

Training Agriculture Graduate Students in Farming System Research and Development for Better Understanding and Improved Sustainable Agriculture

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ABSTRACT

Agriculture is the activity which is the most essential to human survival and well being. With the increase of world's population as well as in Asia and the Pacific , agriculture is not fulfilling all its vital function of feeding people. With accerelating of demand due to population growth, technological change lack of alternative opportunities in rural areas ,and accerelating agricultural output cause degradation and deterioration of environment including deforestation, land degradation, misuse of pesticides, chemicals and the loss of genetic resources.

It is, therefore, sustainability in agriculture has to be considered. Sustainable agriculture involve the management and conservation of the resource base and the orientation of technological and institutional changes in such a manner as to insure the attainment and continue satisfaction of human needs for present and future generation.

As the importance of small farmers who are facing constraints to their production, technologies and how they can utilize their land in a sustainable way, graduate students in Agriculture Production Program at Kasetsart University in Thailand are taught by their instructors to realize the limited land holding and capital of small holders and their raising population. They are also taught that many technologies generated by researchers has not been accepted to farmer simply because farmers feel that they are not practical. The technique of Farming System Research and Development has been introduced to graduate students who will be potentially developing technologies with the purpose of bringing an understanding of farmer's situations. Hopefully, when technologies which are being developed by those graduate students can be further adopted

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and utilized by farmers to increase their production.

When graduate students conducted their theses or dissertations as the partial fulfillment to their degree, they were asked to conduct experiments related to improve agricultural technology suitable for small holders in the sustainable system as well.

Key words: Farming System Research and Development, sustainable agriculture, training

INTRODUCTION

In many parts of the world , agriculture is not fulfilling the vital function of feeding people, providing other basic agricultural commodities and generating stable income. It has been speculated that by the year 2025 the world will have to feed an additional 3.2 billion people from a natural resource base which is already seriously threatened the unsustainable farming practice and environmental pressures arising from other human activities. It is, therefore, agriculture have to meet these challenges, mainly by increasing the production on land already in use and by avoiding further encroachment on land that is only marginally suitable.

Sustainable agriculture

As agriculture is frequently the centre of discussions related to sustainability due to the well known environmental problems resulting from farm activities, the development of sustainable agricultural production is guided by two major concerns : the need to increase production due to population pressure and that of avoiding several irreversible adverse ecological effects. Experience over the last general decades has resulted in the recognition that sustainable agricultural production not only involves the identification and application of improved

technologies but also the consideration of ecological and socio-economic concerns. Sustainable agriculture may be defined as (FAO, 1991 a.)

The management and conservation of the resource base and the orientation of technological and institutional changes in such a manner as to ensure the attainment and continue satisfaction of human needs for present and future generation. Such sustainable development is environmentally non-degrading, technically appropriate, economically viable, and socially acceptable.

The development of sustainable agriculture is of paramount importance, not only because of the requirements for food, fibre and materials but also because of the wide spread economic importance of farming especially in the developing countries and the environmental damage that results from current production practices. Developing sustainable agriculture has little value with the present day population pressure if it resulted in low productivity with marginal economic returns. Low input/low output production is probably the most environmentally friendly system and has been practiced since time immemorial but most countries have abandoned these practices during the process of development due to its low productivity and inability to meet the food requirement of an ever increasing population.

Training graduate students for understanding of sustainable agriculture

A. Curriculum structure of graduate agriculture student at Kasetsart University

Over 35 years already that Kasetsart University of Thailand, the eldest agriculture university of the country has offered the M.S.degree in agriculture since 1968 and the Ph.D program in 1977 , for over 24 years. From the past up to the present, the number of graduate students at the Master degree level is 6,853 persons and 370 persons for the Ph.D

programs. At present, the number of agriculture graduate students for M.S. is 684 and for Ph.D 116 persons.

There are generally two curriculums for graduate students in agriculture. The course work curriculum and the non-course work curriculum (Tropical Agricultural curriculum). The main difference between the non-course work curriculum for M.S. and Ph.D students in agriculture is shown in Table 1 and 2

Table 1 Requirement of the course work and non-course work curriculums for agricultural graduate student at Kasetsart University, A : M.S. level.

Criteria	Type of curriculum	
	Course work	Non-course work
Total credit	≥45	≥36
Thesis	9	36
Major subject	≥24	-
Minor subject	≥9	-
Seminar	2	2
Language use	Thai	English

Table 2 Requirement of the course work and non-course work curriculum for agricultural graduate student at Kasetsart University, B : Ph.D level.

Criteria	Type of curriculum	
	Course work	Non-course work
Total credit	≥40	≥48
Ph.D. dissertation	16	48
Major subject	≥12	-
Minor subject	≥9	-
Seminar	3	4
Language use	Thai	English

B. Training for the need and understanding of sustainable agriculture to graduate students.

There are three ways for graduate students in agriculture to receive the learning experience for their profession in relation to an understanding of the principles and practices in sustainable agriculture. They are as follows :

- Course offer at the curriculum
- Practical exercise in agro-ecological analysis as part of the Farming System Research and Development Training.
- M.S. Thesis or Ph.D. dissertation

1. Courses

Two graduate courses relating to bio-diversity and sustainability which offered for graduate students are

a) Cropping system (Agron.461)

The course description of “Cropping System” is :

“The importance and the development of cropping system. Different type of cropping system Conceptual framework of cropping system which compose of farm resources and production technology. On- farm research and Farming System Research and Development.”

b) Sustainable agriculture

The course description of sustainable agriculture is

“Conceptual framework of sustainable agriculture and its implications. The management and conservation of the resource base and the orientation of technological and institutional changes in such a manner as to ensure the attainment and continue satisfaction of human needs to the present and future

generations.”

