knowledge systems, etc. These materials were gathered from different books, journal articles, and reprints which we have in our library. The participants also received publications produced by SSTD. Other learning materials were displayed during the training. | Seven thick folders, four bound materials, a book, brochures, etc. These included photocopies of all the transparencies used by the resource speakers/persons. |
| **Networking** | Within the Philippines - of all participants and with resource persons, facilitators and trainors plus the previous course participants. | With other participants from other countries and with resource persons and coordinators plus participants of the other five to six courses held simultaneously at IAC. |
| **Course assistants** | Three technical, two secretarial and four student assistants, and two support staff. Participants can approach any of | One technical and one secretarial staff plus two IAC staff for other matters. They had a very strict |

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| | the assistants for help and if he/she is not the one assigned to that problem/ task, he/she refers it to the one in-charge. We even provided assistance even on very personal matters (e.g. buying of seeds and references, photocopying of books/learning materials, recopying of photos and videos, repair of shoes, rescheduling of flight home, etc.) | separation of duties and responsibilities that you really have to know who was in-charge of what to be able to get the proper help that you need. Most of the time you have to do things by yourself rather than ask for their help. |
| **Course coordinator(s) /facilitator(s)** | One coordinator throughout the course who sits in all sessions. Every member of the SSTD team helped was responsible in facilitation, together with invited NGO facilitator. | One main coordinator plus one co-coordinator per module. Main coordinator not always present in all sessions. In most cases he only introduced the co-coodinator of the new module then leaves the class. |
| **Feedbacking** | A daily evaluation of the previous day's topic was required of the participants which they have to do by group and present in in class before the start of the day's topics. The PMC also helped in feedbacking participants' needs/ concerns to the organizers. We also had a "freedom wall" where participants can write their comments anytime. We also had a general course evaluation during the last day of the course. This was processed, summarized, and presented to the participants before the closing ceremonies. | Evaluation was done on a per module basis. Individual participants were given evaluation forms and were required to rate each resource speaker or technical/social excursion on a scale of 1 to 5. We were also encouraged to write down our comments. The evaluation sheets were submitted after each module. At the end of the course, we had three general evaluations, one with the course coordinator and another with an IAC staff. The third was just the filling out of an evaluation form for the NUFFIC, the Dutch organization in-charge of giving out of fellowships. In general, only the technical and logistical aspects of the course was evaluated. The relationship between participants was not taken into consideration. The results of the evaluation was not presented to participants. |

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## B. Significant learnings from the IAC seed course

Exposure to the knowledge and experiences of the Netherlands on seed production and technology has broadened my perspective in the subject matter. The long agricultural history of this country has enabled them to have very advanced legal, institutional and technical machineries to protect their interest. They have a very sophisticated and strict plant variety protection and certification system but most of the private breeding companies that we visited are very much active in doing bioprospecting of exotic plant both in developing and developed countries for their horticultural industry. Their government is giving incentives to farmers who are reducing their chemical inputs but private companies are doing seed and flower production in developing countries with the use of large amount of chemical inputs.

Specifically, my significant learnings are:

Y How to use the target-oriented project planning approach
Y I became familiar with the concept, institutional and technical aspects of quality assurance
Y How to make use of a "zero assessment" in gauging the knowledge of participants in a certain subject matter
Y Learned the legal, institutional and technical aspects of plant variety protection under UPOV as it is applied in a developed country like the Netherlands and the EU in general
Y Different aspects of the seed chain (from research to marketing) from the point of view of a developing country (with focus on countries under ICARDA and some other African countries)
Y How to make use of role playing in synthesizing some lessons learned
Y How to perform seed quality tests (sampling, cleaning, purity analysis, moisture content determination, TTZ and germination) strictly following ISTA rules and under ISTA-accredited laboratory conditions
Y How to use the "Matching Plants, Soil and Climate (MPSC)" computer program in predicting crop performance under different environmental conditions
Y How to make use of Microsoft Excel to construct a seed production computer program
Y Application of the crop physiology (source-sink relationship) in looking at pest management
Y Grafting of tomato and cucumber seedlings using wild relative as rootstock and new variety as scion to increase the resistance of the plant to diseases
Y Review of basic seed physiology concepts and clarification of the concept of physiological maturity
Y Application of gender analysis, sustainable development and new trends in extension and communication in seed production and technology
Y How to do RAPD and to distinguish different varieties of potato and grasses using morphological markers (e.g., using the lightsprouts of potatoes, etc.)
Y How to deal with people from different countries who have an entirely different culture from mine

## C. Application to my work

Significant learnings are work-related and personal. Except for plant variety protection and the use of molecular marker (RAPD) in distinguishing varieties, all of the above are applicable to my research, extension and development work. Some concepts like the quality assurance and ISO are not applicable as of now but can be useful in the future.

## D. My contributions to the course

Y Was able to share some of my group's seed experiences and that of the Philippines during the discussions. This was done together with the other Filipina participant from PCARRD.
Y Issues like the empowerment of resource-poor farmers, sustainable agriculture, the disadvantages of bioprospecting and the inappropriateness of a UPOV-patterned PVP for developing countries were brought up during discussions.

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- Suggested the use of benchmark questionnaires for levelling-off and sensitization purposes for the next course applicants
- Suggested the addition of a module or session on HRD to smooth out the relationship between participants which is very important since we came from different countries, sometimes with totally different or opposing cultures, and we have to work together for 3.5 months
- Assisted an IAC personnel who taught some participants on how to use the computer and e-mail during the first week of the course
- Acted as "informal" moderator of the participants' meeting where we had to decide who among us will deliver a speech during the closing ceremonies in behalf of the class
- Made other participants (e.g. Filipina, Swiss, etc.) aware of the negative side of biotechnology