2. Graduate thesis

Masterate thesis and Ph.D dissertation which enhanced the understanding and practical utilization of sustainable agriculture concept should be conducted along the line with technology which may bring about the sustainability of the system.

FAO had reviewed some of the improved agricultural technologies suitable for small holders in the sustainable system as followed (FAO,1991 b.)

a) the exploitation of biological fixation technique through increasing use of leguminous plants or non-symbiotic ferns (Azolla) and nitrogen fixing blue-green algae (Anabaena),

b) improved grazing management technique including fodder crops and temporary pastures in crop rotation,

c) increasing use of rhizobium inoculation to legume as pre or post rice crop,

d) simulate the mixed cropping or use of varietal mixtures to mimic and structure the diversity of natural ecosystems increased productivity based upon the combined yield of crops is also important,

e) developing alternative energy source for use by small farmers and other poor dweller.

3. Practical exercise at farm level in the area of farming system research and developments

Graduate students in agriculture should realized that technology once generated, the main objectives for the development is to introduce to farmers for adoptions. At present, huge amounts of technologies generated by researcher has not been accepted to

farmer simply because farmers feel that they are not practical. Recently, technique of Farming System Research and Development has been introduced with the purpose of bringing an understanding of farmer's situations to researcher before technologies be developed so that they can be further accepted and utilized by farmers to increase their production.

Using the technique of Farming System Research and Development (FSR&D) graduate students are exposed to the technique of FSR&D as presented in Figure I. They are involved in the so called agro-ecological analysis and problem identification of existing farming practices in the target area. To do these, they need to interview farmers using the technique of Rapid Rural Appraisal (RRA) until all farming problems were prioritized. Furthermore, graduate students were also involved in the planning and conducting on-farm research in order to verify technology for increasing yield and income of farmers.

CONCLUSION

To ensure the understanding of sustainable agriculture, graduate students in agriculture at Kasetsart University has been trained along with all the activities related to an understanding of sustainable agriculture the following criteria :

In evolving more sustainable production system, agriculture and rural development efforts should be directed towards three essential goals, they are food security, employment and income generation in rural area in order to eradicate poverty, and to promote natural resource conservation and environmental protection.

It has been recognized that the root causes of environmental degradation are social and institutional in nature. Measures to address the problem will require integrated strategies which involve the adjustment of policies, values and institutional structure. The major thrust of the strategy for creating

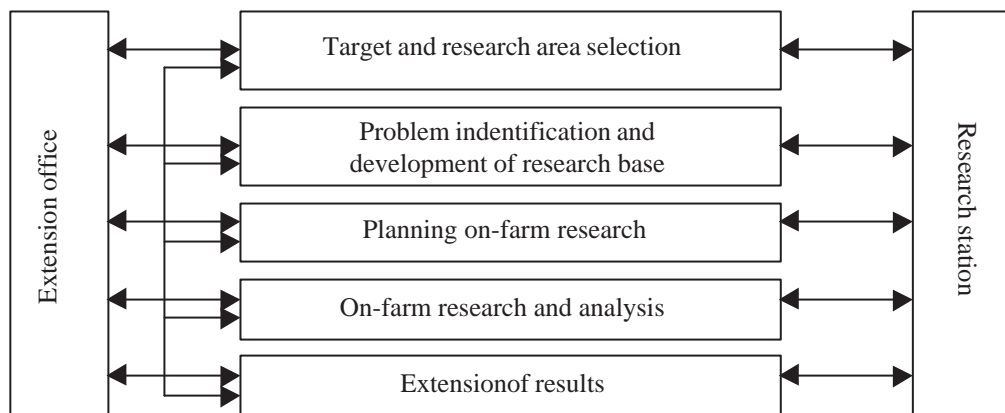


Figure 1 Five basic activities of on-farm research in Farming System Research and Development (Shaner, Philipp and Schmehl, 1981).

the condition for sustainability for the poor must aim at eradication of poverty.

In order to attempt for poverty eradication, rural people must take an active rather than passive role and production systems should serve the need of small scale farmers. This will require the knowledge and use of traditional indigenous technology as well as scientific research, especially, on the biological process that governs agricultural production. It will entail the development, an adoption of a diversity of farming system, which make the most efficient use possible of external inputs which having a minimal negative impact on the environment.

LITERATURE CITED

- FAO. 1991 a. *Sustainable agriculture and rural development in Asia and the Pacific*. Regional document no.2. FAO/NETHERLANDS conference on Agriculture and the environment S' Herterogenbosch, The Netherland, 15-19 April.
- FAO. 1991 b. *Sustainable crop production and protection*, background document no.2 FAO/NETHELANDS conference on Agriculture and environment : S' Heterogenbosch, The Netherland, 15-19 April.
- Pookpakdi, A.1992. *Sustainable agriculture for small scale farmers : A farming system perspective In Sustainable Agriculture for the Asia and the Pacific Regions*. FFTC book series no.44. Food and Fertilizer Technology Center, Taiwan.
- Shaner, W.W., P.F. Philipp, and W.R. Schmehl 1981. *Farming System Research and Development : Guidelines for Developing Countries*. Westview Press, Boulder, Colorado. 414 p.
- FAO. 1991 a. *Sustainable agriculture and rural development in Asia and the Pacific*. Regional